

Next Economy Index

December 31, 2022

Green Alpha[®]

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Investment Philosophy

The greatest growth drivers of today's economy are high-functioning, inventive companies creating and accelerating solutions to system-level risks—the climate crisis, resource degradation, widening inequality, and human disease burdens. Those companies are our best investment opportunity to preserve and grow clients' capital.

Green Alpha's philosophy is simple: seek enterprises creating scalable and rapidly evolving, economically-competitive solutions, rigorously evaluate their fundamentals, and acquire them at reasonable valuations.

Our investments seek to de-risk the global economy (which in turn reduces clients' long-term investment risks) while striving to grow faster than underlying GDP.



Why Invest in the Next Economy Index?

- Active research and stock selection
- Passively managed through an annual rebalance
- Demonstrates the diversity, growth, breadth, and depth of the rapidly-developing Next Economy™
- ~142 global, market-leading companies developing solutions to core economic and environmental risks

Inception Date: December 31, 2008

Vehicle: Separately Managed Accounts

Research

Across our portfolios, we seek companies:

- with products and/or services lowering the global economy's risk profile by creating solutions to our most pressing economic and environmental risks
- committing more capital to R&D and owning more intellectual property than their peers
- run by effective, diverse executive teams and boards of directors with track records of increasing revenues and expanding margins, leading to earnings growth
- exhibiting sound financial fundamentals
- trading at compelling valuations relative to proven and anticipated growth, within acceptable levels of risk

Portfolio Construction

The Next Economy Index utilizes active research and stock selection, and passive portfolio construction to reflect the Next Economy – the innovation-driven, highly efficient, solutions-oriented sustainable economy that is rapidly unfolding.

All companies that pass Green Alpha's top-down and bottom-up research processes with sufficiently high proprietary scores are included in the Next Economy Index portfolio. All other Green Alpha portfolios contain subsets of companies held in the Next Economy Index.

Largest Positions

How The Next Economy Index is driving progress toward the Next Economy

First Solar (Sector: Energy, Industry: Renewable Energy)

- First Solar manufactures solar panels and provides utility-scale PV power plants and supporting services, including finance, construction, maintenance, and end-of-life panel recycling. FSLR uses rigid thin-film modules for its solar panels and cadmium telluride (CdTe) as a panel semiconductor.
- Unique among large solar manufacturers, First Solar is a U.S.-headquartered company and does not use crystalline silicon (c-Si) semiconductors. That means they have fewer supply chain dependencies than traditional c-Si solar PV makers and avoid dependencies on China, which dominates the c-Si industry.
- The company plans to grow revenues by investing \$1.1 billion in a new, 3.5 GW module factory in Alabama, the company's fourth domestic facility, while an additional \$185 million will add 1 GW of new manufacturing to the company's plant in Ohio.
- Under the recently passed Inflation Reduction Act, First Solar could earn as much as 17 cents per watt in subsidies—the highest in the industry, and more than half of their reported production cost per watt.
- First Solar has a vertically integrated manufacturing process providing the lowest carbon footprint and fastest energy payback time available.
- The board of directors is 25% women, including the Lead Independent Director and Audit Committee Chair. The Chief People & Communications Officer is also female. Importantly, the executive team boasts an above-average age spread of 32 years.

Moderna (Sector: Health Care, Industry: Biotech & Pharma)

- Discovery-to-clinical-stage biotech focused on using messenger RNA to develop and deploy therapies and vaccines. Moderna's revolutionary science has existing and potential applications for many areas, including oncology, infectious and cardiovascular diseases.
- Robust early-and-advanced stage pipeline means future growth may be impressive even excluding revenues from their COVID-19 vaccine, although the vaccine has accelerated their time to profitability as well as their ability to fund further research and trials. Interesting vaccines in their pipeline include those for HIV and CMV. Moderna is not just pioneering new medicines, but *new categories* of medicines, potentially transforming medicine overall.
- The Q4 2022 announcement of a partnership with Merck to develop personalized cancer vaccines is a positive indication of a potential forward revenue driver. In addition, Moderna is running 33 development programs, including 26 in the clinic, showing both broad and deep product potential.
- Moderna's executive team exhibits good diversity, with four female Chief-level officers making up 36% of the group. In addition, the board includes three women, two of whom chair the Audit and Product Development Committees.

IBM (Sector: Technology, Industry: Software & Tech Services)

- IBM is a world leader in driving innovation to mitigate global risks. Having divested from its legacy managed-infrastructure business, IBM has re-emerged as a Next Economy™ powerhouse. Their primary initiatives include blockchain code and technology, cloud computing, AI and machine learning, and quantum computing. IBM has said that

IBM, Enphase Energy, and Array Technologies' Next Economy attributes are continued on the following page.

| Company Name | Ticker | Weight |
|---------------------|--------|--------|
| First Solar | FSLR | 1.80% |
| Moderna | MRNA | 1.35% |
| IBM | IBM | 1.27% |
| Enphase Energy | ENPH | 1.20% |
| Array Technologies | ARRY | 1.19% |
| Cisco Systems | CSCO | 1.15% |
| Shoals Technologies | SHLS | 1.11% |
| Extreme Networks | EXTR | 1.10% |
| Flex Ltd | FLEX | 1.07% |
| Vestas Wind Systems | VWDRY | 1.04% |
| % of Portfolio | | 12.28% |

Largest Positions *continued*

IBM *continued*

- ...these innovations “can exponentially alter the speed and scale at which we can uncover solutions to complex problems. We’ve come to call this accelerated discovery.”
- After filing the most U.S. patents annually for 29 straight years, in 2022 IBM pivoted to create more open-source code and platforms, and so was awarded the 2nd largest number of U.S. patents after Samsung. We view this as positive to IBM’s ability to scale as the data economy evolves. They remain among the largest IP holders across many domains: cloud and cognitive software; quantum computing; enabling distributed ledger; pioneering AI; developing security methods atop lattice cryptography; and advancing nanotechnology.
- Women comprise 33%+ of IBM’s workforce. Women with significant authority include the COO, General Counsel, and CHRO. IBM is a longstanding leader on pay equity for both women and minority populations.

Enphase Energy (Sector: Energy, Industry: Renewable Energy)

- Enphase Energy is the world's leading supplier of solar microinverters, completing all-in-one solar panel systems for residential and commercial use. Enphase pioneered semiconductor-based microinverters for DC/AC conversion and paired with proprietary network and software technology, resulting in advanced energy monitoring and control.
- Recently, Enphase extended its business into the fast growth markets of battery energy storage and EV charging stations, both of which benefit from its smart inverter expertise. All Enphase systems with microinverters and batteries use the IQ System Controller device, which automatically detects and switches from grid power to backup battery in the case of a power outage.
- The company has installed more than 48 million microinverters on over 2.7 million homes in over 145 countries, shipped over 17 GW of DC microinverters and provided over 692.98 MWh of storage.
- Females comprise 25% of Enphase’s executive team, including the CFO, CMO, and General Counsel. Importantly, both the executive team and board of directors have significantly above-average age spreads of 38 years.

Array Technologies (Sector: Energy, Industry: Renewable Energy)

- Leading renewable energy company that provides utility-scale solar tracking solutions. The Company offers solar tracking equipment to utilities, corporations, small businesses, and homeowners. Array Technologies serves customers worldwide.
- The company has shipped or awarded over 42 GW, which is equivalent to 23% of the installed utility-scale capacity in North America, Europe, Latin America, and Australia.
- Array Technologies will benefit from three main sections of the recently passed Inflation Reduction Act, which together represent significant benefit to the company from 2023:
 - ✓ The IRA subsidy of \$0.87 per kilogram for torque tubes gives a \$789 subsidy per ton to what appears to cost \$630-\$740 per ton – torque tubes are the largest cost input for trackers.
 - ✓ In addition to torque tubes, Array makes and sells the structural fasteners that hold panels in place as they rotate to face the sun. These have a subsidy from the IRA of \$2.28 per kilogram.
 - ✓ As an American provider of solar parts, Array contributes to a project's eligibility for the 10% added to income tax credits.

Macroeconomic Commentary



The world, and economy, were complex and volatile throughout 2022. In Green Alpha's [signature investing style](#)—combining macro trajectory analysis, identification of problem-fixing companies, fundamental data, and active, benchmark-agnostic portfolio construction—we helped our clients gain market exposure to the Next Economy.

Investing in what's next (as opposed to what was) means valuing innovation and extrapolating the world economy as it is today into what it is likely to become over the next five to ten years. Within that longer-term context, it can be a challenge to make sense of current events, from geopolitical flare-ups to stock market turmoil. If one's investing time frame is a year or two, strategies aimed at the growth of the Next Economy may feel volatile. And indeed, most of our strategies underperformed their benchmark index for the year.

Throughout 2022, inflation remained high and interest rates climbed globally. Tied to the looming threat of recession, stocks have been broadly down, and some sectors have been hit harder than others. Many of the sectors in which companies' share prices dropped the most are within our sphere of interest to invest in and benefit from long-term trends and opportunities. Please see page 7 for portfolio-specific attribution results for the year, as well as since-inception performance numbers.

2022 Macroeconomic Highlights

This year proved that people can collectively coordinate to solve real problems. Within Europe, in 2022 alone, natural gas usage was [down between 21% and 35%](#), depending on the country, while [solar generation capacity was up 47%](#). Surely this shows that people and nations *can* come together to more rapidly decarbonize world energy systems, if properly motivated.

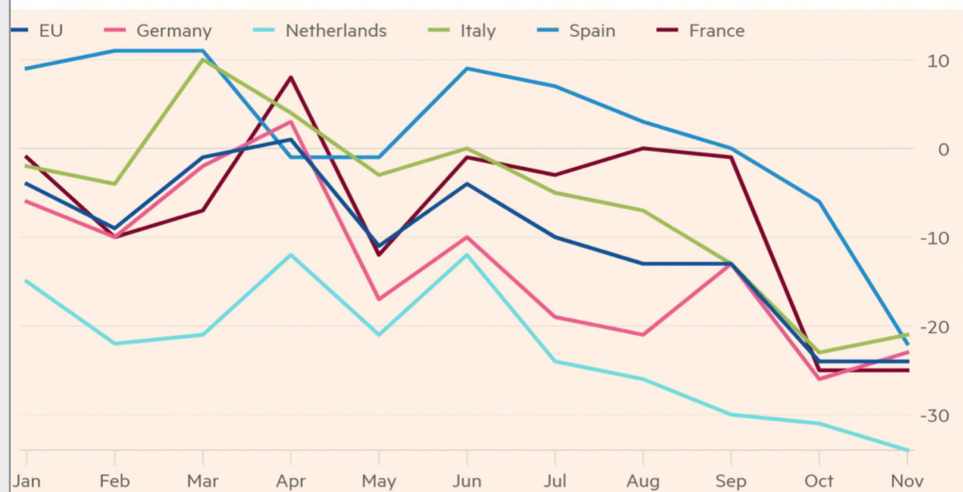
In genomics, 2022 saw [dramatic evidence](#) that one-time therapeutics can treat some types of cancer, a vaccine to prevent malaria became available (and is [already in use](#)), and universal flu and RSV vaccines were developed. 2023 promises more next-gen vaccines.

In space, the James Webb Telescope and the Double Asteroid Redirection Test ([DART](#)) mission were historic advancements in human capabilities and research processes. Artificial intelligence [advanced its capabilities](#) dramatically with clear implications for large-scale problem solving and economic productivity acceleration. Quantum computing, as it has the last several years, continued to make progress toward more generalized usefulness and commercial applications.

Gas demand in Europe drops



Reduction vs five-year average %



Source: Financial Times via <https://www.exponentialview.co/>

Macroeconomic Commentary *continued*

The ultimate synergies that will emerge between AI, machine learning, and quantum computing could make this year's headlines around [Chat GPT](#) and [DALL·E 2](#) seem relatively minor.

So, innovation is accelerating, renewable energies are proliferating, medicine is in unprecedented territory, AI is becoming more powerful, and the groundwork is being laid to set the stage for ever more dramatic and rapid progress.

And yet, these accomplishments are not equaled in the realm of policy. In spite of ambitious agreements signed at 27 COPs, 2022 saw a historic, [new record](#) level high of carbon emissions. [According to the IPCC](#), whose language must be unanimously approved by a very conservative group of [195](#) nations, “policies currently in place point to a 2.8°C temperature rise by the end of the century. Implementation of the current pledges will only reduce this to a 2.4-2.6°C temperature rise by the end of the century.” If we ask ourselves why the mismatch between political ambition and reality, it comes down to investments. Not enough capital has been directed toward the fixes to the climate crisis, and too much continues to be poured into fossil fuels-oriented sectors and companies.

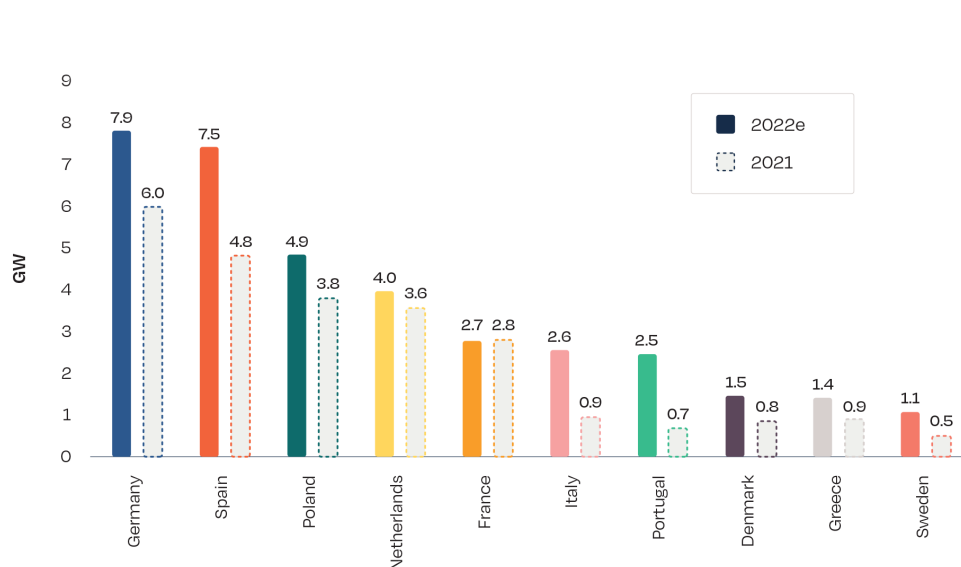
Green Alpha Investments in 2022

The world today is a constantly, rapidly, and dynamically changing environment; and therefore, Green Alpha is continually evolving our portfolio strategies to ensure best alignment with our thesis. This year, we continued to refine our methodologies and approach to address concepts, such as, but not limited to, more emphasis on social cohesion, equity, equality, and diversity of leadership. We also worked to improve our understanding of and exposure to food systems, from farms and manufacturing to packaging and grocery store distribution. We continued our focus on identifying leaders in advanced biotech, with the understanding that this is a [truly transformative](#) moment in that field, and for the global economy. Property development and management have always posed investment challenges for us; this year we renewed our focus on finding and investing in the REITs that are doing more to solve sustainability challenges than to cause them, while exhibiting excellent fundamentals and returning an above-market dividend. The application of our thesis is refined continually as we hone our objectives and turn those into investment actions.

Green Alpha Investments in 2023 and Beyond

For 2023, Green Alpha is evaluating economic conditions based on first, clear evidence that innovation is increasing both economic productivity and environmental sustainability, and second, with the sober awareness that the world

EU27 TOP 10 SOLAR PV MARKETS 2021-2022



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Macroeconomic Commentary *continued*

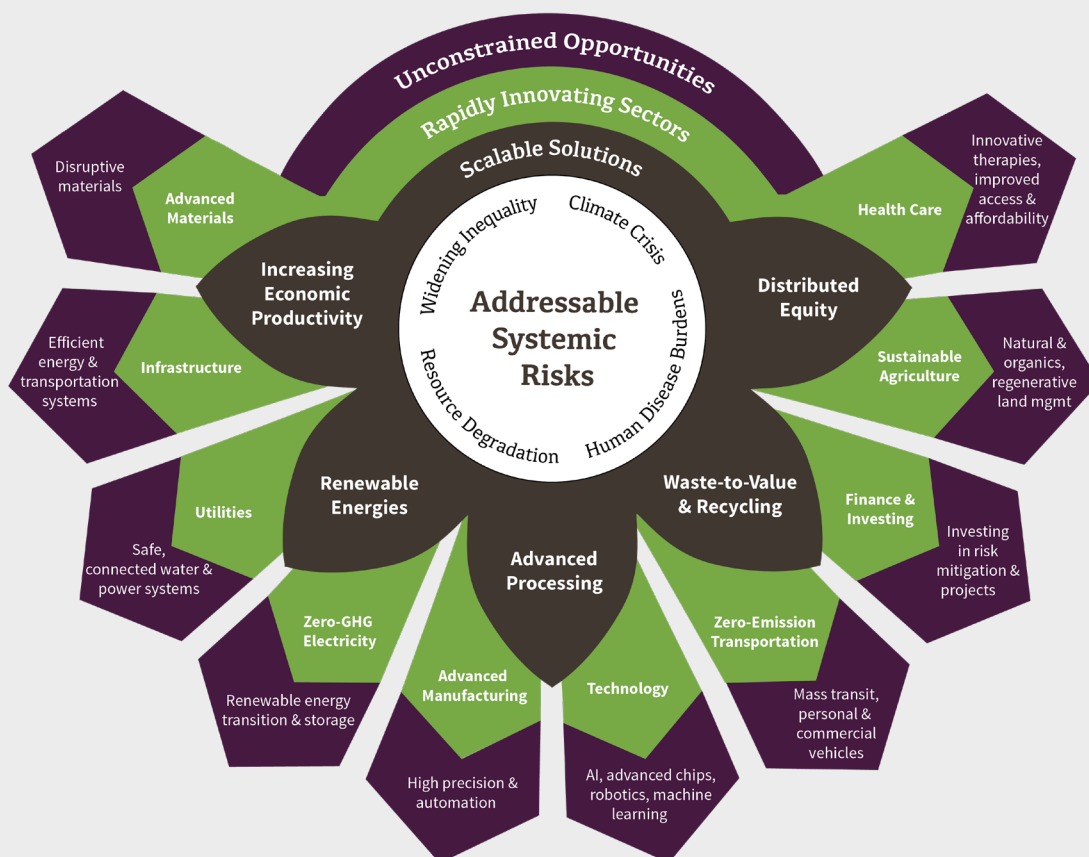
is in many ways still failing to affect sustainability transitions rapidly enough to prevent irreversible, deleterious outcomes. Within those dynamics, we look for opportunities to invest for long-term growth and maximum impact.

As an industry, asset management continues to be overwhelmingly backward-looking, investing in industries that have been important historically, but have far less relevance now and in the future. The desire to change and update the status quo is the source of our long-term competitive track records and is also one of the reasons we founded Green Alpha. The general idea that the economy 10 years hence will essentially be the same economy of 10 years ago is a major market inefficiency. The market of the last 1.5 years, sometimes called a “risk-off market environment,” is a manifestation of that inefficiency, wherein things like potential cures for disease and limitless, very cheap energy have been oversold, in deference to fossil fuels and other 19th century technologies.

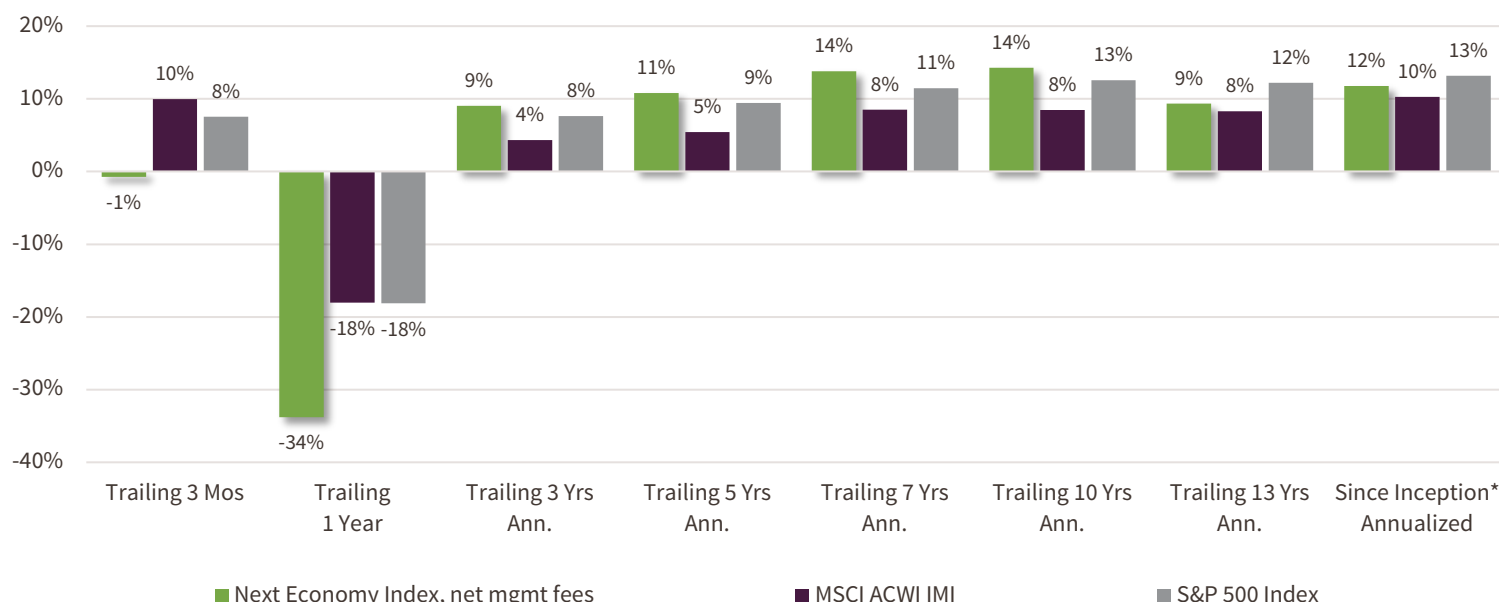
Green Alpha’s Investment Philosophy in Action

We believe that, over time, a company with superior outcomes will see those results reflected in their market returns. Therefore, we refuse to change direction or wander into style drift in the face of downward volatility. On the contrary, we understand that the best time to buy high conviction companies is when they are trading at a discount.

Stocks benefitting from multiple tailwinds, and trading at reasonable prices, will continue to be our focus, even though—and even because—this does not correlate with today’s short-term market orientation. The time horizon mismatch between our investment approach and the markets’ is ultimately okay: we are simultaneously disappointed in a year of underperformance and excited by the opportunity to invest in compelling Next Economy companies at steep discounts relative to the future results we expect from them. To our clients and partners who share our vision, please accept our sincere appreciation. See you in 2023.



Portfolio Performance & Commentary



For full year 2022, Green Alpha's Next Economy Index returned -33.8% net of management fees, versus its benchmark, the MSCI All Country World Investable Market Index (MSCI ACWI IMI), which returned -18.0%. In short, 2022 was a classic manifestation of a "risk-off market environment," which does not favor Green Alpha's investment style of focusing on innovation as the key to solving problems, growing the economy, and raising standards of living.

The sectors detracting the most from the strategy's returns were Technology and Health Care.

- There was really no area within the Technology sector that performed well in 2022. Losses in the sector came from the technology hardware & semiconductors, software, and semiconductors industries. The world's leading designer of chips and systems for AI, data centers, and automation led decreases due to a combination of inflation pressures, supply chains issues, and government mandated reduced ability to sell in China. Other companies contributing to losses are in upstream semiconductor equipment manufacturing and foundry services. Within the software industry, declines were led by enterprise, engineering, and content software developing.
- Within the Health Care sector, the biotechnology and pharmaceuticals, and medical equipment and devices manufacturing industries detracted the most from the portfolio's returns. Within biotechnology, leading developers of mRNA-based therapies and vaccines, along with gene editing-based therapeutics companies, disproportionately contributed to losses. In the medical equipment and devices manufacturing industry, losses came from manufacturers of gene sequencing technology.

The strategy's best performing sectors were Energy and Financials.

- Gains in the Energy sector came from renewable energy equipment manufacturing, specifically thin film module manufacturing and solar tracking technologies. In addition, balance-of-systems technologies—such as solar inverters and storage-related technologies—contributed to gains.
- The Financials sector was the second-best contributing sector to the portfolio, which in the environment of 2022, essentially means that lack of exposure to conventional financials index constituents represented some measure of downside protection. A leading provider of venture debt financing and an AI-enabled insurance platform both remained unchanged in 2022, as they proved resilient to interest rate hikes.

**Portfolio Inception: December 31, 2008. All returns presented above that are greater than 1 year in length have been annualized. Performance data quoted represents past performance. Past performance does not guarantee future results and current performance may be lower or higher than the data quoted. Please see the final page of this document for additional important disclosures.*

Next Economy Index

How our portfolios compare to their benchmark, the MSCI All Country World Investible Market Index

Characteristics

- **Largest Next Economy basket** – by definition, the Index is the most diversified Green Alpha portfolio by number of stocks; all stocks that pass Green Alpha's top-down and bottom-up investment processes enter the Index
- **Fundamentals-driven:** the underlying quality of companies and the price paid for their shares are key drivers of LT returns
 - ✓ **High growth:** indicated by Sales Growth, and a decrease from Current P/E to Forward P/E as revenue and earnings grow
 - ✓ **Compelling valuation:** demonstrated by Price/Sales and Price/Book metrics relative to growth expectations
 - ✓ **Strong balance sheet and management execution:** conveyed by capital stewardship, LT Debt/Equity, and Current Ratio
- **Fossil fuel free since inception:** we have never invested in companies that prospect, extract, refine, or transport fossil fuels, nor in fossil-fired utilities or internal combustion engine manufacturers
- **Diversified – we seek solutions wherever we can find them:** across the globe, in companies of all sizes, and every industry
- **Public equities, long-only:** most investors' largest asset class; largest opportunity for impact

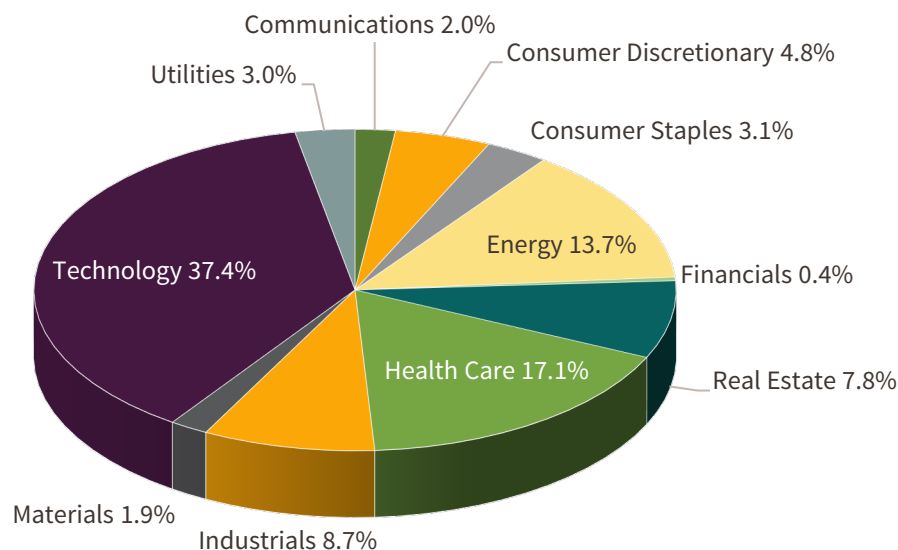
| Characteristics | Next Economy Index | Benchmark: MSCI ACWI IMI (SPGM) | Social Index | Next Economy Select | Growth & Income | Sierra Club Green Alpha | DiversiTerra |
|-----------------------------|--------------------|---------------------------------|--------------|---------------------|-----------------|-------------------------|--------------|
| # of Securities | 142 | 2,488 | 100 | 62 | 35 | 47 | 57 |
| Active Share | 94% | - | 95% | 97% | 97% | 97% | 96% |
| Sales Growth, Trailing 3-Yr | 36% | 10% | 30% | 43% | 23% | 44% | 43% |
| P/E, Current | 16.1 | 14.2 | 17.5 | 15.3 | 14.8 | 18.8 | 18.1 |
| P/E, 1-Year Forward | 16.5 | 13.8 | 19.0 | 14.2 | 15.3 | 17.7 | 18.6 |
| Price/Sales | 2.0 | 1.7 | 2.0 | 1.7 | 1.6 | 1.3 | 1.9 |
| Price/Book | 2.7 | 2.3 | 2.6 | 2.1 | 1.7 | 2.3 | 2.7 |
| LT Debt/Equity | 120% | 169% | 101% | 71% | 59% | 70% | 124% |
| Current Ratio | 3.4 | 2.4 | 3.8 | 4.5 | 2.9 | 2.8 | 3.2 |
| Dividend Yield | 1.31% | 2.37% | 1.20% | 2.07% | 4.59% | 1.61% | 1.50% |
| Market Cap., Wtd Avg (\$B) | \$60.81 | \$261.38 | \$59.18 | \$75.53 | \$66.85 | \$73.44 | \$78.74 |
| Market Cap., Median (\$B) | \$8.34 | \$2.06 | \$8.56 | \$4.59 | \$29.07 | \$9.96 | \$5.68 |
| Turnover, Trailing 2-Yr Avg | 32% | Not Available | 39% | 17% | 19% | 20% | 31% |
| Beta, Trailing 2-Yrs | 1.15 | 1.00 | 1.21 | 1.11 | 1.16 | 1.12 | 1.15 |
| U.S.-Domiciled Companies | 76% | 57% | 85% | 68% | 70% | 69% | 81% |
| % Revenue Derived in U.S. | 49% | 43% | 55% | 47% | 48% | 47% | 58% |

All characteristics are sourced from FactSet, are based on a representative account and include cash. Please see the final page of this document for additional important disclosures.

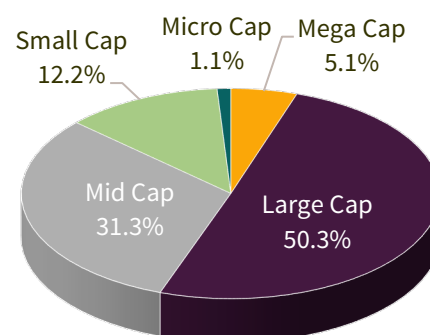
Portfolio Allocations

Our search for Next Economy companies is unconstrained. For the Next Economy Index, we seek solutions to systemic risks wherever they exist – across sectors, market caps, and geographies.

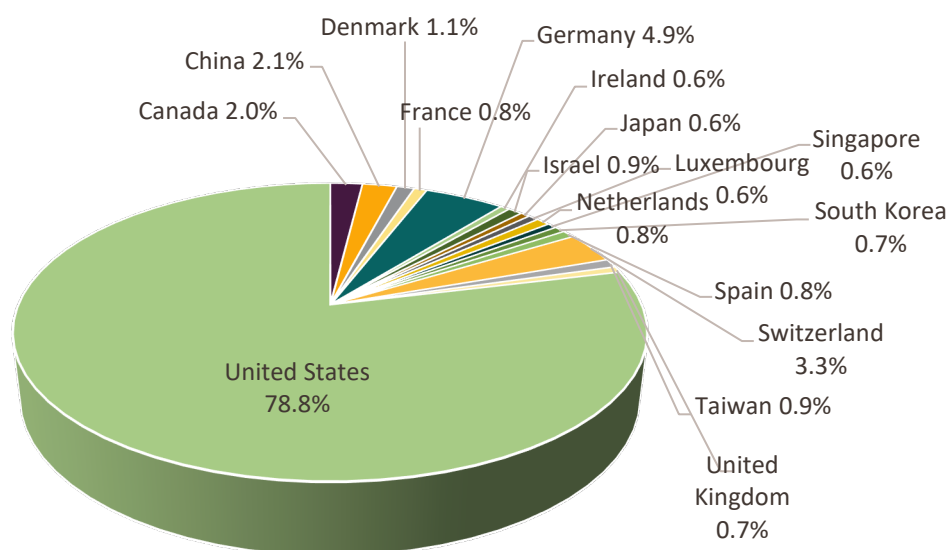
Economic Sectors



Market Capitalizations



Companies' Main Headquarters



Allocation data is sourced from FactSet and is based on a representative account. The exception is the sector chart, which utilizes the Bloomberg Industry Classification Standard from Bloomberg. All charts on this page are shown as percent of equity. Please see the final page of this document for additional important disclosures.

Important Disclosures

- Green Alpha Advisors, LLC is a registered investment advisor. Registration as an investment advisor does not imply any certain level of skill or training.
- Green Alpha Investments is a trade name of Green Alpha Advisors, LLC. Green Alpha is a registered trademark of Green Alpha Advisors, LLC. Green Alpha Advisors also owns the trademarks to “Next Economy,” “Next Economics,” “Next Economy Portfolio Theory,” “Investing in the Next Economy,” and “Investing for the Next Economy.”
- Performance quoted throughout this document represents past performance. Past performance does not guarantee future results, and current performance may be lower or higher than the data quoted. Investment returns and principal will fluctuate with market and economic conditions, and investors may have a gain or loss when shares are sold.
- Beginning November 30, 2021, the Next Economy Index performance results are a composite of discretionary client accounts invested in the strategy on specific custodial platforms. Green Alpha’s discretionary client accounts that are not included in the composite are those custodied at Folio Institutional due to operational limitations of Folio’s data feeds to Green Alpha’s portfolio accounting system Advent APX. The Next Economy Index composite performance results reflect actual performance for a composite of discretionary client accounts, net of actual management fees and transaction costs. Some assets managed in the Next Economy Index strategy within the composite receive a reduced fee from the standard management fee schedule. Actual client returns experienced will vary from the composite returns based on a variety of factors, and we encourage you to ask about specific factors. Accounts are included in the composite for full-month periods under management with Green Alpha Investments. The Next Economy Index performance results do not reflect the reinvestment of dividends and interest.
- Actual advisory fees may vary among clients with the same investment strategy. Green Alpha’s standard fee schedules are available within Form ADV Part 2. For those details and additional legal information, please see information and files here: <http://greenalphaadvisors.com/about-us/legal-disclaimers/>.
- From the strategy’s inception through November 30, 2021, Next Economy Index performance results reflected the actual performance of a representative account, net of actual management fees and transaction costs. Assets managed in the Next Economy Index strategy representative account received a reduced fee from the standard fee schedule. Next Economy Index representative account performance results did not reflect the reinvestment of dividends and interest. Please contact Green Alpha for information about the representative account selection process.
- Green Alpha portfolios may invest in companies with small and medium market capitalizations, which may have more limited product lines, markets, and financial resources than larger companies. In addition, their securities may trade less frequently and in more limited volume than those of larger companies. Small or mid-cap stocks may be more volatile than those of larger companies and, where trading volume is thin, the ability to dispose of such securities may be more limited. Green Alpha portfolios may also invest in foreign domiciled companies. Investing in foreign securities may involve additional risks, including exchange-rate fluctuations, limited liquidity, high levels of volatility, social and political instability, and reduced regulation. Emerging markets are often more volatile than developed markets and investing in emerging markets involves greater risks. International investing may not be suitable for everyone. An investment in Green Alpha portfolios should be considered a long-term investment.
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- The MSCI All Country World Investable Market Index (ACWI IMI) captures large, mid, and small cap representation across 23 developed markets and 27 emerging markets countries. With more than 8,750 constituents, the index is comprehensive, covering approximately 99% of the global equity investment opportunity set. Investors cannot invest directly in this index.
- The SPDR MSCI Global Stock Market ETF (ticker: SPGM) seeks to provide investment results that, before expenses, correspond generally to the price and yield performance of the MSCI ACWI IMI. Investors can invest directly in SPGM.
- The S&P 500 Index is an unmanaged index of 500 common stocks chosen for market size, liquidity, and industry group representation. It is market-value weighted. The S&P 500 Index figures do not reflect any fees, expenses, or taxes. Investors cannot invest directly in this index.
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