

GLOBAL X ETFs RESEARCH

The Next Big Theme: January 2022

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Social Media & Blockchain

Web3 Takes Shape, Metaverse Real Estate Market Heats Up

Seen as internet 3.0, Web3 reimagines internet services and mobile apps utilizing decentralized blockchain technology. Web3 seeks to leverage emerging technologies such as cryptocurrencies, non-fungible tokens (NFTs), gaming, augmented and virtual reality, and the metaverse. Like the metaverse, Web3 encourages companies to be interoperable and put ownership in the hands of users. The burgeoning digital land boom in the metaverse is a prime example of digital ownership. Consumers continue to invest in concert venues, shopping malls, and other high-demand properties using cryptocurrencies powered by the blockchain. Even the cheapest plots of land on two popular metaverse platforms, Sandbox and Decentraland, recently sold for more than \$13,000 dollars.¹

Electric Vehicles

EV Sales Surge Continues

Auto manufacturers continue to deliver on predictions of widespread electric vehicle (EV) adoption. In the latest available data, global EV sales for November 2021 were up 72% year-over-year and represented 11.5% of total vehicles sales.² In Norway, which intends to be the first country to end sales of internal combustion engines, EVs accounted for nearly two-thirds of new car sales in 2021.³ Tesla was the top-selling brand in Norway, which helped the company sell a record 308,600 cars in the fourth quarter. Those sales pushed Tesla's yearly total to 936,712, an 87% increase from 2020.⁴ With production at the company's Berlin and Texas gigafactories slated to start in 2022, Tesla's momentum could continue. Even companies that joined the EV race later intend to aggressively ramp up their EV production. For example, Toyota intends to produce 3.5 million EVs and develop 30 battery-powered models by 2030.⁵

Fintech

BNPL Becoming a Banking Staple





Forty-two percent of survey participants in the U.S. said that they planned to use buy now, pay later (BNPL) platforms for at least a portion of their 2021 holiday spending.⁶ Thirty-two percent noted a willingness to spend \$99, while 26% said that they would go as high as \$200.⁷ Like BNPL's success in the U.S., the Chinese market has significant potential given its consumers' penchant for online shopping coupled with its established mobile payments ecosystem. For 2021, BNPL is expected to grow 51.3% to \$82.78 billion.⁸ BNPL's growth has the attention of the major credit rating agencies. Historically, BNPL lending had no effect on consumer credit history. However, Experian, TransUnion, and Equifax are working to create credit reports on BNPL loans, giving consumers another opportunity to build and improve their FICO scores.

U.S. Infrastructure

Step One: Ports

Following the passage of the Infrastructure and Investment Jobs Act (IIJA), investment in the country's port facilities is underway. In December, Transportation Secretary Pete Buttigieg announced \$241 million in discretionary grant funding for 25 new projects in 19 states and one territory to help smooth the ongoing supply chain issues. Under the IIJA, this grant will nearly double each year for the next five years. Not only are these investments aimed at easing supply chain issues, but they should also provide jobs.

Internet of Things

Japan Enters the Chip Race

The U.S. and China along with Taiwan and South Korea are the main players in the increasingly competitive global semiconductor market. However, a notable competitor is Japan. The government announced that it wants to triple the country's domestic chip revenue by 2030 and is investing \$6.8 billion towards that goal. ¹¹ In 2021, chip shortages created significant supply chain issues for top Japanese companies such as Toyota, Sony Group, and Keyence. Examples of potential long-term solutions to shortages like these include the government's recent approval for Taiwan Semiconductor Manufacturing Co. to build a \$7 billion chip plant with Sony Group. ¹²

Cannabis

Europe Moves to Legalize

In December, Malta became the first country in the European Union to officially legalize cannabis for recreational use. Maltese residents will be permitted to carry up to seven grams of cannabis and grow up to four plants in their residences. ¹³ With this new law, the Maltese government hopes to end the criminalization of cannabis and reduce criminal trafficking. Following Malta's lead, Germany is preparing to legalize cannabis for recreational use by allowing sales to adults in licensed shops. Other nations are expected to follow suit. Luxemburg moved to legalize cannabis for personal use in October 2021 but was delayed by the pandemic. Also, Italy set a referendum to decriminalize domestic cannabis growth and possession.

THE NUMBERS





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

THEMATIC SALES GROWTH

Source: Bloomberg, December 31, 2021, Global X ETFs.



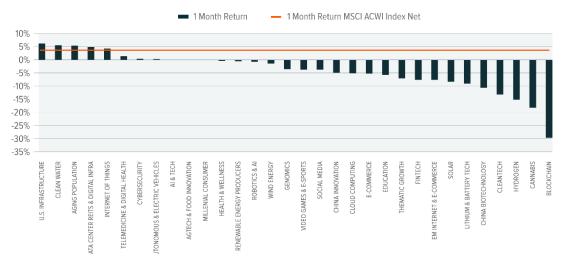
Note: Forward looking based on data and analysis from 12/31/2021.

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

DECEMBER 2021 THEMATIC ETF RETURNS

Source: Bloomberg, December 31, 2021, Global X ETFs.



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





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 12/31/21			Avg. Annualized % Data as of quarter end 12/31/21					
	Expense Ratio		1 Month	3 Month	Since Inception	1 Year	3 Year	5 Year	10 Year	Since Inception	
Robotics & Artificial		NAV	-0.80%	-1.96%	149.13%	8.83%	29.25%	19.84%	-	18.80%	
Intelligence	0.68%	Market Price	-0.72%	-1.72%	149.07%	8.63%	29.54%	19.77%	-	18.79%	
Inception Date 9/12/2016		Index	-0.74%	-1.80%	153.72%	9.66%	29.89%	20.25%	-	19.19%	
Fintech		NAV	-7.37%	-12.31%	180.43%	-9.71%		23.84%	-	21.48%	
Inception Date 9/12/2016	0.68%	Market Price	-7.60%	-12.18%	180.48%	-9.72%	23.96%		-	21.48%	
		Index	-7.35%	-12.23%	189.74%		24.65%		-	22.21%	
Internet Of Things	0.000/	NAV	4.40%	8.54%	172.82%		35.13%		-	20.85%	
Inception Date 9/12/2016	0.68%	Market Price	4.31% 4.44%	8.53%	173.23%	24.11%	35.25% 35.58%		-	20.88%	
·		Index NAV	-4.44% -4.93%	8.64% -7.82%	177.70% 79.25%	-3.26%	33.58%	21./2%	-	21.23% 23.97%	
Cloud Computing	0.68%	Market Price	-4.93% -5.13%	-7.88%	79.25%	-3.20%	-	-	-	24.13%	
Inception Date 4/12/2019	0.0070	Index	-4.89%	-7.67%	82.19%	-2.67%	_	-		24.64%	
		NAV	-4.05%	-11.65%	270.90%		24 85%	20.38%	15.53%	13.82%	
Social Media	0.65%	Market Price	-3.74%	-11.54%	270.96%		25.09%		15.53%	13.82%	
Inception Date 11/14/2011	0.0070	Index	-4.02%	-11.53%	291.92%		25.60%		16.19%	14.42%	
Artificial Intelligence		NAV	0.61%	5.45%	115.59%	17.03%	35.27%	-	-	23.52%	
& Technology	0.68%	Market Price	-0.05%	5.76%	115.86%	17.10%	35.46%	-	-	23.56%	
Inception Date 5/11/2018		Index	0.65%	5.61%	118.62%	17.61%	35.82%	-	-	23.94%	
Autonomous &		NAV	0.47%	11.50%	113.46%	27.98%	38.52%	-	-	22.65%	
Electric Vehicles	0.68%	Market Price	0.27%	11.49%	113.61%	27.80%	38.67%	-	-	22.67%	
Inception Date 4/13/2018		Index	0.50%	11.67%	115.07%		38.90%	-	-	22.85%	
Lithium And Battery Tech		NAV	-8.72%	2.89%	219.61%		47.35%		12.97%	10.69%	
Inception Date 7/22/2010	0.75%	Market Price	-9.04%	3.20%	219.23%	36.74%		30.37%	13.04%	10.68%	
		Index	-8.69%	3.23%	237.18%	38.46%		30.29%	13.38%	11.20%	
Genomics And Biotechnology Inception Date 4/5/2019	0.50%	NAV	-3.85%	-10.62%	29.86%	-16.00%	-	-	-	10.02%	
		Market Price Index	-3.47% -3.84%	-10.80% -10.50%	32.55% 31.72%	-15.93% -15.65%	-	-	-	10.85% 10.57%	
		NAV	-0.06%	-0.76%	191.94%	14.08%		22.78%	-	20.86%	
Millennial Consumer	0.50%	Market Price	-0.13%	-1.06%	190.42%	13.81%		22.72%		20.74%	
Inception Date 5/4/2016	0.5070	Index	-0.02%	-0.63%	199.89%		30.29%		_	21.40%	
		NAV	5.81%	-0.71%	97.94%	3.63%	15.60%		-	12.86%	
Aging Population	0.50%	Market Price	5.43%	-0.06%	101.97%	3.92%	15.51%	14.42%	-	13.27%	
Inception Date 5/10/2016	0.00.0	Index	5.82%	-0.67%	100.93%	3.78%	15.84%	14.93%	-	13.15%	
Health And Wallness		NAV	0.82%	-1.87%	96.71%	10.84%	18.07%	15.38%	-	12.74%	
Health And Wellness	0.50%	Market Price	-0.35%	-1.81%	97.89%	10.44%	17.91%	15.27%	-	12.86%	
Inception Date 5/9/2016		Index	0.86%	-1.80%	101.36%	11.18%	18.51%	15.82%	-	13.19%	
E-Commerce		NAV	-5.26%	-8.43%	86.10%	-13.02%		-	-	22.25%	
Inception Date 11/27/2018	0.50%	Market Price	-5.20%	-8.17%	85.90%		26.18%	-	-	22.21%	
		Index	-5.21%	-8.40%	88.67%		26.75%	-	-	22.76%	
Us Infrastucture	0.470/	NAV Market Price	6.18%	13.66%	97.53%		29.43%	-	-	15.18%	
Development Inception Date 3/6/2017	0.47%	Market Price	6.17%	13.69%	97.66% 102.30%		29.46%	-	-	15.19% 15.72%	
inception Date 3/0/201/		Index NAV	-17.15%	13.84% -33.01%	-73.61%	37.08% -38.91%	30.10%	-		15.72% -44.16%	
Cannabis	0.51%	Market Price		-33.20%	-74.29%	-39.26%		-	-	-44.80%	
Inception Date 9/17/2019	0.01/0	Index	-17.48%	-33.52%	-76.71%	-40.11%	_	-	-	-47.07%	
		NAV	-3.50%	1.12%	91.87%	-7.92%	_	-	-	34.79%	
Video Games & Esports	0.50%	Market Price	-3.71%	1.38%	91.20%	-8.45%	-	-	-	34.57%	
Inception Date 10/25/2019		Index	-3.45%	1.26%	94.09%	-7.39%	-	-	-	35.44%	
Cubousit	NAV 0.78% 5.08% 111.39% 13.67%	NAV					-	-	-	40.90%	
Cybersecurity Inception Date 10/25/2019		-	42.02%								
inception bate 10/25/2019					113.04%		-	-	-	41.33%	
Thematic Growth Inception Date 10/25/2019	0.50%	NAV	-5.26%	-9.31%	80.76%	3.30%	-	-	-	31.15%	
		Market Price	-5.67%	-9.13%	82.00%	3.19%	-	-	-	31.57%	
		Index	-5.29%	-9.39%	79.69%	2.80%	-	-	-	30.74%	
Education		NAV	-5.43%	-18.06%	-40.60%	-49.93%	-	-	-	-29.79%	
Inception Date 7/10/2020	0.50%	Market Price		-18.07%	-40.93%	-50.48%		-	-	-30.05%	
		Index	-5.42%	-17.98%	-40.18%	-49.67%	-	-	-	-29.38%	
Telemedicine & Digital Health	h _{0.68%}	NAV Market Price	1.41%	-6.71%	8.70% 8.64%	-14.16%	-	-	-	6.04%	
Inception Date 7/29/2020		Market Price Index	1.41% 1.46%	-6.66% -6.65%	8.64% 9.64%	-14.21% -13.61%	-	-	-	6.00% 6.67%	
		illuex	1.70/0	-0.00/0	J.U4 /0	-13.01/6	-	-	-	0.07/0	





China Biotech	0.67%	NAV	-9.96%	-11.35%	-4.77%	-12.00%	-	-	-	-3.77%
Innovation Inception Date 9/22/2020		Market Price	-10.58%	-11.25%	-5.37%	-12.71%	-	-	-	-4.24%
		Index	-9.92%	-11.22%	-4.00%	-11.47%	-	-	-	-3.15%
Cleantech		NAV	-13.22%	-5.60%	17.72%	-21.72%	-	-	-	14.86%
	0.50%	Market Price	-13.09%	-5.26%	17.32%	-22.20%	-	-	-	14.53%
Inception Date 10/27/2020		Index	-13.18%	-5.51%	15.09%	-23.52%	-	-	-	12.67%
Data Center Reits &		NAV	4.42%	11.62%	25.23%	20.82%	-	-	-	21.06%
Digital Infrastructure	0.50%	Market Price	4.86%	10.83%	25.76%	20.48%	-	-	-	21.49%
Inception Date 10/27/2020		Index	4.32%	11.58%	25.21%	20.81%	-	-	-	21.03%
merging Markets Internet &		NAV	-7.53%	-15.39%	-32.72%	-38.24%	-	-	-	-29.33%
E-Commerce	0.65%	Market Price	-7.64%	-15.72%	-32.93%	-38.27%	-	-	-	-29.52%
Inception Date 11/09/2020		Index	-7.51%	-15.28%	-32.22%	-37.81%	-	-	-	-28.85%
	0.65%	NAV	-0.31%	0.39%	33.46%	-12.27%	14.50%	11.63%	-	4.47%
Renewable Energy Producers		Market Price	-0.50%	0.52%	33.17%	-12.96%	14.40%	11.43%	-	4.44%
Inception Date 05/27/2015		Index	-0.31%	0.47%	36.85%	-11.82%	14.87%	12.12%	-	4.87%
China Innovation	0.75%	NAV	-4.63%	-2.89%	-27.44%	-	-	-	-	-
		Market Price	-4.84%	-3.01%	-27.72%	-	-	-	-	-
Inception Date 02/22/2021		Index	-1.52%	-2.53%	-22.12%	-	-	-	-	-
	0.50%	NAV	5.56%	10.23%	17.72%	-	-	-	-	-
Clean Water		Market Price	5.48%	9.40%	17.92%	-	-	-	-	-
Inception Date 04/08/2021		Index	5.64%	10.35%	18.04%	-	-	-	-	-
Agtech & Food	0.50%	NAV	0.33%	-8.97%	-21.76%	-	-	-	-	-
Innovation		Market Price	-0.07%	-9.11%	-21.45%	_	_	_	_	_
Inception Date 07/12/2021		Index	0.34%	-8.91%	-21.64%	-	-	-	-	-
		NAV	-15.62%	-5.50%	-17.84%	-	-	-	-	-
Hydrogen	0.50%	Market Price	-15.10%	-5.70%	-17.60%	-	-	-	-	-
Inception Date 07/12/2021		Index	-15.59%	-5.39%	-17.69%	-	-	-	-	-
		NAV	-29.52%	-3.53%	-8.89%	-	-	-	-	
Blockchain	0.50%	Market Price	-29.63%	-3.63%	-8.87%	-	-	-	-	-
Inception Date 07/12/2021		Index	-29.70%	-3.95%	-9.16%	-	-	-	-	-
	0.50%	NAV	-9.28%	-0.70%	-3.62%	-	-	-	-	-
Solar Inception Date 09/08/2021		Market Price	-8.32%	-0.32%	-2.79%	-	_	-	-	
		Index	-9.24%	-0.60%	-3.47%	-	-	-	-	-
		NAV	-1.88%	-6.30%	-6.07%	_	_	_	-	
Wind Energy	0.50%	Market Price	-1.38%	-6.12%	-5.67%	-	-	-	-	-
Inception Date 09/08/2021	1 0.50%	Index	-1.86%	-6.18%	-5.92%					





P/S AND EV/S

Source: Bloomberg, data is as of 12/31/21 and 11/30/21, Global X ETFs.

Ticker	Name	F	P/S	EV/S		
		12/31/21	11/30/21	12/31/21	11/30/21	
вксн	Global X Blockchain ETF	11.20	15.88	15.16	20.76	
GNOM	Global X Genomics & Biotechnology ETF	9.31	9.81	9.39	10.05	
BUG	Global X Cybersecurity ETF	8.69	8.52	10.25	10.15	
CLOU	Global X Cloud Computing ETF	8.10	8.56	10.00	11.03	
HYDR	Global X Hydrogen ETF	7.16	8.42	6.78	8.06	
CHB	Global X China Biotech Innovation ETF	7.10	7.14	6.92	7.00	
FINX	Global X FinTech ETF	6.89	7.20	8.66	8.22	
VPN	Global X Data Center REITs & Digital Infrastructure ETF	6.64	6.55	7.43	7.49	
SOCL	Global X Social Media ETF	5.22	5.42	4.99	5.22	
KEJI	Global X China Innovation ETF	5.06	5.34	3.96	4.20	
BOTZ	Global X Robotics & Artifical Intelligence ETF	4.89	4.67	5.29	4.66	
AGNG	Global X Aging Population ETF	4.67	4.41	5.30	5.02	
EDOC	Global X Telemedicine & Digital Health ETF	4.23	4.18	5.66	5.89	
HERO	Global X Video Games & Esports ETF	4.09	4.24	3.90	4.10	
AIQ	Global X Artificial Intelligence & Technology ETF	4.08	4.06	4.20	4.16	
RNRG	Global X Renewable Energy Producers ETF	3.57	3.58	5.75	5.75	
SNSR	Global X Internet of Things ETF	3.44	3.29	3.76	3.61	
RAYS	Global X Solar ETF	3.27	3.62	4.34	4.72	
MILN	Global X Millennial Consumer ETF	3.22	3.26	3.60	3.64	
POTX	Global X Cannabis ETF	3.21	3.84	7.20	8.22	
SPX	S&P 500 Index	3.17	3.04	3.47	3.33	
AQWA	Global X Clean Water ETF	2.97	2.82	3.96	3.80	
LIT	Global X Lithium and Battery Tech ETF	2.68	2.95	2.93	3.17	
EWEB	Global X Emerging Markets Internet & E-commerce ETF	2.55	2.77	2.48	2.69	
ACWI	MSCI ACWI Index	2.25	2.17	2.58	2.50	
WNDY	Global X Wind Energy ETF	1.90	1.95	2.94	3.06	
EBIZ	Global X E-commerce ETF	1.86	1.97	1.97	2.07	
EDUT	Global X Education ETF	1.85	1.95	2.04	2.20	
PAVE	Global X U.S. Infrastructure Development ETF	1.72	1.65	2.00	1.94	
KROP	Global X AgTech & Food Innovation ETF	1.69	1.68	2.02	2.07	
CTEC	Global X Cleantech ETF	1.64	1.89	1.91	2.17	
BFIT	Global X Health & Wellness ETF	1.63	1.64	1.81	1.82	
DRIV	Global X Autonomous & Electric Vehicles ETF	1.35	1.35	1.50	1.49	

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

F12 MONTH SALES GROWTH, PSG, AND EVSG Source: Bloomberg, data is as of 12/31/21 and 11/30/21, Global X ETFs.

Ticker	Name	F12M Sa	iles (%)	PSG		EVSG	
		12/31/21	11/30/21	12/31/21	11/30/21	12/31/21	11/30/21
вксн	Global X Blockchain ETF	127.3%	97.7%	0.09	0.16	0.12	0.21
POTX	Global X Cannabis ETF	92.2%	88.3%	0.03	0.04	0.08	0.09
RAYS	Global X Solar ETF	63.9%	58.3%	0.05	0.06	0.07	0.08
СНВ	Global X China Biotech Innovation ETF	45.9%	38.2%	0.15	0.19	0.15	0.18
LIT	Global X Lithium and Battery Tech ETF	35.9%	36.7%	0.07	0.08	0.08	0.09
KEJI	Global X China Innovation ETF	33.3%	30.9%	0.15	0.17	0.12	0.14
EWEB	Global X Emerging Markets Internet & E-commerce ETF	29.1%	27.9%	0.09	0.10	0.09	0.10
HERO	Global X Video Games & Esports ETF	25.4%	24.8%	0.16	0.17	0.15	0.17
EBIZ	Global X E-commerce ETF	24.4%	22.6%	0.08	0.09	0.08	0.09
BUG	Global X Cybersecurity ETF	22.9%	21.9%	0.38	0.39	0.45	0.46
FINX	Global X FinTech ETF	17.0%	17.0%	0.41	0.42	0.51	0.48
BOTZ	Global X Robotics & Artificial Intelligence ETF	16.5%	13.7%	0.30	0.34	0.32	0.34
SOCL	Global X Social Media ETF	16.4%	15.1%	0.32	0.36	0.31	0.35
CLOU	Global X Cloud Computing ETF	14.8%	13.8%	0.55	0.62	0.68	0.80
AIQ	Global X Artificial Intelligence & Technology ETF	13.3%	12.8%	0.31	0.32	0.32	0.32
RNRG	Global X Renewable Energy Producers ETF	12.9%	11.6%	0.28	0.31	0.45	0.49
VPN	Global X Data Center REITs & Digital Infrastructure ETF	12.9%	13.3%	0.52	0.49	0.58	0.56
EDOC	Global X Telemedicine & Digital Health ETF	12.8%	11.1%	0.33	0.38	0.44	0.53
MILN	Global X Millennial Consumer ETF	12.3%	11.5%	0.26	0.28	0.29	0.32
PAVE	Global X U.S. Infrastructure Development ETF	12.0%	11.3%	0.14	0.15	0.17	0.17
DRIV	Global X Autonomous & Electric Vehicles ETF	11.5%	11.0%	0.12	0.12	0.13	0.14
BFIT	Global X Health & Wellness ETF	11.3%	11.0%	0.14	0.15	0.16	0.17
ACWI	MSCI ACWI Index	10.4%	9.4%	0.22	0.23	0.25	0.27
SPX	S&P 500 Index	10.2%	9.5%	0.31	0.32	0.34	0.35
SNSR	Global X Internet of Things ETF	9.7%	9.9%	0.36	0.33	0.39	0.37
GNOM	Global X Genomics & Biotechnology ETF	9.7%	12.3%	0.96	0.79	0.97	0.81
HYDR	Global X Hydrogen ETF	9.3%	8.8%	0.77	0.96	0.73	0.92
AGNG	Global X Aging Population ETF	7.5%	6.7%	0.62	0.66	0.71	0.75
WNDY	Global X Wind Energy ETF	5.5%	9.9%	0.34	0.20	0.53	0.31
EDUT	Global X Education ETF	5.5%	5.0%	0.34	0.39	0.37	0.44
AQWA	Global X Clean Water ETF	5.4%	4.9%		0.57	0.73	0.77
CTEC	Global X Cleantech ETF	2.2%	4.1%	0.75	0.46	0.87	0.53
KROP	Global X AgTech & Food Innovation ETF	1.9%	0.9%	0.90	1.90		2.34

Note: F12 Sales Growth refers to the consensus analyst expectations for total sales growth in the next 12 months. 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>U.S. Infrastructure Development ETF (PAVE)</u>, <u>CleanTech ETF (CTEC)</u>, Renewable Energy Producers (RNRG), <u>Clean Water ETF (AQWA)</u>, <u>Hydrogen ETF (HYDR)</u>, <u>Solar ETF (RAYS)</u>, <u>Wind Energy ETF (WNDY)</u>
- Multi-Theme: Thematic Growth ETF (GXTG), China Innovation ETF (KEJI)
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- 3. Reuters," Electric cars hit 65% of Norway sales as Tesla grabs overall pole", Jan. 5, 2022.
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- 13. New York Times, "Malta Becomes First E.U. Country to Legalize Marijuana", Dec. 15, 2021.

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