

GLOBAL X ETFs RESEARCH

The Next Big Theme: August 2023



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Technology, Physical
Environment, People &
Demographics



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U.S. Infrastructure Development

IIJA's Impact Persistent

Infrastructure is the driving force behind recent positive trends in the construction industry. In June, the construction backlog remained at a two-year high of 8.9 months, marking the third straight month of outstanding projects awaiting initiation.¹ Eighteen months after the \$1.2 trillion Infrastructure Investment and Jobs Act (IIJA) was passed, this backlog suggests potential insulation for the construction industry.² Also, better-than-expected Q2 2023 GDP bolstered the outlooks for construction and manufacturing with supply shortages improved and price and wage pressures easing.³ Public construction company CEOs share this sentiment, as they expect peak infrastructure spending in four years.⁴ Although ABC's Construction Confidence Index for June showed a dip in sales, profit margins, and staffing, all three metrics remained above 50, implying growth over the next six months.⁵ Recent examples of the IIJA in action include the California Transportation Commission's \$2 billion investment in the state's transportation infrastructure.⁶ More than \$571 million of that investment originates from the IIJA.⁷

Social Media

Platforms Tap Into Consumer Loyalty for Growth

The growth prospects of social platforms continues to climb, and recent price increases reflect their potential. Spotify raised the price of its premium service by \$1 to \$10.99, marking its first price adjustment since 2011.⁸ Spotify also raised prices for its subscription tiers Duo, Family, and Student.⁹ YouTube increased its individual YouTube Premium plan by \$2 to \$13.99 per month and YouTube Premium Music by \$1 to \$10.99 per month.¹⁰ Apple and Amazon also raised prices for their music subscription offerings over the past year.¹¹ Feature enhancements can be another source of growth. Despite Threads' initial rapid growth tapering off, Meta remains committed to developing the platform. Recent updates to Threads include a Following tab that enables users to access threads from followed accounts in chronological order, deviating from algorithm-driven suggestions.¹² Also, in response to user demand, Threads is set to add a desktop-friendly web version and a full search feature.¹³

Solar

First Solar Leads the U.S. Solar Charge

First Solar announced plans to build its fifth manufacturing facility in the United States and increase its annual capacity by 3.5 gigawatts (GW) by 2026.¹⁴ This U.S.-based cadmium telluride thin-film module manufacturer will invest \$1.1 billion into its forthcoming Series 7 solar module production facility.¹⁵ When complete, Series 7 modules are projected to constitute over two-thirds of the company's annual U.S. capacity.¹⁶ First Solar expects its global annual module production capacity to reach 25GW, including 14GW



within the United States, by 2026.¹⁷ With this new facility, First Solar's capital investment in the past year totals over \$2.8 billion and is expected to bring 7.9GW of additional U.S. manufacturing capacity.¹⁸ These updates follow The Department of the Interior's Bureau of Land Management recently held auction for the advancement of large-scale solar energy projects in Nevada. The high bids reached \$105.15 million, potentially adding nearly 3GW of renewable energy to the grid.¹⁹ This stands as the agency's most successful onshore renewable energy auction to date.²⁰

FinTech & Millennial Consumers

FinTech and Big Tech Show Synergy

The payments landscape is ripe with new and enhanced consumer services. Fiserv unveiled a collaboration with Amazon that enables eligible debit and credit cardholders to convert uChoose Rewards® points into purchases on Amazon.com and the Amazon mobile app.²¹ Over 200 financial institutions are enrolled, and hundreds more are expected to provide this redemption feature by year-end.²² PayPal introduced PayPal Pay Later to Microsoft customers in several countries, including the Australia, Germany, France, Italy Spain, the United Kingdom, and the United States.²³ Also, U.S. customers will soon be able to use PayPal's Venmo in the Microsoft Store, an extension of an existing partnership focused on Xbox purchases.²⁴ Apple Pay helped Apple to record-breaking revenue within the payment services category in Q2 2023.²⁵ Recent Apple Card success includes its Savings account, which exceeded \$10 billion in only about four months since its debut in April.²⁶

Artificial Intelligence

Generative AI Intersects with User Experience

Pioneers in the field of generative AI are consistently refining their offerings to elevate user experiences across a multitude of domains. Google is updating its AI-powered Search Generative Experience (SGE) with images and videos in the summary box above search results.²⁷ With the SGE feature enabled in Search Labs, users can expect a richer multimedia display for search outcomes. Still in the experimental phase, Google continues to refine this feature, aiming for faster presentation of the summary box and more contextual information for the linked content. With Meta's generative AI-based AudioCraft, users can create musical and audio compositions.²⁸ AudioCraft models MusicGen and AudioGen tools use text inputs to generate new audio content, while its EnCodec model enhances music quality through reduced artifacts.²⁹ Microsoft rolled out the Windows Copilot Preview to Windows Insiders via a controlled feature release.³⁰ The initial preview prioritizes an integrated User Interface (UI) experience, with forthcoming previews set to show additional functionalities.

Internet of Things

Semiconductors Top Government To-Do Lists

Global semiconductor sales surged to \$124.5 billion in Q2 2023, a 4.7% increase from Q1.³¹ June sales increased 1.7% from May to \$41.5 billion.³² Continued sales strength shows why governments are so keen to develop the industry. In the United Kingdom, the government aims to create the next generation of scalable semiconductor companies, helped by initiatives like the Silicon Catalyst-led pilot incubator program, which offers startups contract, funding, and team building training.³³ China aims for semiconductor self-sufficiency amid persistent trade sanctions. Working towards that goal is the National Natural Science Foundation of China (NSFC), which introduced a program to allocate up to US\$6.4 million to as many as 30 research projects focused on "chiplet" technology. Chiplets are small, well-defined integrated circuits that can be combined with other chiplets.³⁴ At the end of 2022, India's government announced a \$10 billion



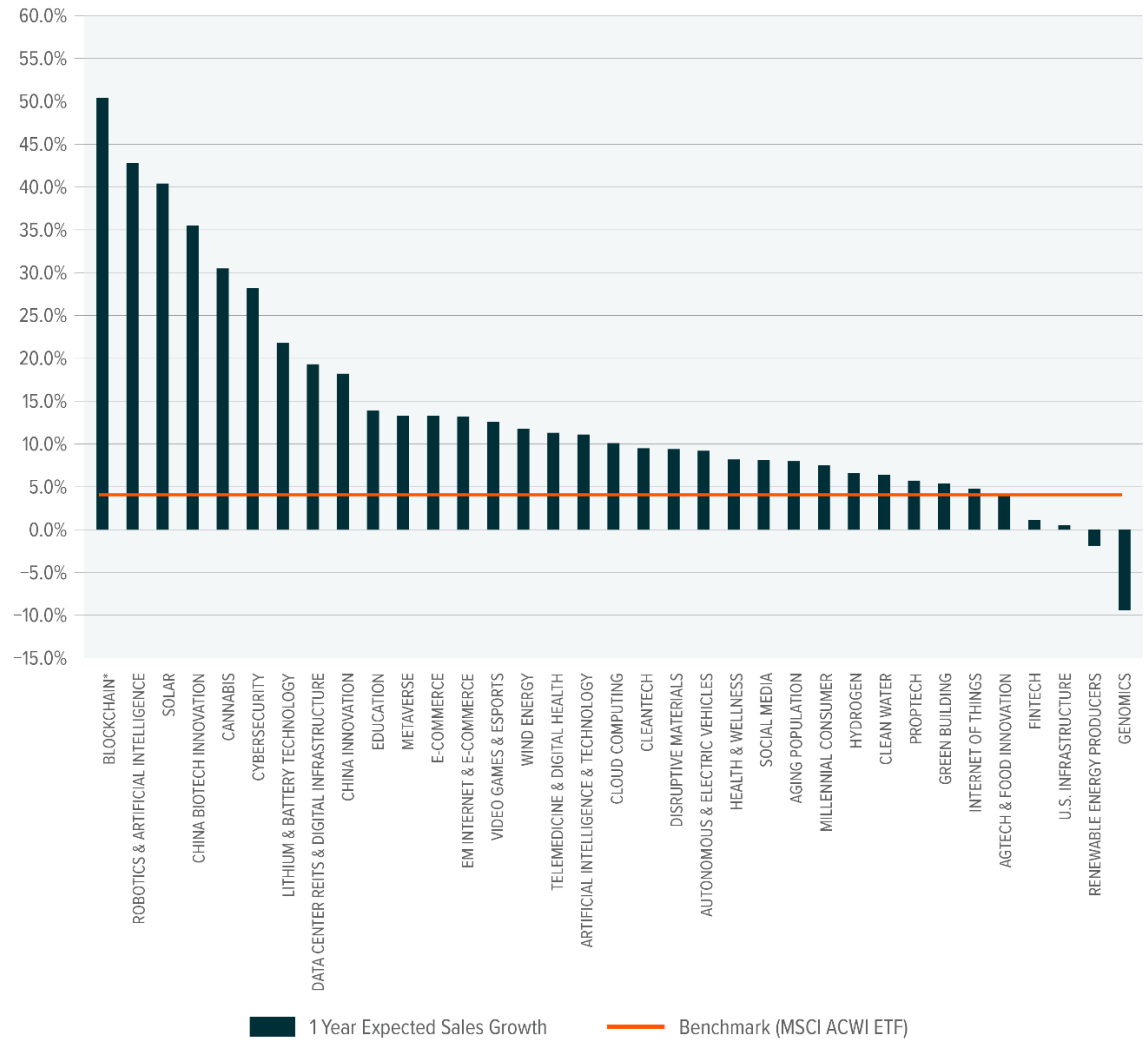
incentive plan to develop the country's semiconductor industry. At the SemiconIndia conference, top U.S. semiconductor firms Micron, Cadence, Applied Materials, and AMD lauded India's technological prowess, emphasizing their investments in the country and new ventures.³⁵

THE NUMBERS

The following charts examine returns and sales growth expectations by theme, based on their corresponding ETFs.

THEMATIC EXPECTED SALES GROWTH

Source: Bloomberg, July 31, 2023, Global X ETFs.



Note: Forward looking based on data and analysis from 7/31/2023.

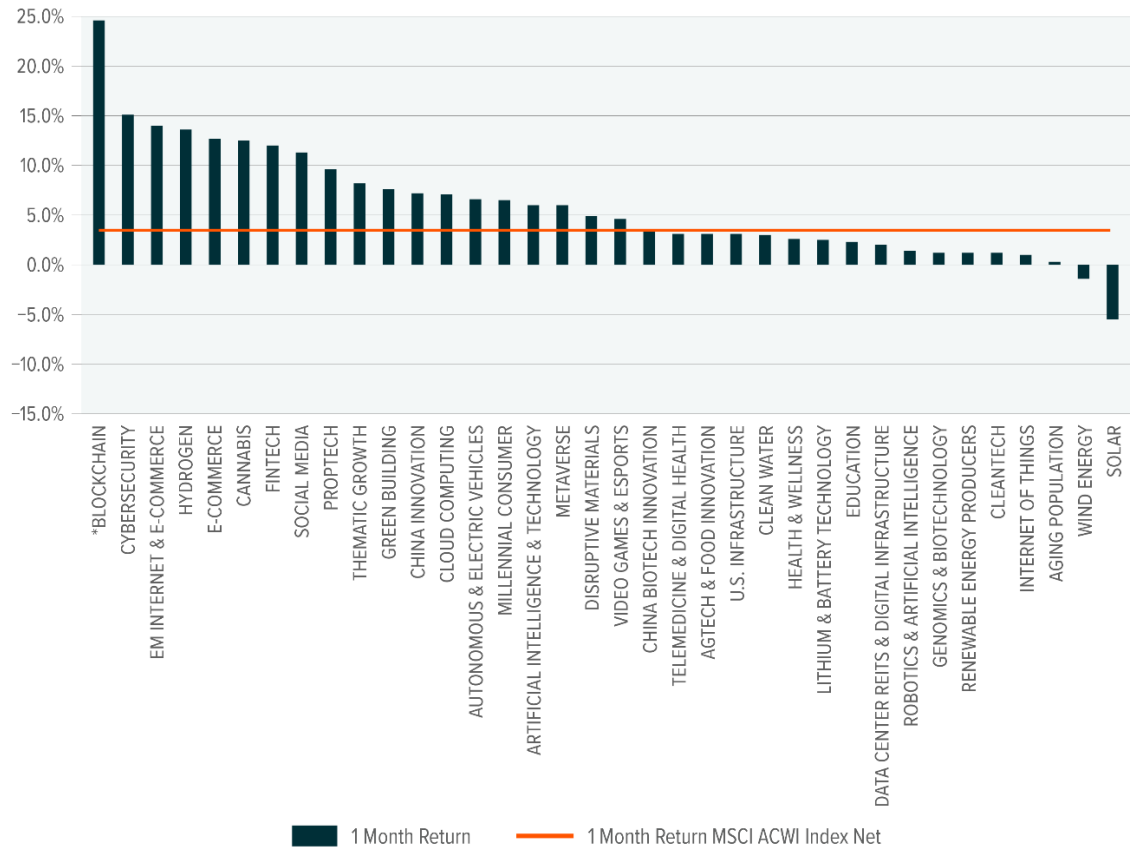
1 year annualized forward sales growth is the consensus analyst expectations for total sales growth in the next 12 months.

*Blockchain reflects figures according to BKCH ETF



JULY 2023 THEMATIC ETF RETURNS

Source: Bloomberg, July 31, 2023, Global X ETFs.



Note: The performance data quoted represents past performance and does not guarantee future results.

*Blockchain reflects figures according to BKCH ETF

Performance data quoted represents past performance and does not guarantee future results. Investment return and principal value of an investment will fluctuate so that an investors' shares, when sold or redeemed, may be worth more or less than their original cost. Current performance may be higher or lower than the performance quoted. High short-term performance of the fund is unusual and investors should not expect such performance to be repeated. For performance data current to the most recent month end, please call 1-888-493-8631 or visit www.globalxetfs.com.

| Standard Performance | | Cumulative % Data as of month end (07/31/23) | | | Avg. Annualized % Data as of quarter end (06/30/23) | | | | | |
|--|---------------|---|---------|---------|--|--------|---------|--------|---------|-----------------|
| | Expense Ratio | | 1 Month | 3 Month | Since Inception | 1 Year | 3 Year | 5 Year | 10 Year | Since Inception |
| Robotics & Artificial Intelligence Inception Date 9/12/2016 | 0.69% | NAV | 1.85% | 17.84% | 103.05% | 41.12% | 6.43% | 6.00% | - | 10.68% |
| | | Market Price | 1.39% | 17.20% | 102.78% | 41.70% | 6.59% | 6.15% | - | 10.73% |
| | | Index | 1.85% | 17.86% | 108.13% | 41.61% | 7.05% | 6.40% | - | 11.08% |
| Fintech Inception Date 9/12/2016 | 0.68% | NAV | 12.14% | 19.14% | 74.32% | 3.86% | -10.97% | -2.05% | - | 6.70% |
| | | Market Price | 12.01% | 18.78% | 74.02% | 3.86% | -11.07% | -2.11% | - | 6.69% |
| | | Index | 12.24% | 19.27% | 80.68% | 4.00% | -10.65% | -1.59% | - | 7.25% |
| Internet Of Things Inception Date 9/12/2016 | 0.68% | NAV | 1.65% | 14.73% | 146.76% | 35.11% | 13.20% | 13.12% | - | 13.93% |
| | | Market Price | 0.98% | 13.97% | 145.77% | 35.73% | 13.27% | 13.16% | - | 13.97% |
| | | Index | 1.73% | 14.91% | 152.30% | 35.47% | 13.60% | 13.48% | - | 14.29% |
| Cloud Computing Inception Date 4/12/2019 | 0.68% | NAV | 7.16% | 26.40% | 43.70% | 20.32% | -1.99% | - | - | 7.20% |
| | | Market Price | 7.11% | 26.56% | 44.20% | 20.32% | -2.01% | - | - | 7.30% |
| | | Index | 7.24% | 26.64% | 47.61% | 21.06% | -1.35% | - | - | 7.87% |



| | | | | | | | | | | |
|---|-------|--------------|--------|---------|---------|---------|---------|--------|--------|---------|
| Social Media Inception Date 11/14/2011 | 0.65% | NAV | 10.55% | 1713% | 181.01% | 11.16% | -4.79% | 0.76% | 9.68% | 8.35% |
| | | Market Price | 11.31% | 17.79% | 182.33% | 10.95% | -4.89% | 0.73% | 9.72% | 8.33% |
| | | Index | 10.64% | 17.29% | 198.83% | 11.81% | -4.34% | 1.27% | 10.22% | 8.92% |
| Artificial Intelligence & Technology Inception Date 5/11/2018 | 0.68% | NAV | 6.02% | 24.85% | 102.03% | 34.35% | 10.87% | 13.87% | - | 13.37% |
| | | Market Price | 5.97% | 24.48% | 102.45% | 34.81% | 11.00% | 13.87% | - | 13.42% |
| | | Index | 6.10% | 25.14% | 106.44% | 34.98% | 11.41% | 14.34% | - | 13.83% |
| Autonomous & Electric Vehicles Inception Date 4/13/2018 | 0.68% | NAV | 6.76% | 25.15% | 98.03% | 22.87% | 22.34% | 13.95% | - | 12.57% |
| | | Market Price | 6.61% | 24.78% | 97.90% | 22.97% | 22.34% | 13.91% | - | 12.59% |
| | | Index | 6.75% | 25.08% | 99.69% | 22.96% | 22.68% | 14.15% | - | 12.76% |
| Lithium and Battery Tech Inception Date 7/22/2010 | 0.75% | NAV | 3.15% | 11.26% | 155.54% | -9.69% | 27.64% | 16.13% | 12.66% | 7.26% |
| | | Market Price | 2.54% | 11.05% | 155.30% | -9.39% | 27.85% | 16.35% | 12.61% | 7.30% |
| | | Index | 3.22% | 11.45% | 171.82% | -9.21% | 28.17% | 16.39% | 12.98% | 7.76% |
| Genomics and Biotechnology Inception Date 4/5/2019 | 0.50% | NAV | 1.24% | 0.00% | -19.70% | -1.22% | -11.61% | - | - | -5.32% |
| | | Market Price | 1.24% | 0.08% | -18.06% | -0.82% | -11.56% | - | - | -4.87% |
| | | Index | 1.27% | 0.56% | -18.24% | -1.05% | -11.31% | - | - | -4.92% |
| Millennial Consumer Inception Date 5/4/2016 | 0.50% | NAV | 6.27% | 12.27% | 132.96% | 22.72% | 5.18% | 7.83% | - | 11.59% |
| | | Market Price | 6.50% | 12.33% | 132.39% | 22.85% | 5.17% | 7.78% | - | 11.52% |
| | | Index | 6.31% | 12.43% | 140.97% | 23.28% | 5.70% | 8.37% | - | 12.11% |
| Aging Population Inception Date 5/09/2016 | 0.50% | NAV | 0.76% | -0.23% | 94.41% | 10.97% | 5.11% | 6.92% | - | 9.64% |
| | | Market Price | 0.32% | -0.52% | 97.59% | 10.62% | 5.09% | 6.85% | - | 9.95% |
| | | Index | 0.79% | -0.13% | 98.01% | 11.24% | 5.32% | 7.13% | - | 9.91% |
| Health and Wellness Inception Date 5/9/2016 | 0.50% | NAV | 3.01% | 0.24% | 64.99% | 11.63% | 5.21% | 4.46% | - | 6.81% |
| | | Market Price | 2.57% | 0.11% | 65.75% | 11.46% | 5.35% | 4.43% | - | 6.95% |
| | | Index | 3.08% | 0.35% | 69.78% | 11.97% | 5.56% | 4.83% | - | 7.23% |
| E-Commerce Inception Date 11/27/2018 | 0.50% | NAV | 12.66% | 19.99% | 41.20% | 10.10% | -7.30% | - | - | 5.04% |
| | | Market Price | 12.71% | 20.39% | 41.27% | 10.36% | -7.37% | - | - | 5.04% |
| | | Index | 12.74% | 20.19% | 44.14% | 10.59% | -6.96% | - | - | 5.50% |
| Us Infrastructure Development Inception Date 3/6/2017 | 0.47% | NAV | 3.06% | 17.58% | 124.85% | 39.19% | 28.08% | 14.92% | - | 13.14% |
| | | Market Price | 3.05% | 17.70% | 124.92% | 39.12% | 28.01% | 14.90% | - | 13.14% |
| | | Index | 3.12% | 17.79% | 132.32% | 39.86% | 28.79% | 15.51% | - | 13.71% |
| Cannabis Inception Date 9/17/2019 | 0.51% | NAV | 13.51% | -10.33% | -94.29% | -58.26% | -51.42% | - | - | -54.60% |
| | | Market Price | 12.54% | -9.65% | -94.41% | -58.59% | -51.27% | - | - | -54.74% |
| | | Index | 13.35% | -10.64% | -95.23% | -59.69% | -53.01% | - | - | -56.68% |
| Video Games & Esports Inception Date 10/25/2019 | 0.50% | NAV | 5.20% | 6.80% | 46.10% | -2.38% | -3.35% | - | - | 9.33% |
| | | Market Price | 4.64% | 6.65% | 45.86% | -1.85% | -3.32% | - | - | 9.44% |
| | | Index | 5.27% | 6.93% | 48.73% | -1.94% | -2.89% | - | - | 9.84% |
| Cybersecurity Inception Date 10/25/2019 | 0.51% | NAV | 4.78% | 19.11% | 71.73% | -1.45% | 8.09% | - | - | 14.36% |
| | | Market Price | 4.74% | 19.07% | 74.67% | -1.45% | 8.02% | - | - | 14.90% |
| | | Index | 4.82% | 19.25% | 74.56% | -0.85% | 8.54% | - | - | 14.86% |
| Thematic Growth Inception Date 10/25/2019 | 0.50% | NAV | 8.51% | 16.42% | 19.53% | -6.77% | -3.82% | - | - | 2.66% |
| | | Market Price | 8.18% | 15.69% | 20.25% | -6.34% | -3.90% | - | - | 2.92% |
| | | Index | 8.50% | 16.40% | 18.46% | -6.80% | -4.07% | - | - | 2.41% |
| Education Inception Date 7/10/2020 | 0.50% | NAV | 15.63% | 14.19% | -48.70% | 4.15% | - | - | - | -23.92% |
| | | Market Price | 15.06% | 14.03% | -48.90% | 4.09% | - | - | - | -23.90% |
| | | Index | 15.65% | 14.43% | -47.86% | 4.70% | - | - | - | -23.51% |
| Telemedicine & Digital Health Inception Date 7/29/2020 | 0.68% | NAV | 3.17% | 2.12% | -20.98% | 1.04% | - | - | - | -8.73% |
| | | Market Price | 3.10% | 2.13% | -21.25% | 0.95% | - | - | - | -8.81% |
| | | Index | 3.22% | 2.24% | -19.98% | 1.19% | - | - | - | -8.35% |
| China Biotech Innovation Inception Date 9/22/2020 | 0.65% | NAV | 4.05% | -12.09% | -46.83% | -31.15% | - | - | - | -21.52% |
| | | Market Price | 3.52% | -11.82% | -46.96% | -31.82% | - | - | - | -21.45% |
| | | Index | 4.05% | -11.91% | -45.82% | -30.72% | - | - | - | -20.99% |
| Cleantech Inception Date 10/27/2020 | 0.50% | NAV | 1.49% | 2.89% | -0.15% | 8.58% | - | - | - | -0.61% |
| | | Market Price | 1.16% | 2.91% | -0.68% | 8.04% | - | - | - | -0.68% |
| | | Index | 1.57% | 3.07% | -1.60% | 9.10% | - | - | - | -1.18% |
| Data Center Reits & Digital Infrastructure Inception Date 10/27/2020 | 0.50% | NAV | 2.44% | 6.89% | -2.99% | -6.31% | - | - | - | -2.01% |
| | | Market Price | 1.99% | 7.47% | -2.97% | -5.81% | - | - | - | -1.85% |
| | | Index | 2.48% | 6.96% | -3.16% | -6.56% | - | - | - | -2.10% |
| Emerging Markets Internet & E-Commerce Inception Date 11/09/2020 | 0.65% | NAV | 13.35% | 13.96% | -45.28% | -6.26% | - | - | - | -24.12% |
| | | Market Price | 14.00% | 14.02% | -44.76% | -5.41% | - | - | - | -24.01% |
| | | Index | 13.40% | 14.18% | -44.37% | -5.44% | - | - | - | -23.66% |
| Renewable Energy Producers Inception Date 05/27/2015 | 0.66% | NAV | 1.25% | -0.07% | 5.71% | -13.89% | -2.89% | 2.89% | - | 0.53% |
| | | Market Price | 1.17% | -0.15% | 5.17% | -14.36% | -3.08% | 2.94% | - | 0.48% |
| | | Index | 1.22% | 0.00% | 8.96% | -13.22% | -2.49% | 3.33% | - | 0.91% |
| China Innovation Inception Date 02/22/2021 | 0.75% | NAV | 6.83% | 2.97% | -50.79% | -23.66% | - | - | - | -28.09% |
| | | Market Price | 7.20% | 3.23% | -50.75% | -24.56% | - | - | - | -28.17% |
| | | Index | - | - | - | - | - | - | - | - |
| Clean Water Inception Date 04/08/2021 | 0.50% | NAV | 2.72% | 8.79% | 9.20% | 19.85% | - | - | - | 2.78% |
| | | Market Price | 2.98% | 9.23% | 9.33% | 19.14% | - | - | - | 2.72% |
| | | Index | 2.76% | 8.88% | 9.93% | 20.16% | - | - | - | 3.07% |



| | | | | | | | | | | |
|---|-------|--------------|--------|--------|---------|---------|---|---|---|---------|
| Agtech and Food Innovation ETF Inception Date 07/12/2021 | 0.50% | NAV | 2.99% | -8.67% | -48.70% | -20.55% | - | - | - | -29.83% |
| | | Market Price | 3.07% | -8.66% | -48.66% | -20.95% | - | - | - | -29.84% |
| | | Index | 3.08% | -8.69% | -48.33% | -20.33% | - | - | - | -29.61% |
| Hydrogen Inception Date 07/12/2021 | 0.50% | NAV | 14.60% | 7.63% | -58.28% | -23.77% | - | - | - | -40.17% |
| | | Market Price | 13.59% | 7.73% | -58.24% | -23.59% | - | - | - | -39.87% |
| | | Index | 14.69% | 8.34% | -57.81% | -23.03% | - | - | - | -39.85% |
| Blockchain Inception Date 07/12/2021 | 0.50% | NAV | 25.22% | 64.21% | -59.42% | 52.73% | - | - | - | -43.61% |
| | | Market Price | 24.58% | 65.08% | -59.39% | 53.97% | - | - | - | -43.44% |
| | | Index | 25.20% | 63.54% | -60.78% | 48.80% | - | - | - | -44.57% |
| Solar Inception Date 09/08/2021 | 0.51% | NAV | -5.15% | -8.14% | -27.64% | -15.48% | - | - | - | -13.90% |
| | | Market Price | -5.51% | -7.99% | -27.64% | -16.16% | - | - | - | -13.72% |
| | | Index | -5.09% | -7.95% | -26.82% | -14.98% | - | - | - | -13.39% |
| Wind Energy Inception Date 09/08/2021 | 0.50% | NAV | -1.56% | -5.58% | -35.58% | -17.12% | - | - | - | -20.90% |
| | | Market Price | -1.38% | -5.47% | -35.66% | -18.22% | - | - | - | -21.04% |
| | | Index | -1.56% | -5.51% | -35.04% | -16.77% | - | - | - | -20.54% |
| Disruptive Materials Inception Date 01/24/22 | 0.59% | NAV | 5.76% | 1.15% | -17.21% | -8.22% | - | - | - | -15.74% |
| | | Market Price | 4.93% | 1.04% | -17.00% | -7.86% | - | - | - | -15.12% |
| | | Index | 5.88% | 1.16% | -16.68% | -7.90% | - | - | - | -15.42% |
| Green Building Inception Date 04/11/22 | 0.45% | NAV | 7.78% | 7.83% | -7.83% | 0.17% | - | - | - | -12.05% |
| | | Market Price | 7.57% | 7.43% | -7.78% | -0.41% | - | - | - | -11.87% |
| | | Index | 7.87% | 7.96% | -7.67% | 0.71% | - | - | - | -11.98% |
| Metaverse Inception Date 04/26/22 | 0.50% | NAV | 6.19% | 20.29% | 14.08% | 25.07% | - | - | - | 6.28% |
| | | Market Price | 5.95% | 20.09% | 14.29% | 25.27% | - | - | - | 6.64% |
| | | Index | 6.19% | 20.43% | 14.63% | 25.66% | - | - | - | 6.70% |
| PropTech Inception Date 04/11/23 | 0.50% | NAV | 9.51% | 18.58% | 18.44% | - | - | - | - | - |
| | | Market Price | 9.57% | 18.58% | 18.72% | - | - | - | - | - |
| | | Index | 9.56% | 18.57% | 18.46% | - | - | - | - | - |
| Carbon Credits Strategy Inception Date 05/24/23 | 0.39% | NAV | -0.42% | -- | 2.48% | - | - | - | - | - |
| | | Market Price | -0.64% | -- | 2.62% | - | - | - | - | - |
| | | Index | 6.54% | -- | 4.71% | - | - | - | - | - |



P/S AND EV/S

Source: Bloomberg, data is as of 7/31/23 and 6/30/23, Global X ETFs.

| Ticker | Name | P/S | | EV/S | |
|--------|---|---------|---------|---------|---------|
| | | 7/31/23 | 6/30/23 | 7/31/23 | 6/30/23 |
| BKCH | Global X Blockchain ETF | 6.78 | 5.44 | 8.06 | 6.49 |
| GNOM | Global X Genomics & Biotechnology ETF | 6.29 | 6.22 | 5.66 | 5.57 |
| BUG | Global X Cybersecurity ETF | 5.92 | 5.66 | 5.63 | 5.36 |
| VPN | Global X Data Center REITs & Digital Infrastructure ETF | 4.93 | 4.78 | 7.71 | 7.53 |
| VR | Global X Metaverse ETF | 4.85 | 4.57 | 4.73 | 4.43 |
| CHB | Global X China Biotech Innovation ETF | 4.48 | 4.32 | 4.18 | 4.02 |
| BOTZ | Global X Robotics & Artificial Intelligence ETF | 4.48 | 4.45 | 5.14 | 4.91 |
| CLOU | Global X Cloud Computing ETF | 4.42 | 4.13 | 4.66 | 4.36 |
| HYDR | Global X Hydrogen ETF | 4.26 | 3.76 | 3.92 | 3.30 |
| AIQ | Global X Artificial Intelligence & Technology ETF | 3.75 | 3.49 | 3.89 | 3.63 |
| FINX | Global X FinTech ETF | 3.51 | 3.13 | 3.98 | 3.58 |
| AGNG | Global X Aging Population ETF | 3.50 | 3.48 | 4.12 | 4.11 |
| HERO | Global X Video Games & Esports ETF | 3.36 | 3.20 | 3.37 | 3.20 |
| SOCL | Global X Social Media ETF | 3.32 | 3.02 | 3.27 | 2.95 |
| EDOC | Global X Telemedicine & Digital Health ETF | 2.92 | 2.85 | 2.95 | 2.88 |
| SNSR | Global X Internet of Things ETF | 2.86 | 2.82 | 3.18 | 3.11 |
| SPX | S&P 500 Index | 2.55 | 2.50 | 2.88 | 2.81 |
| AQWA | Global X Clean Water ETF | 2.53 | 2.47 | 3.54 | 3.48 |
| EWEB | Global X Emerging Markets Internet & E-commerce ETF | 2.50 | 2.27 | 2.59 | 2.27 |
| GRNR | Global X Green Building ETF | 2.40 | 2.24 | 4.16 | 4.15 |
| KEJI | Global X China Innovation ETF | 2.28 | 2.13 | 1.98 | 1.73 |
| RNRG | Global X Renewable Energy Producers ETF | 2.27 | 2.30 | 4.42 | 4.46 |
| MILN | Global X Millennial Consumer ETF | 2.09 | 1.97 | 2.45 | 2.30 |
| RAYS | Global X Solar ETF | 2.07 | 2.19 | 2.72 | 2.86 |
| LIT | Global X Lithium and Battery Tech ETF | 2.00 | 1.94 | 2.13 | 2.08 |
| EDUT | Global X Education ETF | 1.97 | 1.73 | 2.07 | 1.82 |
| PTEC | Global X PropTech ETF | 1.95 | 1.78 | 3.17 | 2.87 |
| ACWI | MSCI ACWI Index | 1.88 | 1.83 | 2.21 | 2.14 |
| DMAT | Global X Disruptive Materials ETF | 1.64 | 1.54 | 1.96 | 1.85 |
| WNDY | Global X Wind Energy ETF | 1.63 | 1.67 | 3.23 | 3.27 |
| POTX | Global X Cannabis ETF | 1.61 | 1.41 | 2.21 | 1.85 |
| PAVE | Global X U.S. Infrastructure ETF | 1.56 | 1.51 | 1.85 | 1.80 |
| BFIT | Global X Health & Wellness ETF | 1.34 | 1.31 | 1.53 | 1.50 |
| EBIZ | Global X E-commerce ETF | 1.24 | 1.10 | 1.37 | 1.21 |
| CTEC | Global X Cleantech ETF | 1.16 | 1.14 | 1.54 | 1.52 |
| DRIV | Global X Autonomous & Electric Vehicles ETF | 1.03 | 0.98 | 1.17 | 1.14 |
| KROP | Global X AgTech & Food Innovation ETF | 1.03 | 0.85 | 1.45 | 1.23 |

Note: P/S and EV/S refer to price-to-sales and enterprise value-to-sales, respectively.



F12M SALES GROWTH, PSG, AND EVSG

Source: Bloomberg, data is as of 7/31/23 and 6/30/23, Global X ETFs.

| Ticker | Name | F12M Sales (%) | | PSG | | EVSG | |
|--------|---|----------------|---------|---------|---------|---------|---------|
| | | 7/31/23 | 6/30/23 | 7/31/23 | 6/30/23 | 7/31/23 | 6/30/23 |
| BKCH | Global X Blockchain ETF | 50.4% | 41.4% | 0.13 | 0.13 | 0.16 | 0.16 |
| BOTZ | Global X Robotics & Artificial Intelligence ETF | 42.8% | 36.8% | 0.10 | 0.12 | 0.12 | 0.13 |
| RAYS | Global X Solar ETF | 40.4% | 35.7% | 0.05 | 0.06 | 0.07 | 0.08 |
| CHB | Global X China Biotech Innovation ETF | 35.5% | 31.5% | 0.13 | 0.14 | 0.12 | 0.13 |
| POTX | Global X Cannabis ETF | 30.5% | 39.2% | 0.05 | 0.04 | 0.07 | 0.05 |
| BUG | Global X Cybersecurity ETF | 28.2% | 26.1% | 0.21 | 0.22 | 0.20 | 0.21 |
| LIT | Global X Lithium and Battery Tech ETF | 21.8% | 22.2% | 0.09 | 0.09 | 0.10 | 0.09 |
| VPN | Global X Data Center REITs & Digital Infrastructure ETF | 19.3% | 15.9% | 0.25 | 0.30 | 0.40 | 0.47 |
| KEJI | Global X China Innovation ETF | 18.2% | 16.9% | 0.13 | 0.13 | 0.11 | 0.10 |
| EDUT | Global X Education ETF | 13.9% | 11.9% | 0.14 | 0.15 | 0.15 | 0.15 |
| VR | Global X Metaverse ETF | 13.3% | 11.3% | 0.36 | 0.41 | 0.36 | 0.39 |
| EBIZ | Global X E-commerce ETF | 13.3% | 11.9% | 0.09 | 0.09 | 0.10 | 0.10 |
| EWEB | Global X Emerging Markets Internet & E-commerce ETF | 13.2% | 10.9% | 0.19 | 0.21 | 0.20 | 0.21 |
| HERO | Global X Video Games & Esports ETF | 12.6% | 11.5% | 0.27 | 0.28 | 0.27 | 0.28 |
| WNDY | Global X Wind Energy ETF | 11.8% | 7.8% | 0.14 | 0.21 | 0.27 | 0.42 |
| EDOC | Global X Telemedicine & Digital Health ETF | 11.3% | 11.7% | 0.26 | 0.24 | 0.26 | 0.25 |
| AIQ | Global X Artificial Intelligence & Technology ETF | 11.1% | 9.6% | 0.34 | 0.36 | 0.35 | 0.38 |
| CLOU | Global X Cloud Computing ETF | 10.1% | 9.5% | 0.44 | 0.44 | 0.46 | 0.46 |
| CTEC | Global X Cleantech ETF | 9.5% | 9.8% | 0.12 | 0.12 | 0.16 | 0.16 |
| DMAT | Global X Disruptive Materials ETF | 9.4% | 8.1% | 0.17 | 0.19 | 0.21 | 0.23 |
| DRIV | Global X Autonomous & Electric Vehicles ETF | 9.2% | 8.8% | 0.11 | 0.11 | 0.13 | 0.13 |
| BFIT | Global X Health & Wellness ETF | 8.2% | 7.5% | 0.16 | 0.18 | 0.19 | 0.20 |
| SOCL | Global X Social Media ETF | 8.1% | 5.5% | 0.41 | 0.55 | 0.40 | 0.54 |
| AGNG | Global X Aging Population ETF | 8.0% | 7.4% | 0.44 | 0.47 | 0.52 | 0.55 |
| MILN | Global X Millennial Consumer ETF | 7.5% | 6.6% | 0.28 | 0.30 | 0.32 | 0.35 |
| HYDR | Global X Hydrogen ETF | 6.6% | 3.4% | 0.65 | 1.11 | 0.60 | 0.98 |
| AQWA | Global X Clean Water ETF | 6.4% | 5.0% | 0.40 | 0.49 | 0.56 | 0.70 |
| PTEC | Global X PropTech ETF | 5.7% | 5.2% | 0.34 | 0.34 | 0.56 | 0.55 |
| GRNR | Global X Green Building ETF | 5.4% | 5.5% | 0.44 | 0.41 | 0.77 | 0.75 |
| SPX | S&P 500 Index | 5.3% | 5.5% | 0.48 | 0.45 | 0.54 | 0.51 |
| SNSR | Global X Internet of Things ETF | 4.8% | 5.0% | 0.60 | 0.56 | 0.66 | 0.62 |
| ACWI | MSCI ACWI Index | 4.5% | 4.4% | 0.42 | 0.42 | 0.49 | 0.49 |
| KROP | Global X AgTech & Food Innovation ETF | 4.1% | 3.9% | 0.25 | 0.22 | 0.35 | 0.32 |
| FINX | Global X FinTech ETF | 1.1% | 0.3% | 3.07 | 10.56 | 3.48 | 12.07 |
| PAVE | Global X U.S. Infrastructure Development ETF | 0.5% | -0.3% | 3.21 | -4.77 | 3.81 | -5.68 |
| RNRG | Global X Renewable Energy Producers ETF | -1.9% | -0.8% | -1.16 | -2.77 | -2.27 | -5.36 |
| GNOM | Global X Genomics & Biotechnology ETF | -9.4% | -9.9% | -0.67 | -0.63 | -0.60 | -0.56 |

Note: F12 Sales Growth refers to the consensus analyst expectations for total sales growth in the next 12 months.

Please note that substantial month-over-month variations in F12M Sales may be the result of Bloomberg coverage and estimates of underlying securities.

PSG and EVSG refer to Price-to-Sales over F12 Sales Growth and Enterprise Value over F12 Sales Growth, respectively. N/As reflect a negative growth number in the denominator and similar to traditional PEG ratios aren't typically displayed as such (hence the N/A).

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- **Physical Environment:** [U.S. Infrastructure Development ETF \(PAVE\)](#), [CleanTech ETF \(CTEC\)](#), [Renewable Energy Producers \(RNRG\)](#), [Clean Water ETF \(AQWA\)](#), [Hydrogen ETF \(HYDR\)](#), [Solar ETF \(RAYS\)](#), [Wind Energy ETF \(WNDY\)](#), [Disruptive Materials ETF \(DMAT\)](#), [Green Building ETF \(GRNR\)](#), [Carbon Credits Strategy ETF \(NTRL\)](#)
- **Multi-Theme:** [Thematic Growth ETF \(GXTG\)](#), [China Innovation ETF \(KEJI\)](#)

Footnotes

1. Associated Builders and Contractors. (2023, July 11). ABC's Construction Backlog Indicator Steady in June, Contractor Confidence Down.
2. Ibid.
3. The White House. (2023, July 27). The Advance Estimate of Second Quarter Real GDP.
4. Construction Dive. (2023, July 12). Construction backlog holds steady on infrastructure tailwinds.



5. Ibid.
6. The Sun Gazette. (2023, July 2). CTC Earmarks \$2.3B For Future State Transportation Projects.
7. Ibid.
8. Spotify Newsroom. (2023, July 24). Adjusting Our Spotify Premium Prices.
9. Ibid.
10. The Verge. (2023, July 24). It's Spotify's turn to increase prices.
11. Ibid.
12. CNET. (2023, July 31). Threads Just Added a 'Following' Tab. Here's How to Use It.
13. ZDNET. (2023, August 7). Threads is adding the two most user-requested features.
14. PV Tech. (2023, July 28). First Solar invests US\$1.1 billion in new US facility, intends to submit expression of interest in Germany.
15. Ibid.
16. Ibid.
17. Ibid.
18. Yahoo! Finance. (2023, July 27). American Solar: First Solar to Invest up to \$1.1 Billion in Fifth US Manufacturing Facility, Adding 3.5 GW of Nameplate Capacity in 2026.
19. U.S. Department of the Interior. (2023, June 28). Biden-Harris Administration Holds Record-Breaking Auction for Solar Energy Development.
20. Ibid.
21. Fiserv Newsroom. (2023, July 27). Fiserv Adds the Amazon Shop with Points Program to its Popular uChoose Rewards Offering.
22. Ibid.
23. PayPal Newsroom. (2023, July 26). Microsoft Deepens Relationship with PayPal to Offer Simple, Flexible Payment Options.
24. Ibid.
25. PYMNTS.com. (2023, August 4). Apple CEO: Apple Pay's Convenience Drives Record Payment Services Revenue.
26. Ibid.
27. The Verge. (2023, August 2). Google's AI search is getting more video and better links.
28. Meta Newsroom. (2023, August 2). Introducing AudioCraft: A Generative AI Tool For Audio and Music.
29. Coin Telegraph. (2023, August 4). Meta launches suite of generative AI music tools rivaling Google's MusicLM.
30. Microsoft. (2023, August 2). Announcing Windows 11 Insider Preview Build 22621.2129 and 22631.2129.
31. Semiconductor Industry Association. (2023, July 28). Global Semiconductor Sales Increase 4.7% in Q2 Compared to Q1.
32. Ibid.
33. eeNews Europe. (2023, August 3). Semiconductor incubator move in UK chip strategy.
34. South China Morning Post. (2023, August 3). China's natural science fund supports new 'chiptlet' tech research to advance semiconductor self-sufficiency amid threat of fresh US sanctions.
35. CNBC. (2023, July 28). India woos U.S. chip giants as it looks to become a semiconductor superpower.

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