



# Passive Investing in a Warming World

An Evaluation of Fossil Fuel Impacts on Equity Portfolios

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# Contents

- Key Findings.....4
- Executive Summary.....5
- Fossil Fuels’ Drag on Equity Markets .....7
  - Parent Indices Lag Ex-Fossil Variants .....7
  - Fossil Fuels’ Underperformance Is Costing Passive Investors Across the Market ..... 12
  - Performance Is Sound Even Net of Fees; Indices Are Passing Fiduciary Tests ..... 14
  - The Market for Low-Carbon Indices Has Matured in Response to Market Demand ..... 16
  - Divested Indices Have Lower Portfolio Carbon Footprint and Climate Risk Exposure..... 18
- The Energy Crisis in Context ..... 21
- The Long-Term Outlook for Fossil Fuels ..... 23
- Conclusion: Responding to Financial Risk..... 27
- Appendix ..... 29
- About IEEFA..... 32
- About the Authors..... 32
- Acknowledgements ..... 32

## Figures

Figure 1: Index Performance Over 10 Years.....	8
Figure 2: Rolling Five-Year Performance of Ex-Fossil Indices vs Parent Indices .....	10
Figure 3: Energy Sector Weighting Over Time .....	11
Figure 4: Selected Milestones in Index Inception .....	16
Figure 5: ExxonMobil Returns Factor Analysis .....	22
Figure 6: Fossil Fuel Use by Sector, United States, 2022 .....	23

## Tables

Table 1: Performance of \$10,000 Over 10 Years.....	9
Table 2: Five- and 10-Year Risk and Return of Key Indices .....	9
Table 3: Average Difference in Total Annualized Returns—Ex- or Low-Fossil vs. Parent Index, Broader Market Sample .....	12
Table 4: Carbon Footprint Metrics, S&P 500.....	18

## Key Findings

**The energy transition is beginning to leave an imprint on equity markets. Fossil fuels, once a primary driver of index returns and economic growth, are becoming an increasingly risky and speculative part of passive equity portfolios.**

**Over the last decade, shedding oil, gas, and coal has proven a winning financial strategy — even taking the recent energy crisis into account. As the sector's historic value thesis erodes, a few high-profit quarters have been unable to reverse a decade of underperformance.**

**The passive investment landscape is starting to reflect this shift. In recent years, equity indices with reduced fossil fuel exposure have proliferated, passed major funds' prudence tests, and been adopted without significant transaction costs.**

**This is a part of investors' increasing recognition of the competitive pressures and compounding climate risks undermining the traditional energy sector's long-term outlook.**

**As markets move in the direction of a lower-carbon future, the maturation of ex-fossil passive strategies gives investors a key tool for responding to the risks and rewards of a warming world.**



## Executive Summary

For decades, fossil fuel companies were the epitome of a blue-chip holding: Reliable returns, steady growth and sound underlying fundamentals. Eager for low-risk ways of meeting investment return targets, institutional investors piled in. As the industry powered global economic growth and took hold as a major driver of world equity markets, billions upon billions of dollars in pensions, endowments, and other funds were staked upon its success.

Yet as the 21st century has progressed, this traditional investment thesis has faltered. Disruption and destabilization in fossil fuel commodity markets, competition from renewable energy, the electrification of transport, and growing investor consciousness of climate change's financial risks have driven some investors to re-evaluate the energy sector's role in the portfolio.

This report evaluates the effect that these shifts have had on broad-market equity indices. It takes as a starting point a decade-long pattern of underperformance by the energy sector, compared to flagship equity indices like the Standard & Poor's 500 (S&P 500). The market trajectories are stark. In eight of the 10 years between 2012 and 2021, the energy sector trailed the performance of the S&P 500, and in five of those years, it placed dead last.<sup>1</sup> Once a driver of investment returns, the industry found itself shrinking. At its peak, traditional energy made up almost 30% of the S&P 500 by market capitalization in 1980. By the late 2010s, the figure had declined to low single digits—a stark decline in the fossil fuel sector's value relative to the other sectors of the stock market.<sup>2</sup>

This decline in the market prominence of fossil fuels occurred alongside notable shifts in equity investing. Passively managed investment funds that track market indexes began seeing significant fund inflows after the Great Recession.<sup>3</sup> And major index providers began launching new equity market indices that excluded or underweighted fossil fuel companies (referred to in this report as “ex-fossil” or “low-fossil” indices).<sup>4</sup> These indices soon came to be tracked by index funds and gained the attention of investors.<sup>5</sup> As market demand increased, just a few signature indices became the basis for a number of various options, strategies, and weighting approaches.<sup>6</sup>

After almost a decade of underperformance, the fossil fuel sector rebounded strongly in 2021 and 2022. Among the key drivers were the world's emergence from the COVID-19 pandemic, which

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<sup>1</sup> Novel Investor. [Annual S&P Sector Returns](#). Last accessed January 17, 2024.

<sup>2</sup> Sibilis Research. [S&P 500 Historical Sector Weightings](#). Proprietary.

<sup>3</sup> Financial Times. [Passive attack: the story of a Wall Street revolution](#). Dec. 19, 2018.

<sup>4</sup> In 2014, FTSE Russell and MSCI separately launched some of the first ex-fossil indices for institutional investors. See: NRDC. NRDC, BlackRock and FTSE Jumpstart Mainstream Climate-Conscious Investing. April 29, 2024. See also: MSCI. [MSCI Launches Global Fossil Fuels Exclusion Indexes](#). October 16, 2014. S&P followed in 2015. S&P. [Data, S&P 500 Fossil Fuel Free Index](#). Accessed December 2023.

<sup>5</sup> E.g. [ETF Strategy. SSGA introduces first fossil fuel free S&P 500 ETF](#). December 2, 2015.

<sup>6</sup> NB: Direct underweighting of fossil fuels is not the only sort of climate-conscious passive strategy. This report focuses on such indices, however, because they provide a useful proxy for examining broader market shifts that are relevant even in other contexts. Additionally, fossil fuel divestment is one of the more mature climate approaches to date, with over [\\$40 trillion](#) in managed assets committed to some form of the strategy — and often forms part of the foundation, either explicitly or in practice, of other climate-informed investment approaches (see “Investing Beyond Fossil Fuels” below).



strained international supply chains to the breaking point, and the Russian invasion of Ukraine, which forced profound reconfigurations of global energy flows. Oil prices surged, the fossil fuel industry posted record profits, and commentators declared that the sector's golden age had returned.<sup>7</sup> In subsequent quarters, the bump faded.<sup>8</sup> Despite leading equity markets in 2021 and 2022, the fossil fuel sector posted a -4.8% return in 2023.<sup>9</sup> The sector's stock prices and market weighting rose from record lows in 2020 to a modest 5.2% of the S&P 500 in December 2022 before reversing in 2023 with fossil fuels declining to 3.9% at year-end.<sup>10</sup>

Where do these overlapping trends leave the fossil fuel sector's place in equity portfolios? This report finds that recent disruptions to energy markets have failed to overcome the longer-term market decline of fossil fuels. We compare the risk and returns of some of the most systemically important indices for institutional investors, including the S&P 500, Russell 3000 and MSCI All Country World Index (ACWI) with their ex-fossil variants. We then expand our analysis across more than 60 additional indices and find that the same story remains true. The returns posted by fossil fuel companies amidst a pandemic and war have simply not been enough to rescue the industry from its pattern of longer-term underperformance. The sector has slipped in relation to its historical standing, and markets have taken notice.

We conclude that there is a market evolution at play.

- Across index families, geographies, and target markets, excluding fossil fuels has led to modestly superior returns over the past 10 years, in both absolute and risk-adjusted terms.
- The market for lower-carbon passive investing has matured significantly. Indices that reduce fossil fuel exposure are proving investable and passing fiduciary tests; transaction costs to implement new indices are proving affordable; and investment products benchmarked to them are proliferating.
- There is good reason to believe that this is a durable market trend. Fossil fuel companies once generated shareholder value based on sound underlying fundamentals.<sup>11</sup> More recently, their profitability has become dependent on volatile forces outside their control. The traditional value thesis underlying the industry—that the fossil fuel industry and economic growth are inextricably linked—is eroding. Facing increased competition between fossil fuel producers and from cheaper alternative technologies, the industry is ill-prepared to manage shareholder value in the coming years.

<sup>7</sup> New York Times. [Exxon and Chevron Report Record Profits on High Oil and Gas Prices](#). July 29, 2022. For a sample of commentator responses, see e.g.: Wall Street Journal. [Why We're Bullish on Energy Stocks](#). October 24, 2022. New York Times. [Fossil-Fuel Shares Lead the Stock Market. How Awkward](#). June 3, 2022. Wall Street Journal. [Energy Stocks are This Year's Hottest Trade](#). March 22, 2022.

<sup>8</sup> For further discussion, see: IEEFA. [Energy sector ends 2023 with a weak comeback and a negative outlook](#). January 14, 2024.

<sup>9</sup> Yardeni Research. S&P 500 Sectors and Industries. December 30, 2023. Note: this source is updated daily. A chart showing results as of 12/29/23 is available upon request.

<sup>10</sup> S&P Dow Jones Indices. S&P 500 Index fact sheets.

<sup>11</sup> This more recent erosion of financials is a shift from previous decades, where the industry played important roles in the era's scientific and technological advances, and enjoyed a value thesis intimately related to economic growth more broadly. Useful context on the sector's financial history and role in making modern markets can be found in Steve Coll, *Private Empire: ExxonMobil and American Power* and Daniel Yergin, *The Quest and The Prize*.

These results bear special significance for passive investing. Passive investment strategies rely on broad-market exposure. As a result, conventional wisdom holds that any restriction on diversification inevitably limits possible returns.<sup>12</sup> In the specific case of fossil fuels, real-world market results show that the inverse has been true. During the past decade, excluding the fossil fuel sector resulted in limited risk exposure and improved performance. These results, combined with the sector's negative long-term outlook, should raise real concerns for institutional investors with allocations to passive equity strategies.<sup>13</sup>

With an increased availability of ex- or low-fossil variants of flagship indices, an emerging pattern of long-term outperformance of those variants, and a negative long-term outlook for the fossil fuel sector, the stage is set for increased deployment of low-fossil passive equity strategies.

## Fossil Fuels' Drag on Equity Markets

### Parent Indices Lag Ex-Fossil Variants

Three of the most common indices used to benchmark U.S. institutional investment fund portfolios are the MSCI All Country World Index (ACWI), the S&P 500, and the Russell 3000. We find that each of these marquee offerings underperformed their variants without fossil fuels over the last decade. The graphs below represent the total returns of each ex-fossil variant (black line) and the parent index (blue line), with the index's energy sector (yellow line) added for comparison, starting a decade ago.<sup>14</sup>

<sup>12</sup> See e.g. Daniel Fischel. [Fossil Fuel Divestment and Public Pension Funds](#). June 2017, page 3 ("By restricting the securities that can be included in a portfolio, it is widely recognized that an investor loses the benefits of diversification, suffering lower investment returns for a given level of portfolio risk.") See also: Shaun Davies. [A Review: The Financial Impact for Socially Responsible Investors, 2023](#) ("It is a mathematical fact that the solution to an unconstrained optimization yields a higher expected payoff as compared to the constrained optimization (at least weakly), thus excluding investable asset classes yields inferior portfolios.") See also: Bradford Cornell. [The Divestment Penalty](#). September 4, 2015. ("Basic financial economics principles indicate that excluding classes of securities from an investment portfolio – particularly major classes like energy sector securities – will always reduce diversification and hence, generate at least some expected shortfall (on a risk-adjusted basis) relative to a portfolio without these exclusions (in addition to the transaction and compliance costs of divestment).")

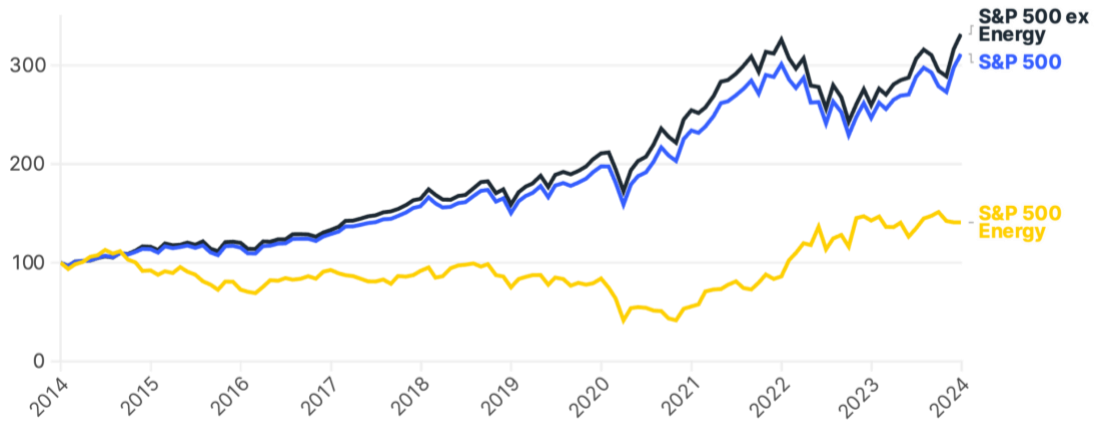
<sup>13</sup> Financial Times. [Passive US funds poised to overtake active, ISS says](#). Jan. 24, 2023.

<sup>14</sup> For these indices, "energy" is a reflection of the fossil fuel sector. (One looking to compare the performance of clean energy would want to use a different index.) MSCI and S&P use the GICS industry classifications, which defines energy purely as the traditional coal/oil/gas/other fuel value chain. Russell's industry classification system defines the energy industry slightly more broadly than MSCI and S&P, but the differences are small and we believe the Russell 3000 and its energy sector and ex-energy variants offer a reasonable comparison for the purposes of this report.

**Figure 1: Index Performance Over 10 Years**

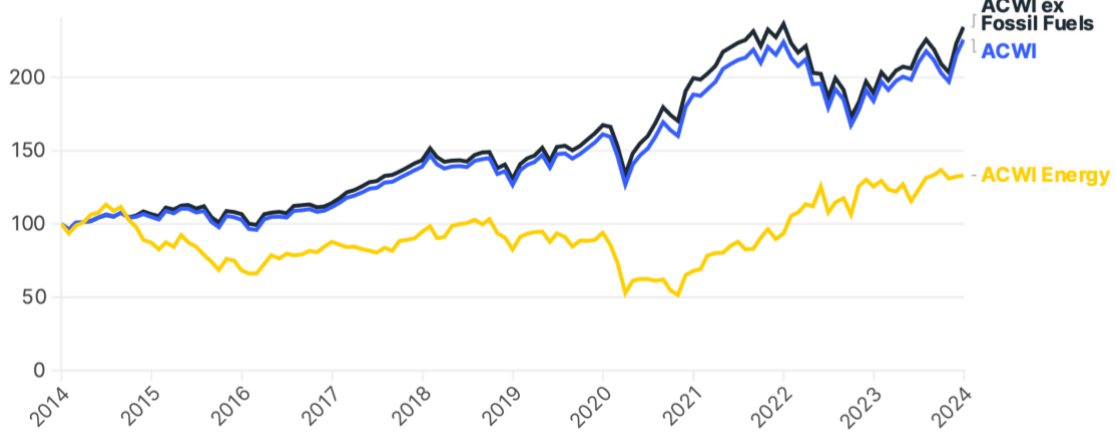
**S&P 500 Series**

Returns



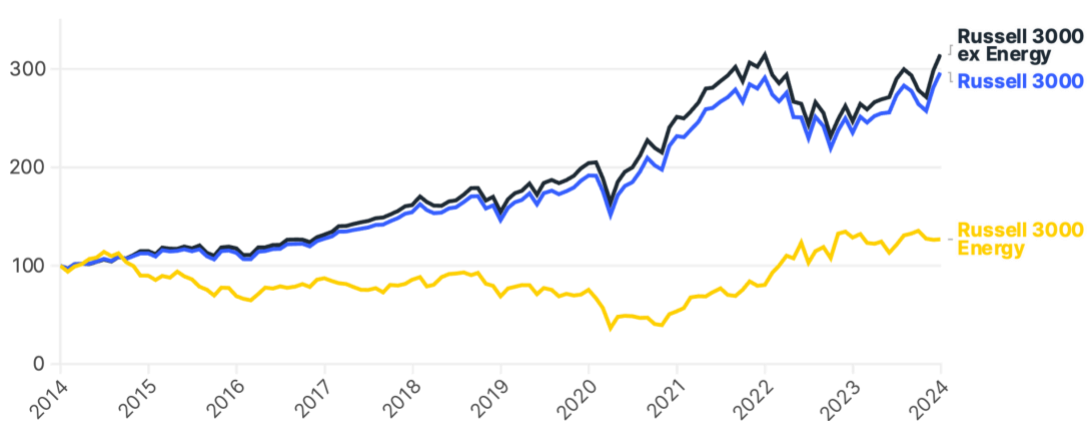
**MSCI ACWI Series**

Returns



**Russell 3000 Series**

Returns



Source: S&P, MSCI, FTSE Russell, Refinitiv.<sup>15</sup>



The ex-fossil variants demonstrate superior performance to their parent index in all three cases. A hypothetical investment of \$10,000 into each of the indices in the above charts would have produced the following returns over the past decade:

**Table 1: Performance of \$10,000 Over 10 Years<sup>16</sup>**

	S&P 500	MSCI ACWI	Russell 3000
<b>Without Fossil Fuels</b>	\$33,174	\$23,430	\$31,488
<b>Standard Index</b>	\$31,149	\$22,570	\$29,641
<b>Energy Sector Alone</b>	\$14,085	\$13,308	\$12,681

Source: IEEFA calculations based on MSCI, S&P 500, and FTSE Russell returns data<sup>17</sup>

Investors have the twin obligations of maximizing return while minimizing risk. Indices are often judged on a risk-adjusted basis, expressed here as annualized returns over annualized standard deviation. In both absolute and risk-adjusted terms, these fossil-free indices have outperformed the parent indices over the last 10 and five years.

**Table 2: Five- and 10-Year Risk and Return of Key Indices**

	S&P 500 ex Energy	S&P 500	MSCI ACWI ex Fossil Fuels	MSCI ACWI	Russell 3000 ex Energy	Russell 3000
10-Year Annualized Returns	12.74%	12.03%	8.89%	8.48%	12.15%	11.48%
10-Year Return/Risk Ratio	0.84	0.79	0.60	0.57	0.79	0.74
5-Year Annualized Returns	15.84%	15.69%	12.40%	12.27%	15.28%	15.16%
5-Year Return/Risk Ratio	0.86	0.85	0.69	0.68	0.79	0.78

Source: MSCI, S&P, FTSE Russell, IEEFA analysis.<sup>18</sup>

The overperformance of ex-fossil indices has been a sustained rather than transitory phenomenon. The color of each tick in the following chart represents the difference in five-year annualized return (in percentage points per annum) between the listed parent index and the ex-energy or ex-fossil fuels variant described in Table 1, as measured to the given month.<sup>19</sup> Green ticks represent outperformance by the ex-fossil variant index on a five-year basis, and red ticks represent

<sup>15</sup> All data reflect gross total return. S&P 500, S&P 500 ex Energy, S&P Energy, MSCI ACWI and MSCI ACWI ex Fossil are sourced from providers. Proprietary Russell 3000 and Russell 3000 ex Energy data is licensed from FTSE Russell. Sectoral ACWI and Russell data is from Refinitiv.

<sup>16</sup> Data in this table reflects index performance, not actual fund results, and is therefore calculated without consideration of sales charges, taxes, or fees.

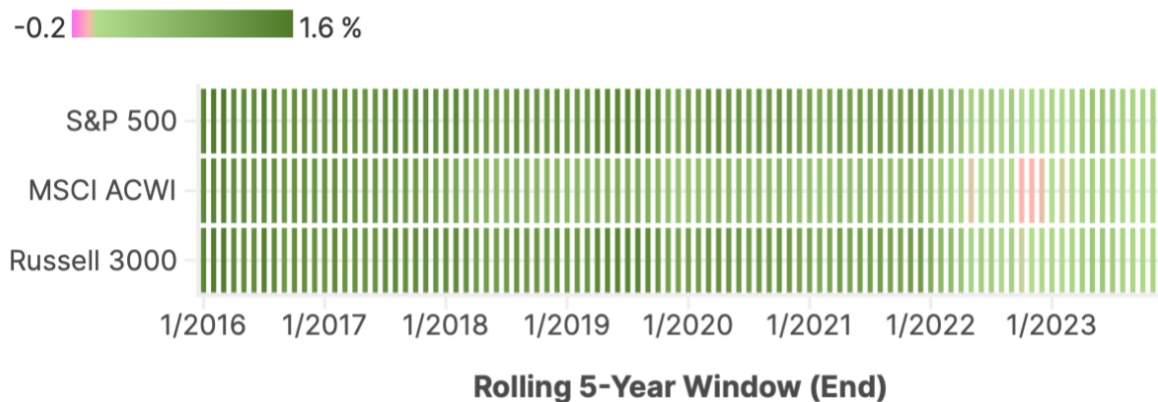
<sup>17</sup> See sources in footnote 15.

<sup>18</sup> S&P 500 (standard and ex-energy) and MSCI (standard and ex-energy) numbers are calculated from providers' gross total returns time series (see footnote 15 for sources). Energy sector performance is via Refinitiv. See appendix for more granular data and methodology notes.

<sup>19</sup> For example, the ticks at 1/2020 reflect the annualized returns of the ex-fossil variants index minus those of the parent indices calculated for the sixty months prior to and including January 2020.

underperformance. The energy sector's returns in 2021 and 2022, represented by redder-shaded ticks, barely register; the predominant pattern is one of outperformance by ex-fossil indices.

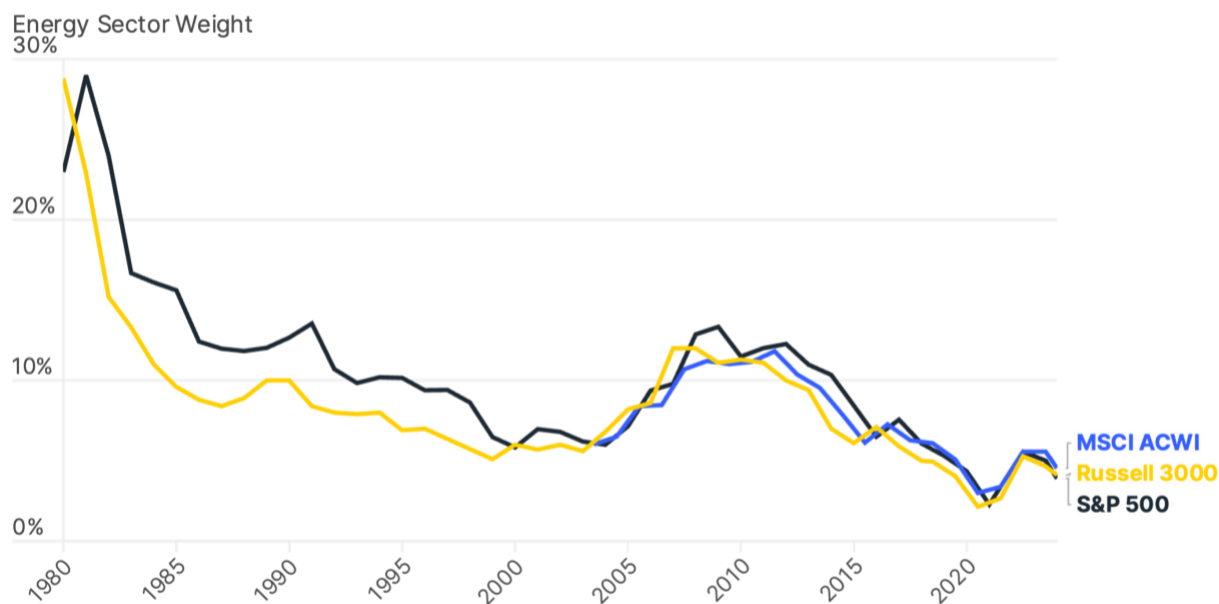
**Figure 2: Rolling Five-Year Performance of Ex-Fossil Indices vs Parent Indices**



Source: Refinitiv, MSCI, FTSE Russell, IEEFA calculations.

This can be understood in the context of a broader structural shift. The following graph illustrates the energy sector's weighting, or percent of the index's total market capitalization contributed by the sector. In the early 1980s, traditional energy peaked at an almost 30% weight in the Russell 3000 and S&P 500 (the ACWI was created more recently). Today, the number is in the single digits—3.9% of the S&P 500 as of Dec. 31, 2023.<sup>20</sup> Once a key driver of index returns, fossil fuels have become an increasingly marginal player in major indices—a reflection of a market judgment about the importance and growth potential of fossil fuel companies compared to other parts of the economy.

<sup>20</sup> S&P Dow Jones Indices. [S&P 500 Factsheet](#). December 29, 2023.

**Figure 3: Energy Sector Weighting Over Time**

Source: FTSE Russell, Sibilis Research (proprietary), Bloomberg Terminal.<sup>21</sup>

Opponents of fossil fuel divestment often argue that reducing energy exposure impairs returns by constraining the fund's opportunity set, causing unacceptable deviation from the fund's benchmark indices.<sup>22</sup> The data does not support such claims. The ex-fossil fuel variants of the S&P 500, MSCI ACWI, and Russell 3000 all follow the general performance of their base index, while delivering modest outperformance over the past decade. The energy sector's quarterly record, meanwhile, has failed to prevent it from dragging down broad-based equity indices on a 10-year basis. Shedding the sector becomes a defensive option to protect a fund's value under a long-term scenario.<sup>23</sup>

As seen in the following section and the appendix, the initial impact of the Ukraine invasion and its aftermath caused a significant increase in the price of oil and sector revenues. This has improved the sector's short-term performance (e.g., on a three-year basis), but has not changed the longer-term picture.

<sup>21</sup> Russell weighting is an approximate composite of data from FTSE (1980-2018) and Bloomberg Terminal (2018-Present). ACWI is from Bloomberg. S&P is from Sibilis Research.

<sup>22</sup> See e.g. CalSTRS. [The Teachers' Retirement Board opposes legislative proposal on fossil fuel divestment](#). March 7, 2022. See also Compass Lexecon. [Fossil Fuel Divestment and Public Pension Funds](#). June 2017. It should be noted that this latter paper was funded by the Independent Petroleum Association of America.

<sup>23</sup> Notably, public pension and other institutional funds necessarily see themselves as long-term investors. See: OECD. [Long-term investing of large pension funds and public pension reserve funds](#). 2022.

## Fossil Fuels' Underperformance Is Costing Passive Investors Across the Market

To test the applicability of these findings, IEEFA examined the investment policy documents of major U.S. pension funds to identify a broader set of commonly used benchmarks. We then paired these (plus some additional benchmark-quality offerings from major providers for context) with their corresponding reduced- or ex-fossil counterparts.<sup>24</sup> This wider sample—more than 60 indices total, representing a wide range of market capitalizations, geographies, and investment strategies—displays the same trend: Over the longer term, standard indices underperform their lower-carbon variants.

**Table 3: Average Difference in Total Annualized Returns—Ex- or Low-Fossil vs. Parent Index, Broader Market Sample**

Index Category	Average Difference			
	10-Year Annualized Returns	10-Year Return/Risk Ratio	5-Year Annualized Returns	5-Year Return/Risk Ratio
World	0.41%	0.02	0.39%	0.02
Developed Markets	0.28%	0.01	0.05%	0.00
Emerging Markets	0.31%	0.01	-0.06%	0.00
North America	0.51%	0.03	0.10%	0.01
Europe	0.69%	0.05	0.67%	0.04
Asia Pacific	0.64%	0.02	0.70%	0.02
<b>All Sampled Indices</b>	<b>0.48%</b>	<b>0.03</b>	<b>0.29%</b>	<b>0.02</b>

Source: IEEFA analysis of provider fact sheets and returns information. Data current as of December 2023. See appendix for underlying data.

The full list of sample constituents can be seen in the appendix. On a 10-year basis, essentially all constituents with reduced fossil fuel exposure have seen performance that is modestly better than their benchmark. The majority outperformed or performed on par with benchmarks on a five-year basis. Across these timescales and indices, there is no evidence that reducing fossil exposure has led to meaningfully lower returns. Crucially, this story remains true when one adjusts for risk. The return/risk ratio (annualized standard deviation divided by annualized return) suggests that the trend of comparable or over-performance has remained true even when taking market volatility into account.

<sup>24</sup> Where possible, indices were compared to variants that entirely excluded either energy sector constituents or fossil fuel reserve owners. When these were not available, we selected variants that significantly underweighted fossil fuels compared to the parent index. Further methodology notes are available in the appendix of this report.

### Not All Lower-Carbon Indices Are Created Equal

When constructing a lower-carbon index, providers have several decisions to make. Will it be based on categorical exclusion or tilt, or will it instead evaluate index eligibility on a company-by-company basis? If the former, does the restriction list entail just fossil fuel reserve holders, or broader parts of the fossil fuel value chain (for example, oilfield services, midstream companies, or retail vendors, etc.), or other high-emitting targets beyond just energy? And once a sectoral scope is determined, how is the universe of restricted companies defined (ready-made options include constituents of the Global Industry Classification Standard, or GICS, Energy Sector, the Carbon Underground 200, or Uргewald’s Global Oil and Gas or Coal Exit Lists)? If index membership is determined based on company-level metrics, which metrics are utilized? What is the investment rationale of relying on those metrics, how are they derived, and how is the data maintained? Before investors make any commitments, they should carefully examine an index’s construction methodology, investment characteristics, risk profile, and other documentation to ensure that it meets their investment needs.

It is possible to take stock over a longer period; other research has found that fossil-free portfolios could have been constructed with comparable performance to benchmarks across multi-decade timeframes.<sup>25</sup> It is also possible to evaluate index performance over shorter periods. As can be seen in the appendix, most low- or ex-fossil fuel indices that were sampled modestly underperform their parent indices over three-year periods, but the majority returned to comparable performance or slight overperformance on a one-year basis. As this report discusses in the following section, this discontinuity can be understood in the context of short-term factors, such as the invasion of Ukraine and other sources of short-term volatility that say very little about the industry’s long-term outlook.<sup>26</sup>

<sup>25</sup> For a 50-year analysis, see e.g. London School of Economics, Grantham Research Institute on Climate Change and the Environment. [The Mythical Peril of Divesting from Fossil Fuels](#). June 13, 2018.

<sup>26</sup> IEEFA. [Taking stock of the oil and gas sector as the transition to sustainable finance proceeds apace](#). August 1, 2023.

## Performance Is Sound Even Net of Fees; Indices Are Passing Fiduciary Tests

Another question that often comes up in discussion of passive portfolio climate preparedness involves fees. Reducing climate risk exposure may lead to slight overperformance on paper, but can it survive fiduciary review when fees are considered?

For most individual and smaller-scale investors, index fund investing is accomplished using exchange-traded funds (ETFs) and other investment vehicles that are designed to track the performance of a given index. Crucially, these ETFs perform comparably to funds tracking the parent index *even when management fees are taken into account*.<sup>27</sup> Although expense ratios for traditional ETFs tend to be slightly lower than those of lower-carbon ETFs, the spread in benchmark performance has tended to essentially negate this advantage.

The SPDR S&P 500 Fossil Fuel Reserves Free ETF and the ProShares S&P 500 ex-Energy have performed on par with the iShares Core S&P 500 ETF over the past five years, including fees.<sup>28</sup> The same is true of the SPDR MSCI Emerging Markets Fossil Fuel Reserves Free ETF compared with the iShares MSCI Emerging Markets ETF,<sup>29</sup> and the iShares MSCI ACWI Low Carbon Target ETF vs. the iShares MSCI ACWI ETF.<sup>30</sup>

In a review of the fund's coal divestment policies commissioned by the California Public Employees Retirement System, investment consulting firm Wilshire concluded that the transaction costs associated with shedding coal could be "considered negligible."<sup>31</sup>

A review of fossil fuel divestment performed by BlackRock for three of New York City's pension plans found that divestment would have "relatively minimal" impact on transaction costs. Meketa Investment Group independently concurred, noting that "in our opinion, transaction costs would not likely be an overriding determinant in [a] divestment decision."<sup>32</sup>

In a 2019 report on decarbonization pathways for the New York state comptroller, one external expert advisor noted that "[i]ndex funds that are low carbon or even fossil free cannot only be readily

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<sup>27</sup> More information on Morningstar's methodology in accounting for fees, as used in the AYS Fund Comparison tool cited in subsequent footnotes, can be found in the "tooltip" or mouse-over text on the page of an individual fund profile (e.g., [iShares Core S&P 500 ETF](#); mouse-over at "Month-end trailing returns" in the Financial Performance section). Of note: the data take into account "management, administrative, 12b-1 fees and other costs taken out of fund assets," but not sales charges, which may vary.

<sup>28</sup> As You Sow. [Compare Funds: SPYX, SPXE, IVV](#). Accessed December 2023. AYS data is sourced from Morningstar, and is calculated net of investment expenses. Calculation methodology confirmed in correspondence with AYS; see note in the Appendix.

<sup>29</sup> As You Sow. [Compare Funds: EEMX, EEM](#). Accessed December 2023.

<sup>30</sup> As You Sow. [Compare Funds: CRBN, ACWI](#). Accessed December 2023.

<sup>31</sup> CalPERS. [Five Year Divestment Review](#). March 15, 2021.

<sup>32</sup> BlackRock. [Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment, Phase 3](#), 2020. Also: Meketa. [Options for Prudent Divestment from Fossil Fuel Reserve Owners](#), 2020. Also: IEEFA. [Major investment advisors BlackRock and Meketa provide a fiduciary path through the energy transition](#). March 22, 2021.



constructed but have been offered by a number of investment firms,” and that the firms are doing so at very low fees.<sup>33</sup>

Larger institutional investors are also finding ex- and low-fossil indices to be prudent and practical. For example, the University of California retirement savings program benchmarks its domestic equity holdings to the MSCI Emerging Markets IMI ex Tobacco ex Fossil Fuels Index, MSCI World ex US IMI ex Tobacco ex Fossil Fuels Index, Russell 3000 ex Tobacco ex Fossil Fuels Index, and Russell 2000 ex Tobacco ex Fossil Fuels Index.<sup>34</sup> Other university funds use the MSCI ACWI IMI ex Tobacco ex Fossil Fuel Index.<sup>35</sup> The Rockefeller Brothers Fund benchmarks to the MSCI ACWI Ex Fossil Fuels Index.<sup>36</sup> Major pension funds, including the New York State Common Retirement Fund, the California State Teachers Retirement System, and Japan’s Government Pension Investment Fund, benchmark portions of their portfolio to related indices that significantly underweight fossil fuels.<sup>37</sup> In a 2020 report for the New York City funds, BlackRock surveyed peer institutional investors and found none that experienced negative returns due to divestment; rather, it found that all had seen neutral to slightly positive impact to their risk-adjusted returns.<sup>38</sup>

Although New York and California may seem like outliers given their significant total assets under management, smaller investors are finding similar results. A review commissioned for the University of Cambridge endowment found that the cost of divestment is likely to be small or non-existent for standard passive portfolios, given declining fees on fossil-free products. The study also said that the evolution of markets renders such costs “unlikely to pose a barrier going forward.”<sup>39</sup> In a report for the Maine Public Employees Retirement System, pension consultant NEPC projected that the implementation costs of divestment across public equities would be on the order of 1-3 basis points (0.01-0.03%)—a quantity dwarfed by the outperformance of fossil-free portfolios over the past decade.<sup>40</sup>

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<sup>33</sup> Appendix: NYS Decarbonization Advisory Panel. [Panel Beliefs and Recommendations](#). April 2019.

<sup>34</sup> UC Retirement Savings Program. [Fossil Fuel Company Investment Change](#). May 17, 2022.

<sup>35</sup> UC Investments. [Managing Climate Change Risks](#). 2021.

<sup>36</sup> Rockefeller Brothers Fund. [Investing in our Mission](#). 2020.

<sup>37</sup> CalSTRS. [Investment Committee Meeting Notes](#). August 31, 2023. Also: GPIF. [Analysis of Climate Change-Related Risks and Opportunities in the GPIF Portfolio](#). September 2021. Also: Office of the State Comptroller. [NYS Pension Fund Commits \\$2 Billion to Climate Transition Fund](#). December 9, 2021.

<sup>38</sup> BlackRock. [Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment, Phase 3](#). 2020. Also: Meketa. [Options for Prudent Divestment from Fossil Fuel Reserve Owners](#). 2020. Also: IEEFA. [Major investment advisors BlackRock and Meketa provide a fiduciary path through the energy transition](#). March 22, 2021.

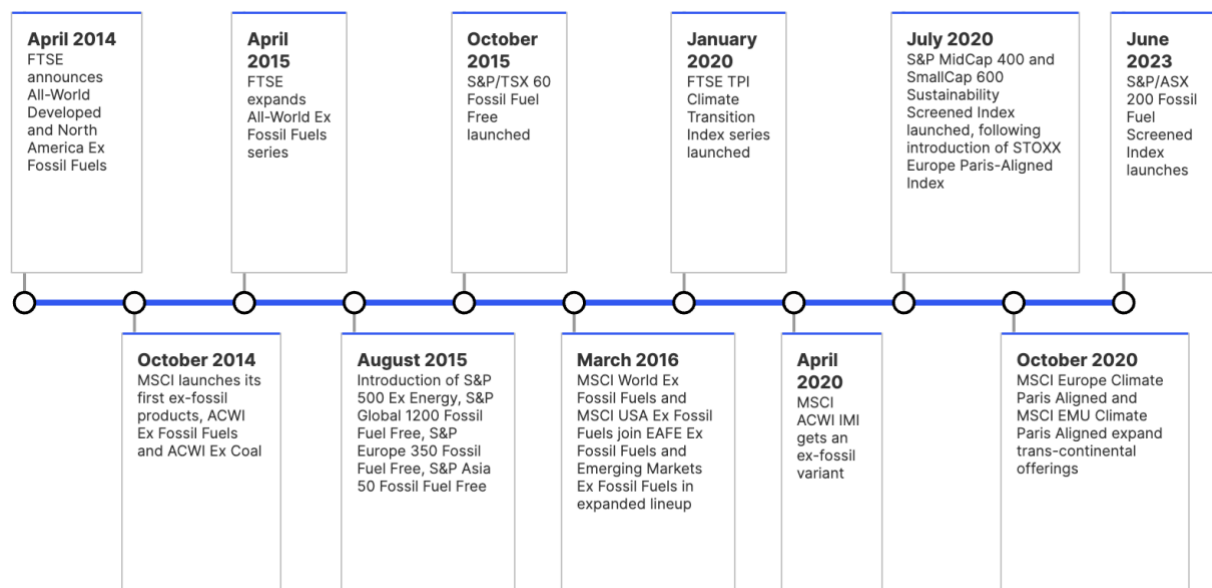
<sup>39</sup> Ellen Quigley, Emily Bugden, and Anthony Odgers. [Divestment: Advantages and Disadvantages for the University of Cambridge](#). 2020.

<sup>40</sup> MainePERS. [Board of Trustees Public Meeting Packet](#). January 12, 2023. Note that the Maine numbers are likely an upper bound. They derive from the assumption that off-the-shelf fossil free indices would not be available to meet the specific exclusion criteria prescribed by state law and that the fund would thus need to engage separately managed accounts. But since the market for fossil fuel free funds is maturing rapidly, the fund retains discretion in how it adheres to the law’s goals, and index providers have proven responsive to specific requests from clients (see next section), the actual cost may well be lower.

## The Market for Low-Carbon Indices Has Matured in Response to Market Demand

The market for indices with lower carbon exposure has developed significantly in the past decade. Although not all such indices are created equal and require specific scrutiny by investors, the proliferation speaks to a shift in the indexing landscape. Consider the following examples:

**Figure 4: Selected Milestones in Index Inception**



Source: Index fact sheets.

The release of so many new indices seems to largely be a response to market demand. To date, funds worth \$40.5 trillion have publicly committed to some form of divestment, meaning that index providers have an incentive to listen when an institutional investor requests the creation of a new index.<sup>41</sup> There is a well-established history of demand from large and small funds driving shifts in the index landscape:

- Some of MSCI's ex-Fossil indices were a result of a collaboration with the University of California's investment office following its divestment commitment in 2019.<sup>42</sup>
- Demand from the University of Oxford endowment led to the creation of new fossil fuel screened index products by BlackRock and MSCI.<sup>43</sup>

<sup>41</sup> Stand.Earth. [Fossil Fuel Divestment Database](#). Accessed December 2023.

<sup>42</sup> See discussion of "work[ing] with you to create an off-the-shelf index that not just us but others can use": MSCI. [Interview with Jagdeep Singh Baccher](#). 2020.

<sup>43</sup> CityWire. [Oxford University and BlackRock unite for fossil-fuel screened index](#). November 10, 2020.

- Elements of the FTSE ex-Fossil series were initiated in response to a 2014 request from the Natural Resources Defense Council, in collaboration with BlackRock.<sup>44</sup>
- Pitzer College's investment office spurred the creation of a variant of MSCI ACWI which excludes fossil fuels and meets certain other client specifications.<sup>45</sup>
- The Japan Global Pension Investment Fund collaborated closely with FTSE Russell to develop index variants that meet the client's environmental, social and governance (ESG) needs, including significant underweighting of the energy sector.<sup>46</sup>
- The FTSE Transition Pathway Index series, a relative of the ex-fossil fuel series which also significantly underweights the energy sector, was initiated in 2019 due to interest from the Church of England Pensions Board.<sup>47</sup>

In other words, the sum of money interested in fossil-free and low-fossil holdings has resulted in a provider landscape that is responsive to needs for specialized or bespoke indices.

This range of options means that the indices in our dataset cover a wide range of geographies and market capitalizations. The result is that investors can shed fossil fuel exposure without significant changes to their existing passive allocation strategy. For headline indices, they can generally remain with the same provider. Remaining with existing service providers potentially increases an investor's ability to negotiate favorable fees for new indices, and the growing availability of competitive, off-the-shelf products reduces the need for more-expensive specialty or custom portfolios.

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<sup>44</sup> NRDC. [NRDC, BlackRock and FTSE Jumpstart Mainstream Climate-Conscious Investing](#). April 29, 2014.

<sup>45</sup> BusinessWire. [Pitzer College and BlackRock Launch First Ever ESG-Focused, Fossil Fuel-Free Global Equity Index Fund](#). September 21, 2017.

<sup>46</sup> FTSE Russell. [ESG Integration into Japan's Passive Investments](#). April 2018.

<sup>47</sup> Church of England. [FTSE TPI Climate Transition Index](#). Accessed August 2023.

## Divested Indices Have Lower Portfolio Carbon Footprint and Climate Risk Exposure

An institutional investor's focus should be on reducing risk and maximizing returns for beneficiaries. In service of these goals and especially given the broad-reaching nature of climate risk, investors can make all-things-considered judgments that also aim to reduce a portfolio's carbon footprint or climate effects.

Carbon footprint can be understood in two forms. One is inward-facing carbon footprint, or the emissions proportionally associated with an investor's ownership share in a company. Due to the especially large emissions profile of fossil fuel companies *vis-à-vis* other industries, reducing fossil fuel exposure can reduce a portfolio's exposure to carbon emissions. Consider the S&P 500:

**Table 4: Carbon Footprint Metrics, S&P 500**

	S&P 500 Ex Energy	S&P 500	S&P 500 Energy Sector
Carbon to value invested (metric tons CO <sub>2</sub> /\$1M invested)	35.3	47.2	340.28
Carbon to revenue (metric tons CO <sub>2</sub> /\$1M revenues)	123.92	154.13	409.09
Weighted average carbon intensity (Metric tons CO <sub>2e</sub> /\$1M revenues)	123.19	134.71	418.57
Fossil fuel reserve emissions (metric tons CO <sub>2</sub> /\$1M invested)	0	470.97	12077.82

Source: *Index fact sheets, December 2023.*

Investors have indicated that they use corporate carbon footprints as an important indicator of broader climate risk exposure.<sup>48</sup> A climate-related portfolio screen should result in a marked decrease in an index's associated emissions.<sup>49</sup> This is a reflection of the fact that the fossil fuel industry's business model and present trajectory leave its core revenue stream fundamentally dependent on continued carbon combustion. From this perspective, the industry's footprint can indicate its broader ill-preparedness to manage long-term shareholder value amidst an energy transition. Many investors have chosen to reduce such exposure as a matter of financial prudence and risk-management—while advancing net-zero portfolio goals in the process.

Carbon footprint can also be considered in an outward-facing manner—the impact of investment activity on the real economy and global CO<sub>2</sub> emissions. Reducing a passive portfolio's fossil fuel exposure can matter on this front, as well. The academic literature suggests divestment is an

<sup>48</sup> Ceres. [Analysis Shows Investors Strongly Support SEC's Proposed Climate Disclosure Rule](#). October 11, 2022.

<sup>49</sup> Note that S&P's numbers do not take full Scope 3 emissions into account; if one does, the emissions footprint disparity would be even larger. For more, see S&P. [Index Calculation Metrics Explained](#). 2020.

important component of broader active ownership strategies, and that these techniques (especially taken together) can be an important signaling device with material financial and carbon impacts for companies,<sup>50</sup> markets,<sup>51</sup> and civil society.<sup>52</sup> Ceres has likewise noted how divestment even by small actors can influence the actions of a much broader universe of investors.<sup>53</sup> BlackRock made a similar point in its report for New York City funds, observing how divestment on the part of smaller investors served to shift at-large market norms.<sup>54</sup>

Climate risk is systemically embedded across the economy. And as discussed below, there is reason to believe that the fossil fuel sector's exposure to this uncertainty is outsized and disproportionate. Investor experience suggests that lower-carbon passive investing can help funds respond to both these specific and systemic aspects of climate risk. Lower-carbon indices can help a fund meet fiduciary expectations by excising some of its riskiest holdings. It also can be a component of an investor's broader efforts to reduce system-level climate misalignment, as well.

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<sup>50</sup> R. Slager and W. Chapple. [Carrot and Stick? The Role of Financial Market Intermediaries in Corporate Social Performance](#). *Business & Society*, 55(3): 398–426. March 2015 (suggesting that the potential of exclusion from an index can incentivize companies to meaningfully alter their business practices). Also of note: M. Rohleder, *et al.* [The effects of mutual fund decarbonization on stock prices and carbon emissions](#). *Journal of Banking and Finance*: 134. January 2022 (raising the possibility that divestment pressure can incentivize companies to lower their carbon emissions).

<sup>51</sup> E. Marti *et al.* [The Impact of Sustainable Investing: A Multidisciplinary Review](#). *Journal of Management Studies*. 2023 (noting how divestment fits within, and can be a part of, broader efforts by investors to shift market norms). Of note: fossil fuel companies have themselves recognized that the divestment movement can potentially be a financial risk: see IEEFA. [Two Economies Collide](#). October 13, 2022, Section III.C.2.

<sup>52</sup> N. Bergman. [Impacts of the Fossil Fuel Divestment Movement: Effects on Finance, Policy and Public Discourse](#). *Sustainability*, 10(7). 2018 (on how divestment has helped spur broader climate awareness in the financial sector and public discourse). See also: T. Schifeling and A.J. Hoffman. [Bill McKibben's Influence on U.S. Climate Change Discourse: Shifting Field-Level Debates Through Radical Flank Effects](#). *Organization & Environment*, 32(3): 213–233. November 2017 (suggesting that the spread of the divestment movement increases popular support for other climate policies, such as a carbon tax).

<sup>53</sup> Ceres *et al.* [The Role of Investors in Supporting Better Corporate ESG Performance](#), February 2019

<sup>54</sup> BlackRock. [Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment, Phase 1](#). March 2021.

## Investing Beyond Fossil Fuels

When it comes to addressing climate change as a systemic risk, many investors have found that divestment is a floor, not a ceiling—the first step in a broader climate risk and energy transition strategy. Indeed, some of the boldest portfolio-wide active ownership strategies to date have emerged from investors who first began with coal, oil, and gas exit policies.

Among the policies that leading investors have paired with divestment are broader portfolio-wide decarbonization pledges,<sup>1</sup> thematic reinvestments focused on climate solutions,<sup>2</sup> heightened engagement with the sort of systemically-important actors (such as banks or heavy industry) where investor pressure has a potential to make a difference,<sup>3</sup> direct capital infusions into real-economy decarbonization,<sup>4</sup> support of regulations and policies to mitigate climate uncertainty,<sup>5</sup> and others.

On a purely financial level, many investors have shed fossil fuels as a matter of risk management and fiduciary duty fulfillment. In the process, some are finding that a divestment decision opens doors and creates opportunities to ask broader questions about the fund's climate preparedness. Divestment, in other words, can serve as a steppingstone for other sorts of climate action by a fund, as well—something that complements and enables other engaged stewardship and universal ownership commitments.

<sup>1</sup> Rockefeller Brothers Fund. [Beyond Divestment: Decarbonizing our Investment Portfolio](#). 2023.

<sup>2</sup> IEEFA. [Two Economies Collide](#). October 13, 2022, Section 2.E.

<sup>3</sup> For how investors can better address climate risks through proxy voting, see: Sierra Club et al. [The Hidden Risk in State Pensions](#). January 2024. For an example of a divestment commitment enabling a systemic ownership approach, see Reuters. [New York pension seek stricter climate emissions rules from bank portfolios](#). January 24, 2023.

<sup>4</sup> Consider: PhenomenalWorld. [Labor's Green Capital](#). September 12, 2023 (discussing the New York City Comptroller's efforts to spur the buildout of public solar; while this effort is not funded by pension assets specifically, it is nonetheless a part of the office's broader climate plan which developed in response to calls from the divestment movement and others.)

<sup>5</sup> An example: Investors' vehement support of the SEC's proposed climate disclosure rule. Ceres. [Analysis Shows Investors Strongly Support SEC's Proposed Climate Disclosure Rule](#). October 11, 2022.



## The Energy Crisis in Context

Prior to the energy crunch of the later COVID-19 pandemic and war in Ukraine, a variety of pension consultants, financial analysts, and academic researchers tended to agree that reducing fossil fuel exposure created no significant financial loss and potentially modest gains.<sup>55</sup> Our analysis finds that this story remains true. Even in wake of the industry's supposed comeback, its history of underperformance remains driven by competitive pressures across the oil and gas sector, as well as conflict among its political components.

Accordingly, essentially all lower-fossil indices in the sample outperform on five- and 10-year bases (even taking the industry's record 2022 profits into account). It is only in the three-year timescale that most slightly underperform. (At the time of writing, most have returned to outperformance over a one-year period.) So which metric is more relevant to investors? The sector's longer-term underperformance, or the brief moment of shorter-term overperformance? Which says more about its present and future?

A company may reap returns because of skill that drives innovation, reshapes markets, outmaneuvers competitors, etc. Or it can see returns because of luck caused by changing market winds, independent of the strategy of a given company. This latter category, although it can lead to a few good quarters (and generate returns for short-term speculators), is ultimately far less relevant to a long-term investor. Volatility, after all, is hardly the same as long-term value creation.

In hindsight, the industry's recent profits look most like the latter. The 2021-22 era saw a global supply chain crunch as the economy emerged from the COVID-19 pandemic, followed by Russia's invasion of Ukraine. Overnight, global energy flows were broken and reformed; the resulting friction and uncertainty drove up oil and gas prices. The revenues, profits, and market value of fossil fuel companies increased accordingly. Yet the very fact that it took a war and pandemic to drive up the sector's financial returns should raise concerns about the industry's long-term viability. As IEEFA has noted elsewhere, any financial endeavor that depends on large-scale geopolitical catastrophe to sustain its bottom line is inherently a speculative, high-risk endeavor—not a stable blue-chip bet.<sup>56</sup>

As markets continue to adapt to the effects of the war and energy crisis, the variability of oil prices has illustrated just how little companies can rely on such destabilization to maintain indefinitely high returns. For much of the past decade, the industry had been spending more than it earned, seeing negative free cash flow when distributions to shareholders were taken into account. In the first half of

<sup>55</sup> IEEFA. [Divestment from Fossil Fuels: The Financial Case](#). July 2, 2018. See also: BlackRock Sustainable Investing. [Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment – Phase Three Identification, Analysis and Evaluation of Prudent Strategies](#). 2021. See also: C. Ryan and C. Marsicano. [Examining the Impact of Fossil Fuel Divestment on University Endowments](#). *NYU Journal of Law and Business*, 17(1). 2020-21. D. Khajenouri and J. Schmidt. See also: [Standard or Sustainable — Which Offers Better Performance for the Passive Investor?](#) *Journal of Applied Finance & Banking*, 11(1): 61-7. See also: A. Trinks *et al.* [Fossil Fuel Divestment and Portfolio Performance](#). *Ecological Economics*, 146: 740-748. 2018. See also: Wall Street Journal. [The Dickey Economics of Investing in Oil During Covid-19](#). December 11, 2020.

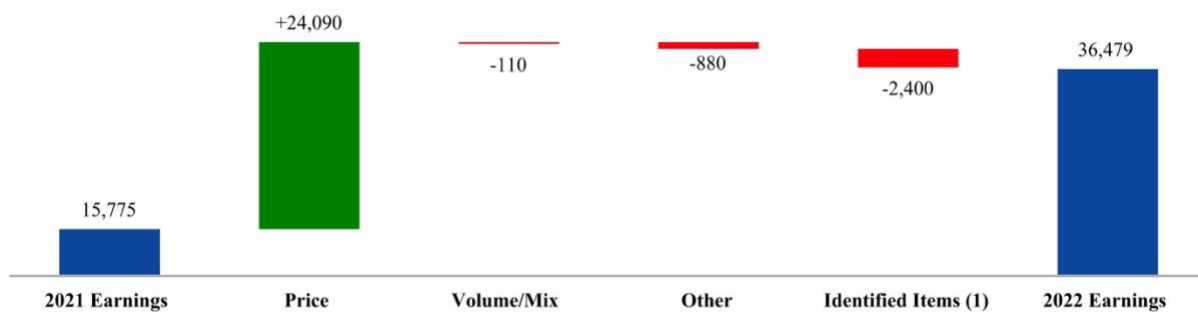
<sup>56</sup> IEEFA. [Taking stock of the oil and gas sector as the transition to sustainable finance proceeds apace](#). August 1, 2023.

2023, this pattern resurfaced once again.<sup>57</sup> As a sector, fossil fuels underperformed the S&P 500 in 2023, finishing second-worst among sectors with a -4.8% return. The year's results included a period of several months where the energy sector was in last place.<sup>58</sup>

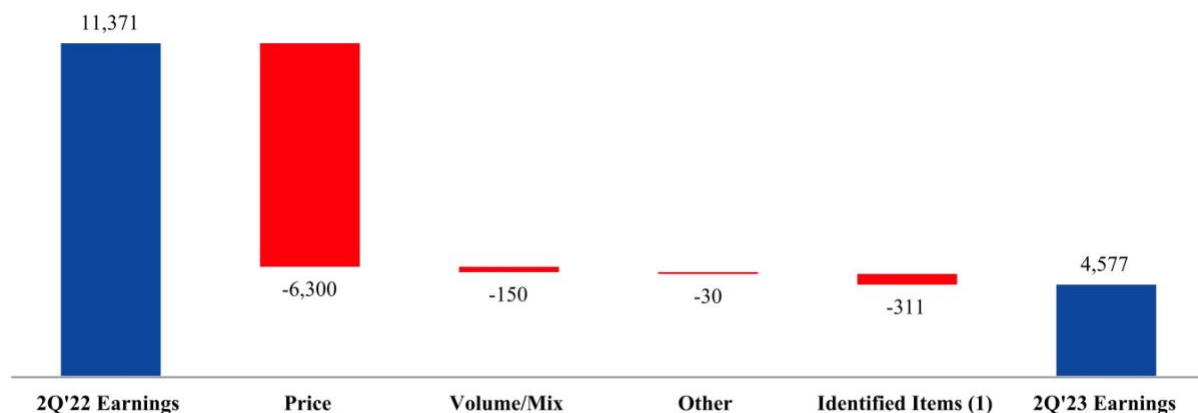
A factor analysis from ExxonMobil's SEC filings illustrates the extent to which volatility of prices—that is, factors unrelated to the industry's skill at producing oil and gas—drove both the industry's sudden ascent in 2022, and its fall in the second quarter of 2023. Almost all of the company's outperformance in 2022 over 2021 was attributable to the rise in prices, according to its own numbers, and almost all of the falling returns in 2023 were attributable to their decline:

**Figure 5: ExxonMobil Returns Factor Analysis**

2022 Upstream Earnings Factor Analysis (millions of dollars)



Upstream Second Quarter Earnings Factor Analysis (millions of dollars)



Source: ExxonMobil 2022 [Form 10-K](#); 2Q2023 [Form 10-Q](#).

<sup>57</sup> IEEFA. [Declining Supermajors Profits Reveal Flaws in Oil and Gas Business Model](#). August 9, 2023.

<sup>58</sup> Yardeni Research. [S&P 500 Sectors & Industries](#), Figure 1. Note: this source is updated daily. A chart showing sector results as of 12/29/23 is available upon request.

Even accounting for the sector's good quarters due to the Russian invasion of Ukraine and emergence from the pandemic, the industry has still underperformed the stock market on a 10-year basis. The prices of fossil fuels may be higher or lower in the short-term, and the industry's immediate returns will fluctuate with them. The fossil fuel sector has shown that large-scale geopolitical destabilization has become a necessary part of its value thesis, and an investment strategy which bets on this is hardly a low-risk endeavor.

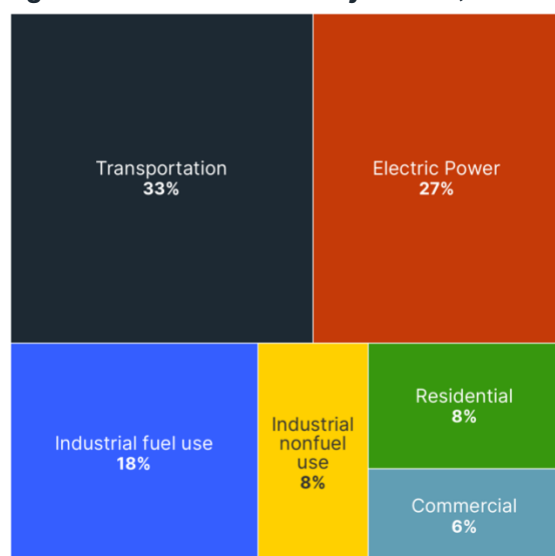
In other words, the long-term underperformance of traditional indices compared to reduced-fossil ones has been a durable trend; the shorter-term overperformance seems to have been due more to external factors than to any improvements in underlying fundamentals. The invasion of Ukraine may have been momentarily good for the sector—but it was unable to reverse its secular lag, and hardly provides a generalizable value thesis for the years to come.

## The Long-Term Outlook for Fossil Fuels

Investors should carefully consider how their portfolios would have fared over the past decade if they had taken steps to reduce exposure to fossil-fueled risk. But past results are no guarantee of future outcomes. Given the near-term rollercoaster of modern energy markets, a fiduciary is also well-served by an evaluation of the fossil fuel sector's outlook. This reveals an industry whose long-term financial outlook is decidedly negative because of volatile commodity prices, increasing competition from non-fossil fuel technologies for a share of fossil fuels' key end-markets, and a series of legal, regulatory, and other risks.

Consider the current demand base for the fossil fuel industry's products:

**Figure 6: Fossil Fuel Use by Sector, United States, 2022**



Source: Adapted from [US Energy Information Administration](#).

One of the main consumers of fossil fuels in the United States is transportation. Yet ExxonMobil CEO Darren Woods expects electric vehicles to dominate passenger vehicle sales by 2040.<sup>59</sup> The second-largest sector is electric power. A shift here, too, is evident: The U.S. is on track to close half its coal capacity by 2026,<sup>60</sup> and in recent years, utilities have invested in 9 megawatts of new solar and wind for each new megawatt of gas power.<sup>61</sup> Decarbonization is also at work in the industrial (such as via green metallurgical processes)<sup>62</sup> and residential/commercial (such as via the spread of heat pumps)<sup>63</sup> sectors.

The U.S. is just one market; the road to decarbonization looks different in other countries and regions. Yet its experience speaks to a broader direction of travel. As the global economy decarbonizes, the world's demand for the fossil fuel industry's core products is projected to fall significantly.<sup>64</sup> In light of this, fossil fuel companies sometimes speak of renewables, carbon storage and/or their petrochemicals businesses as potential replacements for lost profits. Meanwhile, minimal investments in low-carbon business models cast doubt on narratives of serious diversification.<sup>65</sup> It remains unclear if carbon storage and petrochemicals will ever deliver the previous long-run margins of oil and gas.<sup>66</sup> In the case of the former, significant technical and economic barriers remain for widespread commercialization.<sup>67</sup> In the case of the latter, a host of diplomatic efforts (such as ongoing efforts to formalize a plastics reduction treaty via the United Nations Environment Programme),<sup>68</sup> regulatory interventions (such as the proliferation of efforts to reduce single-use plastic consumption and use of fossil fuel chemical feedstocks),<sup>69</sup> and changing stakeholder sentiments (such as the growing tide of shareholder resolutions targeting plastic industry practices)<sup>70</sup> raise significant questions about the stability of revenue streams in the long run.<sup>71</sup>

Of course, transition risk owing to competitive pressure is just one of the many factors clouding the industry's long-term outlook. To summarize a broader discussion in IEEFA's 2022 report *Two Economies Collide*, these risks include but are not limited to:

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<sup>59</sup> CNBC. [Every new passenger car sold in the world will be electric by 2040, says Exxon Mobil CEO Darren Woods](#). June 25, 2022.

<sup>60</sup> IEEFA. [U.S. on track to close half of coal capacity by 2026](#). April 3, 2023.

<sup>61</sup> Edison Electricity Institute. [2022 Financial Review](#). 2023, p. 41.

<sup>62</sup> IEEFA. [Green finance has begun to flow into green steel funding](#). November 11, 2022.

<sup>63</sup> Rewiring America. [The Pace of Progress](#). June 2023.

<sup>64</sup> See, for example, the IEA's NZE scenario in which fossil fuels—abated and unabated alike—make up less than 20% of total global energy supply in a net-zero world by 2050, down from a supermajority today; IEA. [World Energy Outlook](#). 2022.

<sup>65</sup> IEA. [Oil and gas industry faces moment of truth](#). November 23, 2023.

<sup>66</sup> IEEFA. [Two Economies Collide](#). October 13, 2022, Section I.B.

<sup>67</sup> IEEFA. [The Carbon Capture Crucx: Lessons Learned](#). September 1, 2022. See also: IEEFA. [Norway's Sleipner and Snøhvit CCS: Industry models or cautionary tales?](#) June 14, 2023.

<sup>68</sup> United Nations Environment Assembly of the United Nations Environment Programme. [Resolution 5/14](#). Adopted March 2, 2022.

<sup>69</sup> [Global Plastics Laws Database](#). Accessed December 2023.

<sup>70</sup> See, e.g., As You Sow. [Current Resolutions](#) (select "Circular Economy/Waste" program). Last accessed December 1, 2023.

<sup>71</sup> IEEFA. [Once seen as industry savior, petrochemicals losing financial appeal](#). January 23, 2024.

- **Physical risk:** Much of the oil industry’s physical assets lie in flood-prone areas. As sea levels rise and severe weather grows more frequent, climate chaos could hinder their ability to access assets.<sup>72</sup>
- **Asset risk:** Meeting Paris Agreement goals will require keeping vast swaths of companies’ proven reserves in the ground.<sup>73</sup> When a company’s valuation is rooted in assumptions that this extraction will take place unimpeded, unexpected and premature impairment becomes a source of significant financial instability.<sup>74</sup> A similar story is true with the pipelines and other infrastructure supporting the fossil economy. Changing market conditions will likely force the early retirement of some fossil fuel infrastructure, creating losses for those betting on their continued operation.<sup>75</sup>
- **Legal risk:** The fossil fuel industry faces serious legal headwinds, including lawsuits claiming that it misled investors and the public about climate change,<sup>76</sup> that it is liable for climate damages,<sup>77</sup> and that its business operations violate national environmental protection laws or emissions reduction commitments.<sup>78</sup> With many of these cases moving forward, the industry could face significant legal exposure.<sup>79</sup>
- **Regulatory risk:** A patchwork of policy responses from the world’s countries cumulatively pose significant risks to the sector’s business model. Regulatory approvals of infrastructure projects are no longer certain,<sup>80</sup> economic taxonomies that increase disclosure of climate risks or define categories of “clean” and “dirty” investments threaten to realign investment capital away from the industry,<sup>81</sup> electric utilities face regulatory obligations to increase the

<sup>72</sup> Maplecroft. [40% of oil and gas reserves threatened by climate change](#). December 16, 2021. Also see: Inside Climate News. [Thawing Permafrost has Damaged the Trans-Alaska Pipeline and Poses an Ongoing Threat](#). July 11, 2021.

<sup>73</sup> CarbonTracker. [Balancing the Budget: Why deflating the carbon bubble requires oil & gas companies to shrink](#). November 1, 2019.

<sup>74</sup> For example, ExxonMobil is currently engaged in litigation regarding its holdings in the Canadian oil sands. The company’s practices regarding proven and probable reserves have been called into question. Under fraud statutes, the company’s practices circa 2016 and 2017 departed considerably from the rest of the industry. Most companies took substantial impairments on Canadian reserves. ExxonMobil did not. The stock price on the company declined precipitously due to an SEC investigation. The resulting suit has seen multiple rounds of motions by ExxonMobil to dismiss the suit. On August 15, 2023, Judge Edward Kinkeade issued an order certifying the class and moving the case forward. The company has also booked, debooked and rebooked its reserves in the Canadian oil sands, reflecting the difficulties encountered with its 4 billion barrel reserve holdings in the county. The case is filed in the Northern District of Texas, Ramirez v. Exxon Mobil Corporation et al., case number 3:16-cv-03111-K, filed November 7, 2016.

<sup>75</sup> IEEFA. [Over half of Europe’s LNG infrastructure assets could be left unused by 2030](#). March 21, 2023.

<sup>76</sup> See e.g. LA Times, [California sues five major oil companies for ‘decades-long campaign of deception’ about climate change](#). September 16, 2023. Trend discussed in: American Bar Association. [Climate litigation rising: Hot spots to watch](#). Jan/Feb 2022. Also see: Grantham Research Institute on Climate Change and the Environment. [Global trends in climate change litigation](#), 2023. As an example of the growing evidentiary base of industry deceit, see G. Supran *et al.* [Assessing ExxonMobil’s global warming projections](#). *Science*, 379(6628). Also see: Wall Street Journal. [Inside Exxon’s Strategy to Downplay Climate Change](#). Sept. 14, 2023.

<sup>77</sup> See e.g. *Mayor and City Council of Baltimore v. BP PLC*, 31 F.4th 178 (4th Cir. 2022). Also see: *County of San Mateo v. Chevron Corp.*, 32 F.4th 733 (9th Cir., 2022). Also see: *State of Rhode Island v. Getty Petroleum Marketing*, 35 F.4th 44 (1st Cir. 2022). *Chevron Corp. v. City of Oakland*, 141 S. Ct. 2776 (2021).

<sup>78</sup> Insurance Journal. [Exxon Says Guyana Insurance Dispute Could Cut Revenue \\$350M/Month](#), May 22, 2023. Also see: *Vereniging Milieudéfensie, et al. v. Royal Dutch Shell PLC*, no. C/09/5719321 / HA ZA 19-379 (English version), May 26, 2021. Discussed further in: Shearman & Sterling. [Milieudéfensie v. Shell—A landmark court decision for energy and energy-intensive companies](#). June 1, 2021.

<sup>79</sup> Law360. [Circuits’ remand of state climate suits may mean big liability](#). June 22, 2022.

<sup>80</sup> Moody’s Investor Service, [Shifting environmental agendas raise long-term credit risk for natural gas investments](#), September 30, 2020 (Proprietary).

<sup>81</sup> InsideClimateNews. [California’s Climate Disclosure Bill Could Have Nationwide Impacts](#). September 15, 2023.

use of renewable energy,<sup>82</sup> and end-use regulations like bans or restrictions on single-use plastics threaten to decrease demand for petrochemical products.<sup>83</sup>

- **Geopolitical risk:** As discussed above, the industry's profitability has become reliant on a factor largely outside their control. The commodity price of fossil fuels can be driven up or slashed with little warning by exogenous geopolitical factors. This sort of volatility is counterproductive for long-term planning or asset allocation. Unexpected geopolitical disruptions also may hinder the ability to realize assets as expected. As nations deploy oil and gas as a tool of political leverage in global power bloc alignments, market volatility may intensify, putting long-term capital plans and existing contractual arrangements at risk.

Climate-related financial risk is systemically interwoven throughout the economy, but its effects are not distributed evenly. As *Two Economies Collide* notes, there are key ways in which the fossil fuel industry's exposure to this risk is disproportionate.<sup>84</sup> As the economy decarbonizes, many companies will face challenges to their business practices. The traditional energy sector is unique in that it faces a challenge to its core business model. Its basic revenue stream relies on more carbon emissions, leaving it structurally misaligned as the energy transition continues. Numerous academic studies and independent analyses have found that no major fossil fuel company is aligned with the goals of the Paris Agreement.<sup>85</sup> A recent study from CDP (formerly Carbon Disclosure Project) found that in the past year, the sector has moved backward.<sup>86</sup> In 2022, according to the International Energy Agency, the global fossil fuel sector's clean energy spending amounted to only a few percentage points of its total capital expenditure.<sup>87</sup>

The Federal Reserve Board has noted that "climate change poses significant challenges for the global economy and financial system, with implications for the structure of economic activity, the safety and soundness of financial institutions and the stability of the financial sector more broadly."<sup>88</sup> Leading ratings houses like Moody's Investors Service and Fitch Ratings are beginning to identify companies' lack of transition readiness as a material financial risk, and are beginning to set standards that expose fossil fuel companies as especially ill-prepared to meet future challenges.<sup>89</sup> Even critics of environmentally conscious investing have found themselves obligated to recognize these trends. As "anti-ESG" asset manager Strive noted in the original documentation for its fossil fuel-focused ETF, "companies in the fossil fuel and traditional energy sectors may be vulnerable to potential obsolescence due to technological advances and global competition. A company's

<sup>82</sup> National Conference of State Legislatures. [State Renewable Portfolio Standards and Goals](#). August 13, 2021.

<sup>83</sup> National Conference of State Legislators. [State Plastic Bag Legislation](#). February 8, 2021.

<sup>84</sup> IEEFA. [Two Economies Collide](#). October 13, 2022, Section 2.

<sup>85</sup> See e.g. Climate Action 100+. [Net-Zero Company Benchmarks](#). Accessed August 2023. See also: M. Li *et al.* [The clean energy claims of BP, Chevron, ExxonMobil and Shell: A mismatch between discourse, actions and investments](#). PLOS ONE 17(2). 2022. See also: OCl. [Big Oil Reality Check](#), 2022.

<sup>86</sup> CDP. [Research reveals no oil and gas companies have plans in place to phase out fossil fuels](#). June 29, 2023.

<sup>87</sup> IEA. [The Oil and Gas Industry in Net Zero Transitions](#). November 2023, page 128.

<sup>88</sup> Federal Reserve Board. [Federal Reserve Board issues statement in support of the Glasgow Declaration by the Network of Central Banks and Supervisors for Greening the Financial System \(NGFS\)](#). November 3, 2021.

<sup>89</sup> IEEFA. [Energy sector ends 2023 with a weak comeback and a negative outlook](#). January 14, 2024.



profitability may also be affected by pricing pressure, government regulation, environmental factors, and unpredictable changes in consumer demand.”<sup>90</sup>

Investors have a responsibility to monitor and mitigate risks facing their portfolio. This means taking the financial impacts of climate change and the energy transition seriously.<sup>91</sup> In the case of fossil fuels, these factors result in a lopsided risk-reward calculus. It is unlikely that the fossil fuel sector will experience the sustained growth that it once enjoyed several decades ago once again. Yet the predictable and unpredictable challenges of climate change and the energy transition put the very core of the industry’s business model in danger, creating major opportunities for losses. A bet on the industry is becoming an asymmetric wager, with limited upside but significant potential downside in the years and decades to come.<sup>92</sup>

## Conclusion: Responding to Financial Risk

In recent years, the financial rationale of the fossil fuel industry has come undone. Once a market mover, the industry has found itself at the mercy of economic, geopolitical, and scientific trends outside its control. Once a generator of stable blue-chip returns, the industry has found itself relegated to a speculative and volatile existence. Once a sure-fire, forward-looking bet, the industry has come to see its future clouded by competition and uncertainty.<sup>93</sup>

The industry posted high—but transitory—profits during the quarters surrounding the emergence from the COVID-19 pandemic and war in Ukraine. Some commentators claimed that the sector is experiencing a return to greatness.<sup>94</sup> As a consequence, they argue that passive investors would do well to maintain exposure. Conventional wisdom in passive investing would back up this argument. According to the paradigms in which maximal diversification is necessary to replicate market results, exclusions of any sort are presumed to lead to suboptimal returns.

Yet as this report finds, real-world market results have told a different story. Even recent events have failed to meaningfully alter the fossil fuel industry’s laggard status. Fossil fuel stocks have tended to drag down passive indices over the last decade. Indices that shed fossil fuel investments have performed slightly better than their fossil-containing benchmarks over the same period. Even more

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<sup>90</sup> Responsible Investor. [Strive AM Warns of Transition Risk in Documentation for Anti-ESG ETF](#). August 10, 2022.

<sup>91</sup> For more on investors’ legal obligations to act on climate, see Project Syndicate. [Finance Must Combat Climate Change — Or Else](#). November 9, 2021.

<sup>92</sup> For a discussion of the asymmetry of fossil fuel investment, see Bevis Longstreth. [UPMIFA Interpretation Memo](#). January 29, 2016 (noting that the long-term downside potential of the industry significantly outweighs its prospects for future growth). See also major investment consultancy Redburn’s 2019 survey of the oil and gas sector’s future positioning, noting that “[w]hen industries face existential risk, historical multiples provide no floor for share prices.” Quoted: IEEFA. [The terrible, horrible, no good, very bad year for oil and gas](#). 2020.

<sup>93</sup> IEEFA. [Two Economies Collide](#). October 13, 2022.

<sup>94</sup> New York Times. [Exxon and Chevron Report Record Profits on High Oil and Gas Prices](#). July 29, 2022. For a sample of commentator responses, see e.g.: Wall Street Journal. [Why We’re Bullish on Energy Stocks](#). October 24, 2022. New York Times. [Fossil-Fuel Shares Lead the Stock Market. How Awkward](#). June 3, 2022. Wall Street Journal. [Energy Stocks are This Year’s Hottest Trade](#). March 22, 2022.

importantly, these indices are gaining market adoption, proving investible, and passing fiduciary tests. As the broader market evolution away from carbon continues, investors should move, too.

The creation and evolution of low carbon indices and traditional indices that include fossil fuels are on a path toward convergence. The long-term negative outlook for the industry now requires market planners and product designers to contemplate a future where the next business cycle for fossil fuels may be the one that ends in significant disruption. Investors holding fossil fuel equities run a risk that the stocks become increasingly speculative.

Responding to risks is not optional. Once a risk has been identified (particularly one with the scope of implications related to climate change and the energy transition), a full assessment of the issue is warranted. A trustee is obligated to assess whether the holdings in question are compatible with the standards and goals of the fund. Fossil fuels are far from the only source of climate risk for a portfolio. But given their unique proximity to both the causes and effects of climate-related financial uncertainty, a prudent trustee needs to carefully consider their impacts on the broader investment strategy. As the economies of the past and the future collide, investors have a responsibility to act—and, as it turns out, have prudent and pragmatic pathways by which to do so.

## Appendix

	10-Year Annualized Returns	5-Year Annualized Returns	3-Year Annualized Returns	1-Year Annualized Returns	10-Year Return/Risk	5-Year Return/Risk	3-Year Return/Risk
MSCI ACWI ex Fossil Fuels	8.89	12.40	5.52	23.84	0.60	0.69	0.33
MSCI ACWI	8.48	12.27	6.24	22.81	0.57	0.68	0.38
MSCI USA IMI with Expanded Fossil Fuel Exclusions	NA	15.68	8.17	28.55	NA	0.81	0.45
MSCI USA IMI	NA	15.36	8.75	26.25	NA	0.80	0.49
MSCI Emerging Markets Ex Fossil Fuels	2.74	3.72	-5.70	9.01	0.16	0.19	-0.32
MSCI Emerging Markets	2.66	3.68	-5.08	9.83	0.15	0.19	-0.29
MSCI EAFE ex Fossil Fuels	4.24	7.98	2.87	18.30	0.28	0.44	0.17
MSCI EAFE	4.28	8.16	4.02	18.24	0.28	0.45	0.25
MSCI World ex Fossil Fuels	9.05	12.95	6.53	25.08	0.60	0.71	0.38
MSCI World	8.60	12.80	7.27	23.79	0.57	0.70	0.43
MSCI ACWI IMI ex Tobacco ex Fossil Fuels	8.19	11.64	4.75	22.71	0.55	0.64	0.28
MSCI ACWI IMI	7.77	11.49	5.46	21.58	0.52	0.63	0.33
MSCI USA Ex Fossil Fuels	12.54	15.91	8.52	28.80	0.81	0.84	0.47
MSCI USA	11.98	15.74	9.13	27.10	0.78	0.83	0.52
MSCI China ex Fossil Fuels	1.44	-2.74	-19.13	-12.06	0.06	-0.10	-0.63
MSCI China	1.03	-2.65	-18.31	-11.04	0.04	-0.10	-0.62
MSCI Europe Climate Paris Aligned	7.52	10.86	8.50	17.53	0.53	0.66	0.56
MSCI Europe	6.46	9.84	9.47	15.83	0.46	0.62	0.68
MSCI EMU Climate Paris Aligned	7.28	9.92	7.14	17.41	0.47	0.55	0.44
MSCI EMU	6.36	9.54	8.29	18.78	0.40	0.52	0.52
S&P/TSX 60 Fossil Fuel Free Index	8.77	10.98	8.41	12.48	0.74	0.74	0.61
S&P/TSX 60	8.24	11.60	10.39	12.05	0.67	0.76	0.76
S&P 500 ex Energy	12.74	15.84	9.23	27.79	0.84	0.86	0.52
S&P 500	12.03	15.69	10.00	26.29	0.79	0.85	0.57

S&P Composite 1500 Ex-Energy	12.46	15.53	9.07	26.87	0.82	0.84	0.51
S&P Composite 1500	11.76	15.39	9.83	25.47	0.77	0.82	0.56
S&P Global 1200 Fossil Fuel Free Index	9.55	13.25	7.05	24.60	0.65	0.74	0.41
S&P Global 1200	9.11	13.07	7.64	23.38	0.62	0.73	0.46
S&P MidCap 400 Sustainability Screened Index	9.78	12.87	7.45	16.95	0.54	0.57	0.37
S&P MidCap 400	9.27	12.62	8.09	16.44	0.51	0.56	0.40
S&P SmallCap 600 Sustainability Screened Index	9.03	11.11	6.67	16.51	0.45	0.46	0.31
S&P SmallCap 600	8.66	11.03	7.28	16.05	0.43	0.46	0.34
S&P Europe 350 Fossil Fuel Free	7.35	10.85	9.41	17.82	0.52	0.68	0.65
S&P Europe 350	7.25	10.74	10.42	16.82	0.51	0.67	0.75
S&P Europe LargeMidCap Net-Zero 2050 Paris Aligned	NA	10.60	5.92	24.03	NA	0.55	0.31
S&P Europe LargeMidCap	NA	9.64	6.18	20.76	NA	0.49	0.34
S&P Asia 50 Fossil Fuel Free Index	5.86	4.85	-9.26	5.83	0.29	0.21	-0.38
S&P Asia 50	5.19	3.93	-9.97	5.43	0.26	0.17	-0.41
S&P/ASX 200 Fossil Fuel Screened	8.69	11.24	8.62	13.46	0.61	0.67	0.59
S&P/ASX 200	7.93	10.28	9.24	12.42	0.56	0.62	0.68
S&P Global LargeMidCap Net Zero	NA	13.48	6.21	26.74	NA	0.75	0.36
S&P Global LargeMidCap	NA	12.10	6.05	22.93	NA	0.68	0.37
S&P Emerging LargeMidCap Carbon Control Index	4.34	4.39	-3.89	10.04	0.27	0.25	-0.24
S&P Emerging LargeMidCap	3.64	4.39	-3.71	9.92	0.22	0.24	-0.23
FTSE All World ex Fossil Fuels	8.85	12.40	5.60	23.70	0.60	0.70	0.40
FTSE All World	8.47	12.20	6.30	22.60	0.60	0.70	0.40
FTSE Developed ex Fossil Fuels	9.42	13.20	6.70	25.50	0.60	0.70	0.40
FTSE Developed	9.04	13.10	7.40	24.20	0.60	0.70	0.50
FTSE Emerging ex Fossil Fuels	12.12	4.70	-4.20	8.50	0.20	0.30	-0.30
FTSE Emerging	11.61	4.80	-3.20	9.10	0.20	0.30	-0.20
FTSE North America ex Fossil Fuels	12.12	15.60	8.50	28.10	0.80	0.80	0.50
FTSE North America	11.61	15.50	9.20	26.60	0.80	0.80	0.50

FTSE Developed ex North America ex Fossil Fuels	4.85	8.50	2.90	19.40	0.30	0.50	0.20
FTSE Developed ex North America	4.83	8.60	3.80	18.90	0.30	0.50	0.20
FTSE North America ex Fossil Fuels USA	12.38	15.80	8.50	28.60	0.80	0.80	0.50
FTSE USA	11.92	15.60	9.10	27.10	0.80	0.80	0.50
FTSE Japan TPI Climate Transition Index	9.28	13.60	13.10	30.50	0.60	0.90	0.80
FTSE Japan	8.57	12.60	12.10	28.20	0.60	0.90	0.70
Russell 3000 Ex Energy	12.15	15.28	7.80	27.53	0.79	0.79	0.44
Russell 3000	11.48	15.16	8.54	25.96	0.74	0.78	0.49
Russell 1000 TPI Climate Transition Index	11.91	15.70	9.40	26.30	0.80	0.60	1.90
Russell 1000	11.81	15.50	9.00	26.50	0.80	0.50	2.00
STOXX Europe 600 Paris-Aligned	NA	10.80	5.50	21.80	NA	NA	NA
STOXX Europe 600	NA	9.90	5.90	21.00	NA	NA	NA
Morningstar Global Ex Fossil Fuels	NA	12.38	5.36	24.00	NA	0.69	0.32
Morningstar Global Markets	NA	12.08	6.02	22.41	NA	0.67	0.37

Wherever possible, we paired each index with an explicitly fossil-free counterpart. Where this was not possible, we used a counterpart that underweights fossil fuels compared to the standard benchmark.

Data is as of December 2023, and consists of IEEFA analysis and calculations based on provider fact sheets and returns data. Archived fact sheets available upon request. Russell 3000 statistics are calculated from raw returns data licensed from FTSE Russell. NA means that a certain data point is not available, likely due to a younger index or provider data limitations. Historic data before inception is based on index provider's backcasting. Numbers reflect total return (gross total wherever possible, net total if gross total was not available).

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