Next Economy Index

Portfolio Review • December 31, 2018

Review Contents

Why Invest in the Next Economy Index?

- Passive, diversified exposure to many sectors and industries
- Global companies driving the transition to the Next Economy™
- Invests in innovative solutions to core economic and environmental risks
- Fossil fuel free since inception

Inception Date: December 30, 2008

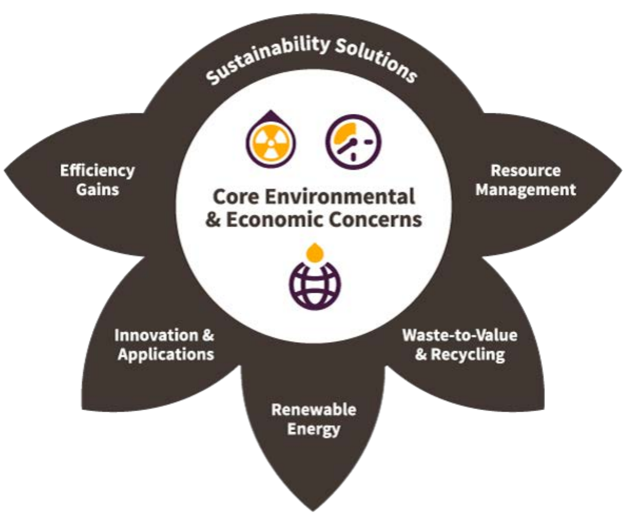
Style: All-Cap Global Growth Equity

Available Vehicle: Separately Managed Account

Next Economy Investment Philosophy

Green Alpha's investment philosophy is straight forward: don't invest in companies that cause global systemic risks; instead, invest in the solutions.

We believe companies that create or enable innovative solutions to climate change, resource scarcity and widening inequality are the greatest growth drivers of the twenty-first century. That's the Next Economy.



Portfolio Construction: Next Economy Index

The Green Alpha Next Economy Index is a passively managed index designed to reflect and benchmark the Next Economy – the unfolding, solutions-oriented, innovation-driven, highly efficient economy. It exists to: (1) define all aspects of the Next Economy, (2) demonstrate the diversity, growth, breadth and depth of the Next Economy, and (3) serve as a performance benchmark for sustainable active, public equity investment strategies. The Index seeks long-term capital appreciation and serves as a basis for all of Green Alpha Advisors' actively managed portfolios. The portfolio uses a modified market-cap weighting and is rebalanced annually. While the managers may choose to add or remove companies from the Index on an inter-rebalance basis, it is anticipated that these changes will not have a large effect on portfolio turnover. Like all Green Alpha portfolios, the Next Economy Index is a fossil fuel free, all-cap, cross-sector, global equity strategy.

Portfolio Overview: Next Economy Index

Portfolio characteristics and how they compare to the S&P 500 (SPY) and other Green Alpha portfolios

Next Economy 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 investment process to enter the Index
- **Fundamentals-driven** – because the quality of the companies you invest in and the price you pay for them matter
  - ✓ **High growth** – indicated by Sales Growth, drop from current P/E to Forward P/E as revenue and earnings grow
  - ✓ **Compelling valuation** – demonstrated by Price/Sales, Price/Book metrics
  - ✓ **Strong balance sheet, solid management execution** – expressed by LT Debt/Equity, Current Ratio
- **Fossil fuel free since inception** – we have never invested in companies that prospect, extract, refine, or transport fossil fuels, nor fossil-fired utilities
- **Diversified – we look for solutions wherever we can find them** – across the globe, in firms of all sizes, and in every industry
- **Public equities, long-only** – largest asset class, largest opportunity for impact

Characteristics	Green Alpha Next Economy Index	Benchmark: S&P 500 (SPY)	Green Alpha Next Economy Social Index	Green Alpha Next Economy Select	Green Alpha Growth & Income	Sierra Club Green Alpha
# of Securities	115	500	95	52	32	42
Sales Growth, TTM	18.97%	12.42%	20.81%	17.75%	13.79%	16.59%
P/E, Current	35.65	25.24	36.16	20.12	28.23	24.64
P/E, 1-Year Forward†	18.53	14.45	20.07	17.26	16.67	17.15
Price/Sales	1.37	1.89	1.52	0.95	1.89	1.28
Price/Book	2.29	2.99	2.74	1.61	1.94	1.93
LT Debt/Equity	0.69	0.85	0.82	0.67	1.23	0.66
Current Ratio	2.89	1.82	2.91	2.44	1.83	2.55
Dividend Yield, TTM	1.87%	2.15%	1.88%	2.27%	5.83%	1.95%
US Domicile Non-US Domicile Cash	74.19% 23.96% 1.85%	100% - -	80.85% 16.71% 2.43%	69.84% 28.94% 1.22%	80.95% 17.54% 2.48%	73.66% 23.71% 2.62%
Market Capitalization Weighted Avg (US$B)	54.74	201.30	50.83	41.36	25.35	52.52
Turnover, TTM	25%	-	65%	15%	32%	29%
Beta, Trailing Two Years	1.05	1.00	1.05	1.00	0.85	0.95

TTM = Trailing Twelve Months *† Bloomberg consensus estimates*

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

Top Ten Positions

And how the top five positions are driving progress toward the Next Economy

Company Name	Ticker	Weight
Alphabet	GOOG	2.80%
Palo Alto Networks	PANW	1.53%
Atlassian Corporation	TEAM	1.44%
Qualcomm	QCOM	1.39%
AU Optronics	AUO	1.35%
AT&T	T	1.31%
Apple	AAPL	1.28%
Dassault Systemes	DASTY	1.27%
Int'l Business Machines	IBM	1.23%
Oracle Corporation	ORCL	1.22%
% of Portfolio		14.83%

Alphabet (Communications, Media)

- Provider of unlimited access to global information. Anyone with access to Google has better access to information than the richest person on earth had 20 years ago.
- Innovation-driven venture capital fund with dozens of fascinating "moonshots" (e.g., "Project Loon – the balloon-powered internet for everyone"). All extremely well capitalized by the best ad-serving machine in history.
- Global operations use 100% renewable energies.
- Three woman in Senior Management, including an award-winning CFO & the CEO of YouTube. Board of Directors has two women (18%), including the Audit Committee Chair.

Palo Alto Networks (Technology, Software)

- Cybersecurity leader offering an automation-enabled Security Operating Platform that aims to prevent breaches.
- An increasingly connected economy requires excellent security protocols.
- Significant R&D & intelligent acquisitions to increase leadership position in highly dynamic segment of the economy.
- Serves more than 54,000 customers in 150+ countries across multiple industries.

Atlassian Corporation (Technology, Software)

- A software company that aims to empower teams through open work, enabled by open & rapid communication tools.
- Innovation & efficiency requires effective team collaboration, & if they can do so from the location where they're happiest, employees may be happier & more productive.
- Substantial investments in R&D & smart acquisitions demonstrate strategic growth.
- Women make up 14% of Senior Management & 22% of the Board, including Chairs of the Board & Compensation.

Qualcomm (Technology, Software)

- Multinational company that designs & markets wireless telecommunications products & services.
- Connectivity—swift data exchange & use between devices—is key to an efficient/sustainable economy, & Qualcomm enables this across applications: auto, health care & tech (IoT, mobile computing, networking).
- Major R&D expenditure, signaling that they are doing everything they can to stay ahead of tech curve.

AU Optronics (Energy, Renewable Energy)

- Manufacturer & marketer of thin film transistor-liquid crystal displays & plasma display panels, components of LCD displays, solar power systems, & LED displays.
- Improves efficiency of LCD displays, solar panels (particularly in weak light settings), & LED displays (light design, low power consumption).
- Very competitive player in the LCD space, particularly cost to quality proposition. OEMs & other enterprises can source displays inexpensively & serve large markets efficiently.
- Women make up 22% of the Board, including Chair of the Remuneration Committee.

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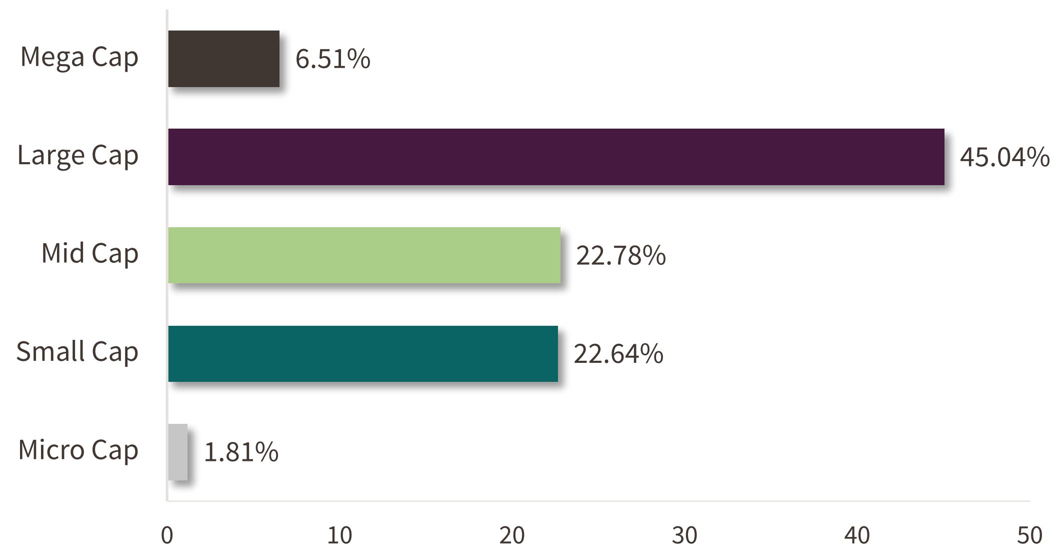
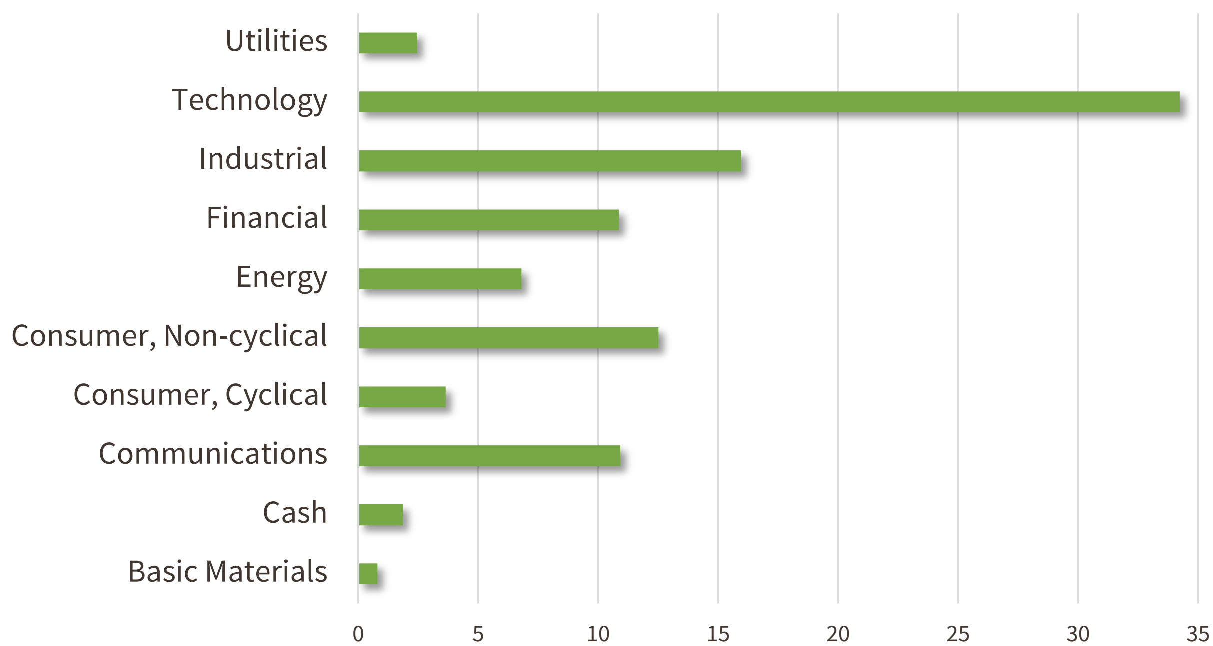
Allocation by Market Cap & Sector

Our search for Next Economy companies is unconstrained. We seek solutions to systemic risks wherever they exist – across sectors, market caps, and geographies. The following divisions are the result of our Next Economy process, rather than the starting point.

Equity Allocation by Market Cap



BICS[††] Sector Allocation (% of Portfolio)



[††] *Bloomberg Industry Classification Standard*

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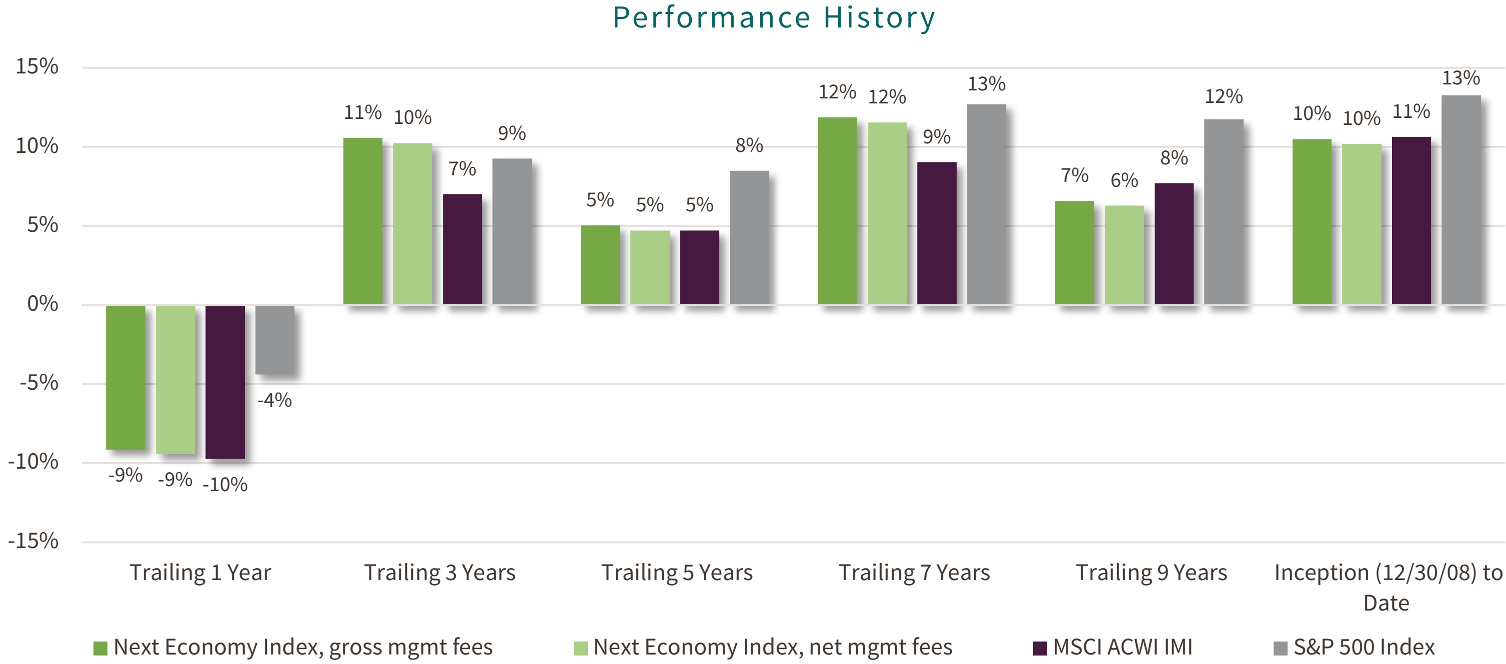
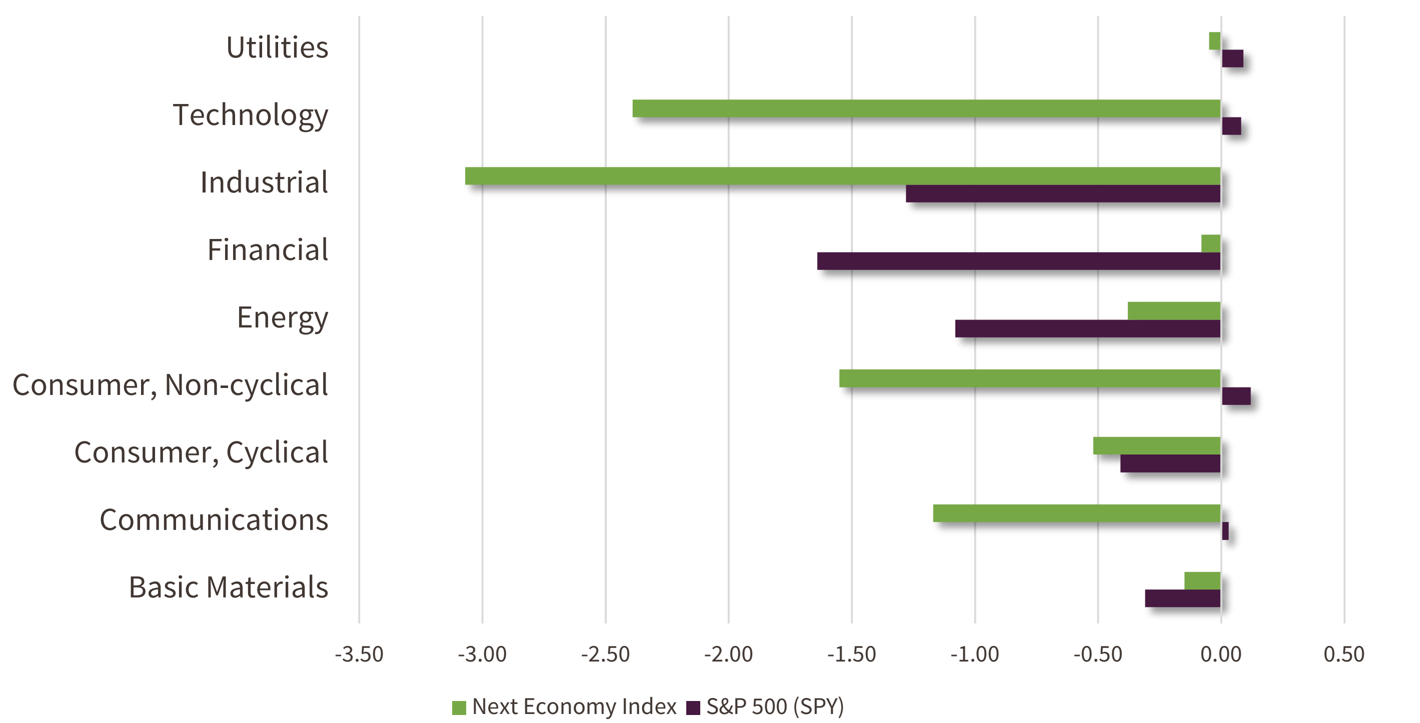
Performance History & Sector Attribution

For commentary, see pages 7 - 9.



Year to Date 2018 Sector Attribution by BICS††



†† Bloomberg Industry Classification Standard

All returns presented above that are greater than 1 year in length have been annualized. Performance data quoted represent past performance. Past performance does not guarantee future results and current performance may be lower or higher than the data quoted. Next Economy Index performance results reflect actual performance for a representative account, net of actual management fees and transaction costs. Assets managed in the Next Economy Index strategy representative account receive a reduced fee from the standard fee schedule. Next Economy Index performance results do not reflect the reinvestment of dividends and interest. 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. Please see more important disclosures on the final page of this document.

Top Five Contributors & Detractors

Next Economy innovation doesn't unfold overnight—or even a quarter. Think of this as one way of looking at the previous quarter's performance, not necessarily the long-term picture.

Five Largest Contributing – 4th Quarter

Company Name	Ticker	Average Weight	Stock Price Return	Contribution to Portfolio Return
Tesla	TSLA	1.17%	25.69%	0.32%
Materialise	MTLS	0.36%	45.57%	0.26%
Atlassian Corporation	TEAM	0.64%	21.87%	0.23%
Cree	CREE	0.90%	12.95%	0.13%
Vestas Wind Systems	VWDRY	1.15%	11.96%	0.13%

Five Largest Detracting Stocks – 4th Quarter

Company Name	Ticker	Average Weight	Stock Price Return	Contribution to Portfolio Return
NVIDIA Corporation	NVDA	1.71%	-52.45%	-1.19%
Square	SQ	1.81%	-43.35%	-1.05%
Apple	AAPL	1.72%	-29.88%	-0.55%
Fortinet	FTNT	1.54%	-23.67%	-0.49%
Seattle Genetics	SGEN	1.34%	-26.53%	-0.49%

Past performance is not a guarantee of future results. To obtain information about the calculation methodology used to select the representative account's largest contributors and detractors from performance or to obtain a list showing every holding's contribution to the account's performance during the measurement period, contact us at info@greenalphaadvisors.com. Given differences in account sizes, custodial fee arrangements and other client-specific factors, not all accounts invested in the Next Economy Index experienced the exact portfolio contributions shown above. The holdings identified throughout this document do not represent all of the securities purchased, sold, held or otherwise recommended for advisory clients. Nothing in this document should be considered recommendation to purchase or sell any particular security.

Manager Commentary

2018 in Review

End-of-year 2018 was one of the worst that U.S. stock markets have experienced, and traders have no trouble finding reasons for pessimism. Like, maybe the end of democracy, or at a minimum a slowing of its economic benefits, is nigh. Beginning in December, the U.S. government was closed 'indefinitely,' or at least the shutdown can was kicked down the road to the next Congress. An economy-shrinking trade war is in effect. The IPCC told us we have 12 years to get our act together on climate disruption, and a U.S. federal climate change report described the dangerous consequences for American farmers if changes aren't made soon.

It's enough that you might ask, 'what's the point of being worried?'

Stewart Brand wrote, "science is the only news…Human nature doesn't change much; science does, and the change accrues, altering the world irreversibly." In that light, this period is likely to be remembered by history less for Trump and more as the time when humanity took control of its own evolution, artificial intelligence (AI) began to usher in a "New World Order," and as the time when we either lost or regained control of our system-level risks. It is in these last three pieces of our "only news" (as Brand would have it) that we see our present paradox: risks and innovation are peaking together, today, and it's not clear to which side of the knife's edge humanity will fall: toward an unimaginably better future of abundance or to an unimaginably worse one of ruin and dystopia.

This double precipice is why we have to invest to manage the risks that matter, why Green Alpha is here, and may be why you have placed your trust in Green Alpha to invest in the innovations driving progress toward the Next Economy™. When market sentiment is at its most negative is when investors can set themselves up for potential future gains.

In 2018, and particularly in Q4, markets began exhibiting the volatility we predicted would occur within the context of unpredictable political leadership. At the same time, business results, if not share prices, have been improving steadily in many Next Economy areas. Our holding First Solar was a prime example of this in 2018.

Green Alpha strategies had negative performance returns for the year, but they performed reasonably well relative to major benchmarks, albeit with more inter-strategy dispersion than we have seen in previous years. So, what did we observe about the ongoing transition to the Next Economy in 2018? (For those who may need a refresher on our thesis of Next Economics™, a quick audio overview can be found here and a more thorough white paper treatment is here.)

RE 100: growing corporate commitments to 100% renewables-based operations. In 2018, we saw de-politicization of renewable energy as an idea. Corporations and governments around the world have been making formal commitments to deriving 100% of their electricity production from renewable sources, usually meaning wind and solar supported by battery storage. A Yale survey reported that 81% of Americans, including 64% of Republicans, now support renewable energy. We've always believed that renewables represent great economic development and wealth creation opportunities, all while countering climate disruption and reducing pollution. Therefore, wind and solar should not be pawns in culture wars, and innovation shouldn't and ultimately can't be contained by ideology.

As of this writing, RE 100 (an informal group of global companies committed to running their operations on 100% renewable energies) had 158 of the world's largest companies as signatories. Many companies are eager to adopt renewable energies for the same reasons we invest in them; they de-risk the global economy relative to fossil fuels, and they are cheap, meaning they increase the productivity of every dollar invested in a company. It's not surprising that 2018 was a record year for corporate purchasing of renewable energies. As Deloitte said of energy in 2018, "Solar and wind move from mainstream to preferred."

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Manager Commentary (cont.)

2018 in Review

EVs are booming. According to the U.S. Department of Energy, “1 million plug-in vehicles have been sold in the United States" as of October 2018, up from zero in 2010. Electric vehicles (EVs) reached a per-month sales crescendo (until the next one) of 45,000 vehicles per month. This is occurring even though overall vehicle sales are down, meaning EVs are increasing their market share. This has significant implications not only for climate change and pollution mitigation but also for industries all along the value chain of EVs—advanced materials, battery storage, microgrids, AI (including autonomy), charging infrastructure, and electricity demand versus liquid BTU demand. All of these areas are likely to see more rapid growth. Audi, Mercedes-Benz, BMW and BMW Mini, Nissan, Porsche, Kia, and Volvo all have announced new all-electric vehicles for 2019, and many more will follow in 2020, including VW. We predict EVs will continue to be responsible for any new growth in the personal vehicle space.

California is leading. The world’s fifth largest economy is showing us how to accelerate the transition to sustainability. The 2018 highlight was SB 100, a law that set a target of 100% clean energy by 2045, making California the largest political jurisdiction to make such a commitment. The law confirmed new standards that require panels to be installed on any new home or low rise residential building of three stories or less—about 80,000 new homes a year. That could quadruple the amount of solar in California.

The state’s 100% zero-emission bus rule states that all state transit authorities must convert to 100% electric transit vehicles by 2040. By 2029, all government transit bus services have to be zero-emissions vehicles, and California is providing incentives for cities to get there.

In electricity, transit, and electrification of homes (including heating), the importance of California’s efforts shouldn’t be understated. Over and over, we’ve seen that centers of innovation lead to global changes, even in the face of significant resistance. The economic scale of the state alone means businesses around the world hoping to sell into or work in the state must adapt to their policies.

However, the political economy of technology is now visibly ascendant. The days of policy preceding change are ending, and policy is increasingly reacting to tech- and innovation-based change. Thus, for us, investing on the basis of proactive policy will be of limited utility. California’s leadership is outstanding, but it works because the underlying green tech is productive and economically efficient. All that said, intelligent policy will pay for research that is likely to improve green tech over the long-term, but does not have immediate return on investment. Here too, California is “going solo,” and in the lead.

AI is rising. Green Alpha invests along the value chain that is enabling AI to emerge as a source of innovation (e.g., Google’s quantum computing) and, perhaps more importantly, a way to address problems insoluble by human minds, perhaps ultimately enabling humanity to have good standards of living around the world without further crossing planetary boundaries. Taking the long view, Steven Strogatz put it down clearly: “we will recall with pride the golden era of human insight, this glorious interlude, a few thousand years long, between our uncomprehending past and our incomprehensible future.”

Common threads among Green Alpha portfolios: thesis and management consistency

To have a shot at earning alpha and outperforming markets and peers, an investment manager has to look at the world from a different angle. Most managers conform to benchmark tracking—settling for beta or market-comparable returns—because the consequences of a period of underperformance could be significant. At Green Alpha, your portfolio managers are founders and plurality owners of the firm. We invest every day, we strive to remain fully invested every day, and we strictly adhere to our thesis, even during periods of volatility, with conviction that long-term results will remain competitive.

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Manager Commentary (cont.)

2018 in Review

This frees us to strive for outperformance without the handcuffs of benchmark correlation. Consequently, we define our own portfolio construction methodologies and address the world as it is, rather than faithfully employing Modern Portfolio Theory. The problem with the ubiquity of the present application of Modern Portfolio Theory is that if any given manager sees the world the same way as every other manager, they will likely miss market inefficiencies and have low probabilities of achieving standout performance as a result. Free of Modern Portfolio Theory, we can fully commit to our Next Economy thesis, and the world we see unfolding, without feeling the need to mimic benchmarks that represent the carbon-intensive economy of the past. Seeing things differently has the risk of short-term periods of underperformance, yet it is a necessary precondition of long-term outperformance.

Next Economy investing, like private equity investing, requires patience, and it does mean that Green Alpha will experience periods of both underperformance and outperformance over shorter time periods. In 2018, we saw both, and with more dispersion among our strategies than we have observed in previous years.

Next Economy Index - Portfolio Commentary

Green Alpha's Next Economy Index returned -9.15%, gross of management fees, during 2018.

- Primary detractors during 2018 were the Industrial and Technology Sectors, detracting 3.07% and 2.39%, respectively, during the period.
  - In Industrials, Electronics as an industry fared the worst, detracting 1.26% from portfolio performance. In Electronics, the makers of advanced displays, both OLED and LCD, fared the worst, as concerns emerged about global device sales. Makers of smart meters also fared poorly, as some utilities dragged their feet on smart-grid integration, and sales were slower than expected.
  - In Technology, Semiconductors were responsible for constructively all of the sector's losses, detracting 3.26%. Makers of integrated circuits, chips, remote sensors, system-on chip designers and makers, and upstream capital equipment required to produce these items all suffered. The often cited reasons was a "secular slowdown" in chip demand, caused by perceptions of a globally slowing economy, along with mature device markets. These concerns may prove valid in the short-term, but in the long run, the global economy will need far more advanced chipsets, not fewer.
- Utilities was the portfolio's leading sector, contributing -0.05%. Utilities was followed by the Financial Sector, which contributed -0.08%.
  - In Utilities, the Water Utilities industry was up, adding 0.12% to overall performance, but the Electric Utilities industry was down and detracted 0.17%. Water as a theme held up well in 2018, as the importance of the resource became more frequently discussed and the proliferation of water-centered investment vehicles meant there were more dollars chasing the relatively small number of stocks in the space. Our electric utilities exposure didn't fare as well, primarily due a large, solar energy based utility going private at an unfavorable valuation.
  - In the Financial Sector, reinsurance lived up to its reputation for long-term stability and low volatility and added 0.09% to overall returns. The long-term emphasis on solvency and conservative nature of their capital requirements, combined with attractive dividend yields, no doubt gave investors the comfort they desired during a volatile cycle.

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- The SPDR S&P 500 ETF (SPY) seeks to provide investment results that, before expenses, correspond generally to the price and yield performance of the S&P 500 Index. Investors can invest directly in SPY.
- MSCI ACWI IMI: The MSCI ACWI Investable Market Index (IMI) captures large, mid and small cap representation across 23 developed markets and 24 emerging markets countries. With over 8,700 constituents, the index is comprehensive, covering approximately 99% of the global equity investment opportunity set. Investors cannot invest directly in this index.
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