

Growth & Income

March 31, 2023

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 Growth & Income?

- Active research, stock selection, and portfolio management
- Lower volatility portfolio producing above-market dividend income, while seeking long-term capital preservation and growth
- 25-45 global, market-leading companies developing solutions to core economic and environmental risks

Inception Date: December 31, 2012

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 Growth & Income portfolio is designed to harness the powerful combination of growth and current income within one portfolio. Portfolio holdings are selected for current or potential dividend yield, coupled with strong revenue growth, bought at a reasonable price.

The Growth & Income strategy typically exhibits lower short-term volatility than broad market indices and other Green Alpha portfolios, while providing a competitive dividend yield.

Largest Positions

How the Growth & Income portfolio is driving progress toward the Next Economy

Horizon Technology Finance (Sector: Financials, Industry: Specialty Finance)

- Horizon Technology Finance Corp is a publicly traded specialty finance company that provides secured loans to venture capital and private equity-backed companies in the technology, life sciences, healthcare information and services, and cleantech industries.
- Horizon has deployed more than \$5 billion in venture loans, including their current ~\$720 million book, to more than 300 businesses in the underserved venture loan space.
- The loan portfolio is conservatively managed with transactions usually well below their maximum of \$35 million and terms of 3-5 years backed by security of offering debt on a “first lien” or “first lien behind a bank revolver” basis. They often partner with other institutions to reduce transactional risk.
- Horizon focuses on providing flexible and customized financing solutions to its portfolio companies, including growth capital, equipment financing, working capital lines of credit, and acquisition financing. Their lending strategies are designed to meet the unique needs of early and growth-stage companies, with a focus on companies that have the potential for rapid growth and strong market positions.
- Technology, sustainability, life sciences, and healthcare technology companies are attracting record investments on the VC side. This means Horizon enjoys a growing total addressable market in an underserved debt arena and offers the opportunity to invest in a venture loan fund that constitutes a diversified basket of privately held Next Economy™ companies via a single stock.
- Horizon Technology Finance is committed to maintaining a strong balance sheet and managing risk effectively, with a focus on generating attractive risk-adjusted returns for its shareholders. The company also emphasizes the importance of corporate responsibility, including ethical business practices, environmental sustainability, and community engagement.

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 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.

Taiwan Semiconductor, Brookfield Renewable, and Deutsche Telekom’s Next Economy attributes are described on the following page.

Company Name	Ticker	Weight
Horizon Tech. Finance	HRZN	6.72%
IBM	IBM	5.84%
Taiwan Semiconductor	TSM	5.79%
Brookfield Renewable	BEPC	5.31%
Deutsche Telekom	DTEGY	4.59%
% of Portfolio		28.25%

Largest Positions *continued*

Taiwan Semiconductor *(Sector: Technology, Industry: Semiconductors)*

- Taiwan Semiconductor Manufacturing Company Limited (TSMC) is a Taiwanese multinational semiconductor contract manufacturing and design company. It is the world's most valuable semiconductor company, the world's largest dedicated independent (pure-play) semiconductor foundry.
- TSMC is a contract manufacturer, meaning it does not design or sell its own chips; it manufactures chips for other companies, including Apple, Qualcomm, and NVIDIA. TSMC's customers include some of the world's largest technology companies, and the company's chips are used in a wide range of products, including smartphones, computers, and cars.
- TSMC is by far the largest semiconductor foundry in the world with 54% market share overall and 92%+ market share of the world's most advanced chips. It is one of two companies capable of producing advanced 3-nanometer tech, and ahead on the next generation as it prepares to produce 2-nanometer chips in 2023.
- The company relies solely on internally generated funds to finance organic growth, capacity expansion, and R&D; it only invests in practical growth, never engaging in share buybacks.
- The company features strong fundamentals, including a fortress-like balance sheet and outstandingly high credit ratings.
- Their new Arizona plant will make advanced 3-and-5-nanometer transistors. The factory is expected to be operational by 2024, and it will be TSMC's first fab in the United States.
- TSMC's executive team includes several women in positions of high authority, including the President of TSMC Europe.

Brookfield Renewable *(Sector: Utilities, Industry: Electric Utilities)*

- Brookfield Renewable is a leading renewable power company that owns and operates a portfolio of solar, wind, and hydroelectric power generation and storage facilities in North America, South America, Europe, and Asia.
- Brookfield is one of the largest renewable power companies in the world, with a portfolio of over 24,000 megawatts of generating capacity. The company's mission is to provide sustainable energy solutions that help people and businesses thrive. They are committed to developing and operating renewable energy projects that are environmentally responsible, socially beneficial, and economically viable.
- Brookfield is conservatively managed, continually looking for acquisitions at favorable prices and organic development to grow generation capacity, and has revenues largely backed by long-term PPAs. Brookfield is inflation resilient and may benefit from an inflationary environment, because their generating costs are fixed but their PPAs are indexed to inflation.
- Women comprise 30% of board directors (including the Audit Committee Chair), 25% of overall workforce, and 26% of the exec team. The exec team has a robustly above-average age spread of 48 years, as does the board at 38 years.

Deutsche Telekom *(Sector: Communications, Industry: Telecommunications)*

- Deutsche Telekom is a multinational company with operations in more than 50 countries. The company's main businesses are fixed-line telecommunications, mobile telecommunications, and information and communication technology (ICT). They also have smaller businesses, including media and entertainment, and real estate.
- Deutsche Telekom has a strong track record of innovation, particularly in the field of telecommunications. For example, the company was one of the first in Europe to offer 5G services, and it has also invested heavily in research and development to stay at the forefront of emerging technologies.
- Deutsche Telekom is well-positioned to continue to grow in the years to come. The company is investing heavily in new technologies, such as 5G, fiber optic networks, and cloud computing. These investments will allow them to offer its customers the latest and most innovative telecommunications services.
- They are a shareholder in T-Mobile U.S., the 2nd largest mobile telecomm provider in the America. T-Mobile U.S. is a growth company, and Deutsche Telekom's investment is a material driver of Deutsche Telekom's overall growth.

Please see the final page of this document for important disclosures about portfolio, benchmark, and characteristic information.

Macroeconomic Commentary



In the first quarter of 2023, the global economy continued to be characterized by the key challenges of 2022, including the ongoing COVID-19 pandemic, the war in Ukraine, rising inflation, and interest rate hikes. These challenges have had a significant impact on economic growth, trade, and investment, which has led to continued high market volatility.

For Green Alpha strategies, January 2023 provided double-digit performance gains as some of the above-listed concerns seemed to be easing, and then tougher markets in February and March as some issues seemed to reassert themselves, capped off by a positive rally at quarter-end as markets reverted to a more January-like dynamic. And yet, in context, inflation, interest rate concerns, and even geopolitical conflicts have historically been short-to-medium term sources of market volatility. As always, we endeavor to think about the longer term, and position our portfolios to preserve and grow our clients' purchasing power over multi-cycle periods.

And yes, the global economy is also facing long-term challenges, such as the climate crisis, inequality, and technological change. These challenges will require governments, businesses, and individuals to work together to find solutions, and, in overcoming them, the world will make significant—it is not an exaggeration to say unprecedented—investments in the best of these solutions. The patient, forward-looking investor therefore stands to benefit. To illustrate, let's look at a couple of sectors that saw big changes in Q1.

Carefully Navigating Tech's Rapidly Evolving Landscape

The way we understand the tech economy is changing dramatically. Large language models (LLM) are exponentially improving, seemingly by the week, and traditional search and ad serving businesses are looking less like the indefinite cash cows that they did just last year. The codes for these models are improving so fast, in part, because the models themselves are becoming partially self-recursive in that they produce content not only in natural language but in code itself, meaning software engineers now have very capable "co-pilots" to help them develop the next LLM iteration faster than the last (this is part of why we don't buy the general argument that productivity gains have flatlined). Ultimately, these models will be capable of generating ever-improving versions of themselves without direct human intervention and will be limited only by the capabilities of their underlying hardware.

Speaking of which, we can't let this subject pass without acknowledging a key vulnerability to the global economy: utter dependence on the Taiwan Semiconductor Manufacturing Company (TSMC). According to [recent reporting in Wired](#), TSMC is home to "the world's biggest logic chip manufacturing capacity and produces, by one analysis, a staggering 92 percent of the world's most avant-garde chips...Perhaps more to the point, TSMC makes a third of all the world's silicon chips, notably the ones in iPhones and Macs. Every six months, just one of TSMC's 13 foundries—the redoubtable Fab 18 in Tainan—carves and etches a quintillion transistors for Apple. In the form of these miniature masterpieces, which sit atop microchips, the semiconductor industry churns out more objects in a year than have ever been produced in all the other factories in all the other industries in the history of the world." Unfortunately, this stunning and so far, singular capability resides on one island whose government believes it is a sovereign nation, but that is also claimed as territory by China.

Let's face facts: the wonders we see from the LLMs don't occur in isolation. OpenAI, Microsoft, Google, Nvidia, Apple, and many more tech titans are utterly dependent on this one island with its N-of-One capabilities. The complex code that gives us ChatGPT and its kin have been made possible by the technological achievements at TSMC that brings forth the hardware capable of running these monster programs.

Continued on the following page

Macroeconomic Commentary *continued*

To run ChatGPT and others, [Microsoft Azure says](#) they leverage up to “thousands of NVIDIA H100 GPUs interconnected by NVIDIA Quantum-2 InfiniBand networking,” all made at TSMC. We’re not big on fossil fuel analogies here at Green Alpha but imagine a world where Saudi Arabia has 92% of the world’s oil reserves and is at the same time struggling to maintain its independence from a determined world superpower. This overwhelming dependency on TSMC means the world’s economy is far more vulnerable to disruption than is generally assumed, and of course also means that TSMC is a significant holding in many Green Alpha investment strategies. Challenge and opportunity, hand-in-hand, as always.

Volatility is Unlocking Opportunities: Investing in REITs

Tech isn’t the only place where the challenge/opportunity dynamic exists. We can also see it in the more prosaic field of real estate. Real Estate Investment Trusts (REITs) have had a tough time in 2022 and Q1 2023 in the face of unprecedented Federal Reserve rate hikes and the ongoing phenomenon of work-from-home catalyzed by COVID-19. This pair of headwinds has caused even some of the highest quality REITs to be down more than 70% in the trailing year at the end of Q1 ’23, and, clearly with some justification. Looking more closely, though, we can see that not all REITs are, by any means, equal. While many mid-tier and lower quality office REITs are reporting occupancy levels not much better than 50%, the highest quality office REITs, with AAA space, great sustainability profiles, and in desirable markets, are more than 90% occupied with relatively strong lease pricing power.

Moreover, specialty REITs like those providing lab space for biotechnology are actively growing. The predilection of traders and algorithms to bid down the entire sector is basically a scorched earth approach that has resulted in some amazing value opportunities among the gems in the space. Benefitting from these low entry points requires patience, but is not, in our opinion, particularly risky for the long-term investor. It’s all about waiting for markets to appreciate that not all REITs are created equal, and the quality names have been oversold. Meanwhile, REITs compensate us for this patience with returns in the form of a dividend while we wait. This approach isn’t new in investing, it is a straightforward example of time-arbitrage; while we can’t be sure if it is or is not too soon to enter the highest-quality REIT space, we know for sure it is not too late. At some point, it will be.

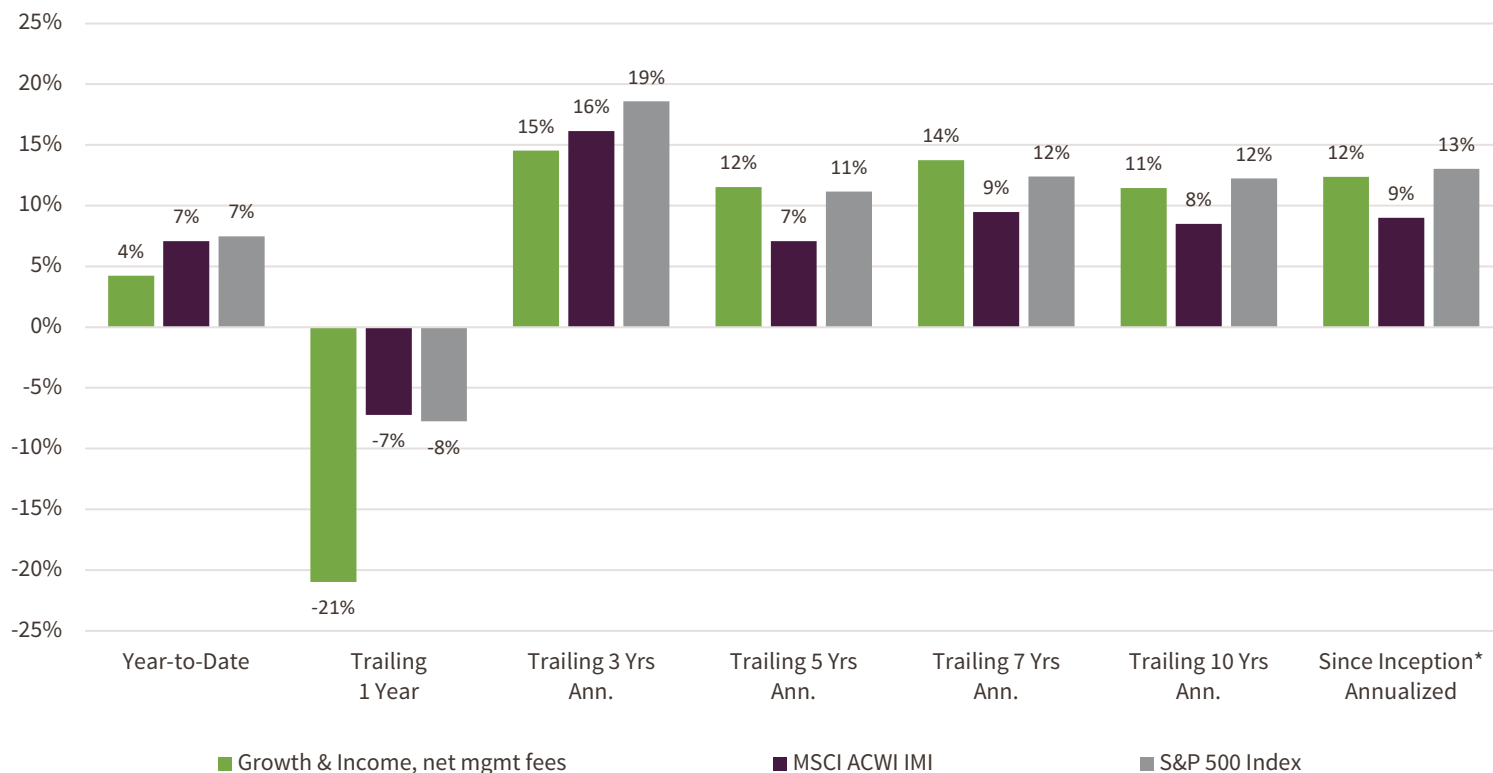
Remain Focused

Tech and REIT stocks are not often particularly correlated. As we’ve seen, they have very different dynamics, dependencies, and fundamentals; holding both is generally considered wise diversification. And yet, we have seen the global leaders in both industries lose share price value recently, even sometimes when their business results were good and improving.

The best thing an investor can do in volatile environments like these is maintain thesis conviction and convert the nearer term challenges into long-term opportunities via a carefully curated basket of securities. Near-term challenges create volatility, long-term challenges show us where to look for growth.

If you are a Green Alpha client, contact betsy@greenalphaadvisors.com to inquire whether your account(s) holds any of the securities listed in this macroeconomic commentary. At the time this commentary was written, Green Alpha held shares in Taiwan Semiconductor Manufacturing Co (TSM), NVIDIA (NVDA), and Apple (AAPL) in some client accounts. No Green Alpha client accounts held shares in Microsoft (MSFT) or Google (GOOG) at the time of authorship. Please see the final page of this document for additional related disclosures.

Portfolio Performance & Commentary



For Q1 2023, Green Alpha's Growth & Income strategy returned 4.22% net of management fees, versus its benchmark, the MSCI All Country World Investable Market Index (MSCI ACWI IMI), which returned 7.09%.

The strategy's top performing sectors were Technology and Utilities.

- Within Technology, the semiconductor value chain contributed the most to returns, including performance from front-end capital equipment makers, chip designers, and foundry manufacturing. Catalysts for semiconductor performance included early implementation of the CHIPS Act, growing recognition of the importance of semis to the global economy, and multiple announcements related to expansion of global production capacity. In the technology hardware industry, communications equipment contributed to gains. Gains were partially offset by declines in technology services.
- In the Utilities sector, the strategy's exposure to a 100% renewables-based global utility was responsible for the sector's positive contributions.

The sectors detracting most from the strategy's returns in the quarter were Real Estate and Health Care.

- Within Real Estate, losses on office Real Estate Investment Trusts ("REITs") were partially offset by gains in industrial, specialty, data center, and infrastructure REITs. Office REITs were under pressure given the interest rate environment and the narrative around work-from-home. However, we believe the highest-quality sustainable office REITs have been oversold vs. industry peers and currently present attractive long-term buying opportunities.
- The Health Care sector, which detracted only modestly from returns, was affected by losses in one of the world's leading mRNA vaccine and therapeutics makers. However, losses were partially offset by gains in a global IP leader in gene-editing technology.

**Portfolio Inception: December 31, 2012. 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.*

Growth & Income

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

Characteristics

- **High Income** – a compelling combination of robust growth and dividend income that is higher than the broad equity market
- **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

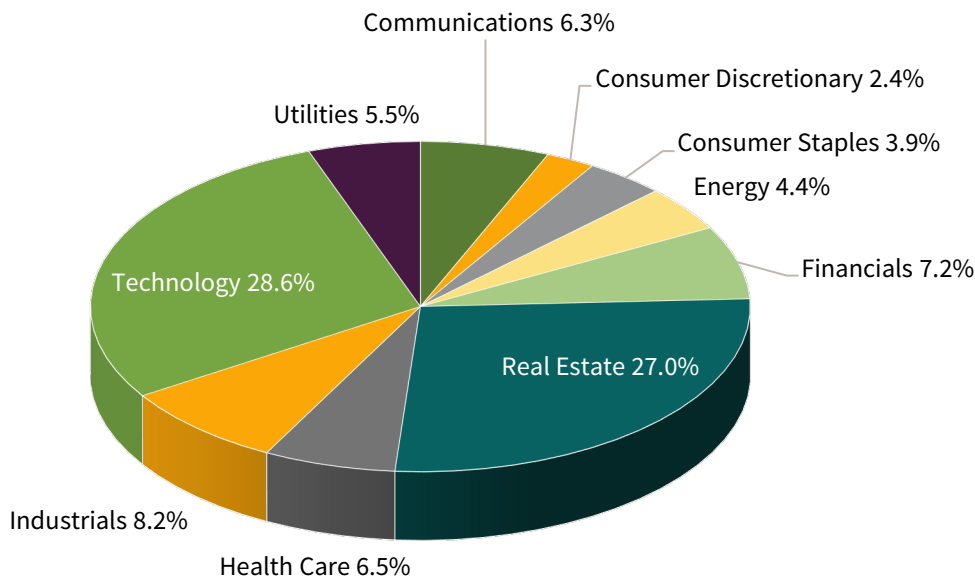
Characteristics	Growth & Income	Benchmark: MSCI ACWI IMI (SPGM)	Next Economy Index	Social Index	Next Economy Select	Sierra Club Green Alpha	DiversiTerra
# of Securities	35	2,488	142	99	63	47	57
Active Share	97%	-	93%	94%	96%	96%	95%
Sales Growth, Trailing 3-Yr	23%	14%	47%	57%	42%	45%	53%
P/E, Current	15.9	16.1	19.8	21.0	16.0	18.7	19.9
P/E, 1-Year Forward	16.0	15.4	20.3	22.1	17.0	19.8	21.7
Price/Sales	1.6	1.6	2.1	2.0	1.6	1.2	1.9
Price/Book	1.7	2.4	3.0	2.8	2.1	2.4	2.6
LT Debt/Equity	63%	138%	105%	92%	93%	95%	97%
Current Ratio	2.7	2.0	3.2	3.8	4.0	2.7	3.2
Dividend Yield	4.42%	2.29%	1.19%	1.10%	1.96%	1.46%	1.46%
Market Cap., Wtd Avg (\$B)	\$84.35	\$326.62	\$88.08	\$86.65	\$103.96	\$104.71	\$109.88
Market Cap., Median (\$B)	\$29.04	\$2.53	\$8.06	\$7.76	\$3.79	\$12.65	\$7.41
Turnover, Trailing 2-Yr Avg	18%	Not Available	12%	43%	12%	21%	32%
Beta, Trailing 2-Yrs	1.20	1.00	1.26	1.30	1.26	1.28	1.26
U.S.-Domiciled Companies	66%	57%	76%	84%	65%	68%	80%
% Revenue Derived in U.S.	45%	43%	48%	53%	43%	45%	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.

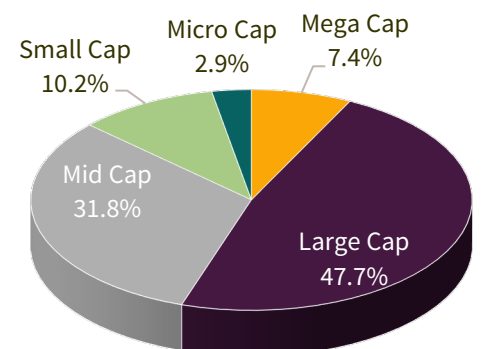
Portfolio Allocations

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

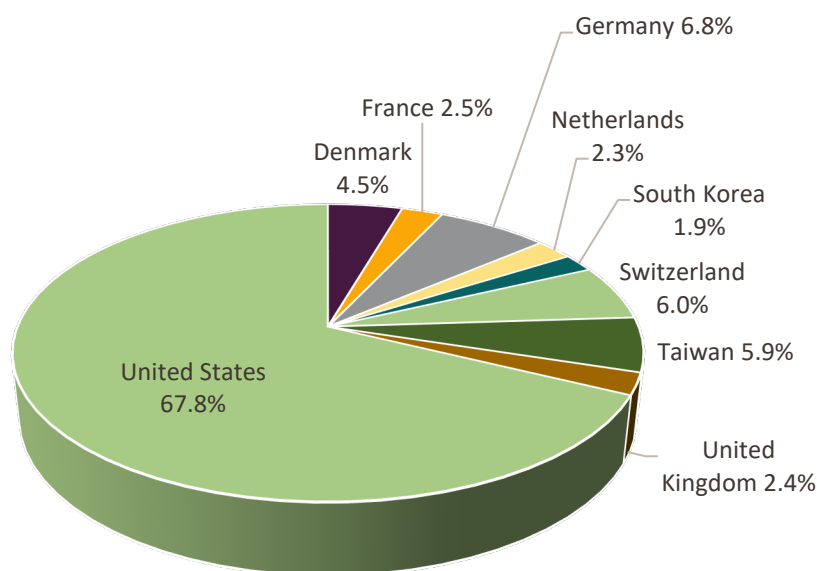
Economic Sectors



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, and is based on a model portfolio. 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 represent 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 July 31, 2021, the Growth & Income performance results are a composite of discretionary client accounts invested in the Growth & Income 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 Growth & Income composite performance results reflect actual performance for a composite of discretionary client accounts. Net-of-fee returns reflect the deduction of actual management fees and transaction costs. Some assets managed in the Growth & Income strategy within the composite receive a reduced fee from the standard management fee schedule. Actual client returns experienced will vary from the returns presented 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. Growth & Income composite performance results do not reflect the reinvestment of dividends and interest.
- Prior to July 31, 2021, the performance results represent a single account managed to the strategy. The performance results shown are not materially higher than if all related accounts were included prior to August 2021. Please contact Green Alpha for information about the representative account selection process.
- 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/>.
- The Growth & Income strategy contains equity stocks that are managed with a view towards capital appreciation and current income. Extreme periods of underperformance or outperformance are due to the concentrated nature of the strategy and the impact of specific security selection. Such results may not be repeatable.
- 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.
- The holdings identified throughout this document do not represent all the securities purchased, sold, or recommended for advisory clients. You may request a list of all recommendations made by Green Alpha in the past year by emailing a request to info@greenalphaadvisors.com. It should not be assumed that the recommendations made in the past or future were or will be profitable or will equal the performance of the securities cited as examples in this document.
- 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.
- This presentation is for informational purposes only, and should not be construed as legal, tax, investment, or other advice. This presentation does not constitute an offer to sell, or the solicitation of any offer to buy, any security. Any mention of an individual security is for illustrative purposes only and should not be considered a recommendation to buy or sell any security. The presentation does not purport to contain all of the information that may be required to evaluate Green Alpha Investments and its investment strategies.