



Q4 2018 Quarterly Report: WilderHill Clean Energy Index[®], December 31, 2018

For 4th Quarter 2018 the Clean Energy Index[®] (ECO) began near 52 and ended December near 44, with ECO down across Q4. Moreover since 2018 had begun nearby 53, the year was down very roughly -15% similar to Q4. There were also gains; late Q4, ECO was up about +6% a single day on December 26th. And looking back 2 years, the ECO Index[®] at the start of 2017 was near 38 so has gained very roughly +16% up to end of 2018. An independent ECO Index[®] tracker at start of 2017 was close to 19, start of 2018 near 25, and at end of 2018 was about 21.

For the last 5 years to November 2018 clean energy as captured by ECO is down some -20%. Yet notably, 2 of the 3 fossil fuels have fallen much harder here, as seen in oil that's down over -60%, & natural gas that's still down by some -50% even after the latter's gains in 2018. Both went far more negative last 5 years than did ECO; those 2 (but not so much coal) fell much more than clean energy. Coal rose steeply 2016/2017 to back near ECO, then fell.

For WilderHill[®] New Energy Global Innovation (NEX) capturing clean energy *worldwide* mostly outside the U.S., it 'underperformed' ECO a bit in 2018. For 5 years to November Q4, however, global NEX has done 'best' of these (and 'better' than many energy-related themes) - to just above nil, 'less down' than many passive Indexes & active funds in clean or dirty energy.

This marked last & final rebalance of Progressive Energy Index[®] (WHPRO) that alone ended in Q1 2019 - [along with an independent tracker \(PUW\) just for it.](#) WHPRO generally excluded clean solar, wind & renewables: that differing WHPRO theme was for reducing CO2 & better efficiency in dominant energy. That Index & tracker started 2006 - and they closed Q1 2019. WHPRO was first-ever for the low-carbon theme and arguably was well ahead of its time. Over 12 years it was live 2016-2019, we saw that WHPRO's theme moved unlike ECO's cleaner focus (which 'can & does at times drop like a rock'); also that a differing WHPRO theme for reducing CO2 in major energy was interestingly non-correlating with traditional oil and coal.

Charts in pages ahead will show varied clean energy themes over the past 1 year, last 5 years, and nearly 10 years. But first, let's look at this clean energy theme as captured & tracked by ECO just Q4 to late December. There was sizable volatility downwards including especially in December - as major broader Indexes like Nasdaq[®], Dow[®] & S&P[®] also dropped down from highs and went negative for the year. First let's see ECO, well down over 4th Quarter:



Source: NYSE.com

Looking next at the last 12 Months, to latter-Q4 (up to late Nov. 2018) - just prior to further falls in December over the varied clean, alternative as well as non-renewable energy themes - some differences among the varied new & older energy are as usual standing out.

Firstly, an only theme that's discussed here but is *Not Shown* in this 1st Chart is a Natural Gas tracker, at times it was up significantly +60%, so its inclusion would have rendered all less visible. Natural gas showed some rebounding Q3 and afterwards it was up more - then down Q4 - yet it's still well down over a longer 5-years as seen in a few subsequent Charts.

Starting then for last 12 months from bottom, lowest shown is a passive narrow solar Index (not ours) via a tracker for solar only, an important theme off -12%. Somewhat 'above' it is an independent tracker for global new energy mainly outside U.S. as captured by WilderHill New Energy Global Index (NEX) down some -8%; nearby all the rest clumped closely.

So roughly tied are an oil tracker after a runup & big declines in 2018; also seen here are an active fund for global alternative energy; a tracker for coal; one (not ours) for global clean energy; and ECO in bold; (also WHPRO via a tracker both of which ended in Q1 2019).



Source: bigcharts.com

As usual we next step back and look backwards closer to 10 years, from around 2010 to again late-November 2018 in a chart below. Included are all 3 fossil fuels along with natural gas and most dramatic here and far down at bottom is Natural Gas, which even after recent gains still is crashed by some -80%! We thus see viewing from bottom that lowest is Natural Gas; then just above that is that tracker for Solar, also well down some -75%. Next, a bit down less is Oil that's fallen hard: lately it has risen/fallen yet still is steeply off some -70%.

Hence a 'greener energy' theme Solar - as well as two 'brown energy' dirtier fossil fuels natural gas, and oil - are All very strongly down when viewed for a past nearly 10 years.

Next 'up' (well down) here is Coal although that's still well down some -60%. Most-CO2 laden theme it had earlier-on trailed even more than here, its tracker then rose 2016 to early 2018, despite facing some pretty dismal economics - falling however in latter 2018.

Above those 4 stories for solar, plus fossil fuels - we next see as before, 3 clumped themes: there's a separate passive Index (not ours) for global clean energy; an active fund for global alternative energy; and ECO Index via independent tracker (again showing it's hard for an active fund to beat passive Index). While these 3 are down some -50% for nearly 10 years, these 3 all still are 'better' (*down less*) than the 4 of Natural Gas, Solar, Oil, Coal.

Next up visibly much higher is a WilderHill Global New Energy (NEX) tracker down some -25%. Among these varied themes, Global New/Clean Energy does rather 'better' - yet these all are after some big falls, with some still down some -2x or -3x more so than NEX. (Lastly above all 7 after a big gap is WilderHill Progressive (WHPRO) via independent tracker for lowering CO2 in dominant energy; it ended near 10 years just up a bit over nil, only energy theme here positive starting so early: as noted though, WHPRO & tracker ceased/ended Q1 2019).

Many energy-trackers don't start so early. And importantly, broad mainly non-energy themes tracking markets more generally like an encompassing S&P 500®, or NASDAQ-100® - hence not seen here nor discussed here since they are beyond just energy- did far, far better:



Source: bigcharts.com

How have Individual constituents *Within* ECO & WHPRO fared the past 52-weeks?

Focusing next on some internals inside of Clean Energy (and in Progressive that's ended), so within ECO (& in WHPRO for one final time) - we'll glance back from early Dec. 2017 through early Dec. 2018 - to observe how *constituents within* ECO fared last 52-weeks. Briefly glancing back at components this past Year for relative Lows, Highs etc to latter Q4 (December 4), we see ECO's Top Performers spread diversely like Q3. There's significant similarity too in names compared to Q3 so rather more inertia than seeing all new 'winners / losers'.

Winners in ECO over these past 52 weeks to latter-Q4 included here in *Energy Services, in *Wind Power and Grid, in *Solar home installation, in *Electric Cars, and *Energy Efficiency. Some past years, winners in ECO were at times concentrated - say mainly solar equipment / solar cell manufacturing - but that's not been the case there for a while - especially as solar cells have been increasingly commoditized with prices per watt in downwards fall.

ECO Index 'Winners' past 52 weeks closer to their own highs (those near in parentheses):

Latter Q4 2018 individual constituents near their own 52-week **Highs** to December, mindful that the broader markets declined of late so few are at their recent highs, include: **AMRC**: in energy services, it was near highs also in Q1, backed off Q2, and now here again; **AMSC**: in wind & grid so core also to clean energy; was near highs in Q2 & again here; (CREE: LED lighting was also near highs in Q1 & Q2 - though has backed-off some here); (CSIQ: in solar panels, also ENPH in solar inverters, both towards high-end of their range); (THRM: in thermoelectrics is towards high-end of range like Q3, though not at top end); (PEGI: in wind power and also towards high-end of its range, though not at top end); (REGI: in biofuels, and also near its past 52-week highs here like it was previously Q3); **RUN**: for solar home residential installations so downstream solar, near highs like in Q3; (TERP: in solar is also towards higher-end of its range, though here not by very top end); **TSLA**: electric cars, solar, and batteries for storage, is somewhat near 52-week highs; **WLDN**: energy efficiency, it is a recent 2018 addition to ECO Index.

Hence there's pretty strong diversity among Top Performers recently within ECO, above.

Next, let's look at constituents within ECO near their own 52-week **Lows to Dec. 4th**:

ECO's constituents near 52-week Lows were diverse, some newly here in Q4 and many more nearer Low-points (than highs) as markets have been swooning broadly:

(AEIS: power conversion again nearer 52-week lows (like Q3) but after long run upwards); (ALB: lithium mining and other elements/chemicals for batteries in electric cars etc); (ASYS: for making solar cells & LEDs, it's again near downwards end of range like Q3); (BLDP: fuel cells, again here somewhat near its own 52-week lows like before in 2018); **BE**: in fuel cells too and also burdened by debt, is a relatively recent addition to Index; (SQM: this miner of lithium to supply modern batteries is here better than its 52-week lows); **DQ**: solar panels and China-based here is pegging pretty close to its own 52-week lows; **HYGS**: in hydrogen, which continues to be a 'potential' energy-carrier of future'; (ITRI: in energy meters is again here; as was LYTS in LED lighting: both up a bit from lows); (JKS: solar panel manufacturer in competitive commodity cells business again near lows); **MXWL**: supercapacitors for storing energy, in past been nearer \$200M market capitalization; **MYRG**: infrastructure for transmission & distribution for the grid, is here new its lows. (similarly OLED: in lighting; and *FCEL in fuel cells which is deleted).

There's pretty strong diversity too as among 2018 'Worst Performers' in ECO, seen above. Included is a constituent in power conversion (but coming after run-up so perhaps not so indicative); there's a *China-based commodity solar cell maker; *transmission infrastructure; and a *maker of supercapacitors that may help energy storage - (intermittency is an issue, yet energy storage has been an area where potential alternatives to batteries struggled).

Consider thus also in 'worst' here are *fuel cells: one pure-play burdened by debt is near lows as is a 2nd, and a 3rd was removed - with a hydrogen constituent too near lows. Yet with its persistence this small sub-theme of hydrogen fuel cells perhaps merits (again) brief mention. Unlike renewables clean solar, wind (both core to ECO theme), hydrogen and fuel cells aren't yet renewable, nor as clean. One day, conceivably, hydrogen as energy carrier might become renewable in using solar or wind from water but isn't so today on steam reform natural gas. Fuel cells may be less-polluting (somewhat) than burning fossil fuels from efficiency - but hydrogen today & fuel cells aren't now renewable nor clean in true sense. That said they've been relevant to clean energy's potential story, so been in ECO - and their fortune, either down or up, are part of an unfolding, unpredictable story. (Indeed as mentioned below they'd be strongly up a single day late-December on the 26th very briefly leading here).

Lastly for a final time before live WHPRO Index ceases in Q1 2019 - we'll look at it:

WHPRO 'Winners' nearer Highs - but with swooning broader markets, not at their tops:

(AGR: seen too Q1 2018 in natural gas & grid, here is middling well off highs);

(GTLS: LNG value chain as a replacement for diesel and coal, here also well off its highs);

CECE: in fluids handling % catalytic pollution reduction, is nearer here to its 52-week highs;

CIG: Brazil-based Utility operating large Hydroelectric, nearer its highs, after 5 years not so;

(ESE: in filtration & pollution controls it has been showing some growth, but here off highs);

HASI: energy efficiency and more sustainable infrastructure, with some 'brownier' exposure;

HCCI: waste recovery & parts cleaning, here nearer highs - though like others not at top);

LXFR: in high performance natural gas cylinders and containment, is here again like in Q2.

A Final Glance at WHPRO Lows, like Q1 & Q2 2018, fewer natural gas lows - and a much wider variety is here of constituents near Lows - than any nearer Highs:

AIMC: in mechanical power transmission, is also coming off some recent highs earlier 2018;

(ANDE: Biofuels based on corn ethanol & U.S. feedstock, another in theme nearer lows);

(AOS: water heaters, by natural gas and electric, yet another in WHPRO nearer lows)

(APOG: glass, coatings, and innovative skins for better building energy efficiency);

(AYI in LEDs and lighting products, had been here earlier in 2018, is again towards lows);

CHK: natural gas but also NGLs and oil production it is pegging near its 52-week lows:

(EMR: engineering and technology solutions for large industrial systems);

FCX: mining / supplying materials for advanced batteries is well off some prior highs;

(GPRE: biofuels, is somewhat like ANDE, all face dramatic cuts in competing oil prices);

(GLNG: is in LNG transportation and infrastructure);

(KNDI: in non-premium electric vehicles, is China-based for smaller vehicles);

LDL: in heat/thermal abatement and insulation is pegging near its own 52-week lows;

(MDR: somewhat similar to EMR, engineering & technology solutions major energy today);

(MEOH: methanol used for industry, energy activities, this has previously been near highs);

(REX: in ethanol and off its utter lows, but like ANDE and GPRE it faces lower oil prices);

TTM: working on coming electric and very-small vehicles, but as a large conglomerate.

In sum for WHPRO & tracker, both having retired Q1 2019, Lows / Highs were diverse.

Top 20 in NEX Index Over the Past Q4 to early-December 2018:

Of these energy Indexing themes above only 1 was a bit up (just over nil) last 5 years to early December 2018: the NEX Index (it like others after swooned down in December). Broader Indexes like well-known NASDAQ QQQ® and S&P500® far, far outperformed it over this period upside - but among just these energy-stories, outcomes were rather dismal last 5 years.

Still, just one here: the WilderHill Global New Energy NEX with its listings mainly outside the U.S. went (barely) up - vs. other energy stories for Oil, Coal, Natural Gas - as well as vs. clean themes for just Solar, vs. Clean Energy with U.S. listings, vs. the (ceased in Q1 2019) WHPRO, vs. competing global clean energy Index - and vs. an active fund for alternative energy.

Hence we'll here just glance briefly at Top 20 Holdings in NEX in Q4 to early December 2018, seen via a tracker. Unlike a Market Capitalization Weighting that may give outsized-weightings to a Top 20, even Top 10, the NEX's weightings are about 1 ½% to 2 ¼% each - so closer to one another and true to modified equal weighting. This is arguably fairly encompassing a view of *global clean energy* (so most constituents outside the USA). A Chart for these Past 5 years although only back to near nil, and before December 2018's swoon, is in Appendix II:

Top 20 of NEX Index via its independent tracker over Q4 to early December 2018:

<u>Weight</u>	<u>Name</u>
2.276	Tesla Inc - Electric Vehicles, Energy Storage, Solar.
2.141	Cree Inc - LED manufacturer for power-saving lumens.
1.995	Hannon Armstrong Sustainable Infrastructure Capital
1.882	Seoul Semiconductor Ltd - Lighting and auto LEDs, Korea.
1.868	OSRAM Licht AG - Lighting manufacturer, Germany.
1.693	BYD Ltd - Batteries, future EVs, rail, solar farms, China.
1.66	Vestas Wind A/S - Wind Turbines pioneer, Denmark.
1.654	Xinyi Solar Ltd. - Solar clear glass products, China.
1.602	Landis+Gyr Group AG - Meters, and grid, Switzerland.
1.595	Epistar Corp - LEDs manufacturer and IP, Taiwan.
1.591	Siemens Gamesa Renewable Energy SA - Wind, Spain.
1.581	Pattern Energy Group. - Large wind farms, possible solar.
1.573	Sociedad Quimica y Minera de Chile SA. Lithium, Chile.
1.566	Sunrun Inc. - Residential solar downstream installations.
1.546	Kingspan Group PLC - Buildings insulation, Ireland.
1.542	Orsted A/S - Wind and Biomass, Denmark.
1.54	GS Yuasa Corp. - Advanced Battery technologies, Japan.
1.533	Nibe Industrier AB - Heating and Cooling, Sweden.
1.524	Universal Display Corp. - Organic LEDs, efficient displays.
1.521	Signify NV. - Lighting, efficiency, The Netherlands.

On December 26th the Dow was up about 1,000 points, its greatest one-day points gain ever, near +5%. Meanwhile ECO and an independent tracker were both up around +6%. So it may be of some interest to see constituents within ECO Index on that day, Dec. 26th. More typically we'll look at unusually-strong Down days, but as it was fairly remarkable for (any) Index, let's take a quick look at each constituent in ECO that day. Shown here also is where each one stands over its Past 52-week range, displaying most are well-down this past year:

<input type="checkbox"/> AEIS	38.74	77.99	+6.64%	<input type="checkbox"/> MYRG	26.56	40.81	+3.75%
<input type="checkbox"/> APD	148.44	175.17	+4.70%	<input type="checkbox"/> OLED	78.75	209.00	+7.97%
<input type="checkbox"/> ALB	71.89	138.67	+4.31%	<input type="checkbox"/> ORA	45.79	70.68	+3.89%
<input type="checkbox"/> AMRC	7.65	16.59	+6.21%	<input type="checkbox"/> PEGI	16.58	22.18	+6.51%
<input type="checkbox"/> AMSC	3.06	9.88	+5.58%	<input type="checkbox"/> PLUG	0.99	2.47	+28.43%
<input type="checkbox"/> AY	18.00	21.79	+2.11%	<input type="checkbox"/> PWR	27.90	40.10	+6.62%
<input type="checkbox"/> ASYS	4.03	11.53	+8.93%	<input type="checkbox"/> REGI	9.50	32.52	+5.91%
<input type="checkbox"/> AQMS	1.42	4.22	+1.25%	<input type="checkbox"/> SEDG	30.80	70.74	+5.63%
<input type="checkbox"/> BLDP	2.25	4.62	+13.27%	<input type="checkbox"/> SPWR	4.55	10.00	+7.61%
<input type="checkbox"/> BE	9.42	38.00	+8.89%	<input type="checkbox"/> RUN	5.08	16.45	+6.08%
<input type="checkbox"/> CREE	30.78	51.78	+7.86%	<input type="checkbox"/> TERP	9.90	12.14	+5.13%
<input type="checkbox"/> SQM	36.70	64.20	+5.68%	<input type="checkbox"/> TSLA	244.59	387.46	+10.39%
<input type="checkbox"/> CSIQ	11.37	19.09	+3.66%	<input type="checkbox"/> TPIC	17.79	32.22	+4.19%
<input type="checkbox"/> DQ	20.35	72.50	+3.90%	<input type="checkbox"/> VECO	6.27	20.55	+5.94%
<input type="checkbox"/> ENPH	1.83	7.60	+7.54%	<input type="checkbox"/> WLDN	19.25	39.00	+5.91%
<input type="checkbox"/> FCEL	0.47	2.17	+11.36%				
<input type="checkbox"/> FSLR	36.51	81.72	+7.01%				
<input type="checkbox"/> THRM	30.18	50.30	+0.05%				
<input type="checkbox"/> HXL	53.50	73.42	+3.57%				
<input type="checkbox"/> HYGS	3.80	12.00	+14.25%				
<input type="checkbox"/> ITRI	44.35	77.40	+5.02%				
<input type="checkbox"/> JKS	7.11	25.56	+6.95%				
<input type="checkbox"/> LYTS	3.15	8.88	-2.44%				
<input type="checkbox"/> MXWL	1.77	6.27	+4.78%				

These were serious gains across many constituents, but big standouts were all four (all ECO's) in hydrogen & fuel cells. BLDP, a leader here & in ECO from start some 15 years ago was up +13.2. HYGS in hydrogen up +14.2%. PLUG remarkably up +28.4%. And BE was up 'just' +8.8. FCEL which earlier fell below an Index floor so has been announced for deletion, was still up +11.3%. These 4 happened to be leaders briefly on that day (yet near 52-week lows); BLDP & PLUG are in NEX Index as well (up +5%). Yet next day, intraday, fuel cells all dropped.

Conclusion:

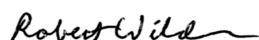
For 4th Quarter 2018 the Clean Energy Index[®] (ECO) began near 52 and ended December near 44, with ECO down across Q4. Moreover since 2018 had begun nearby 53, the year was down very roughly -15% similar to Q4. There were also gains; late Q4, ECO was up about +6% a single day on December 26th. And looking back 2 years, the ECO Index[®] at the start of 2017 was near 38 so has gained very roughly +16% up to end of 2018. An independent ECO Index[®] tracker at the start of 2017 was close to 19, start of 2018 near 25, and at end of 2018 was about 21.

Last 5 years the clean energy theme captured by ECO is down some -20% to November; yet oil & natural gas are much more negative past 5 years. The NEX is here just positive though barely up, while most all energy themes - classic, clean, and alternative - are well off. And in December many sectors swooned including outside energy and brought a bear market.

Of note this was the final rebalance of Progressive Energy Index[®] (WHPRO) that alone ended in Q1 2019 - along with an independent tracker (PUW) just for it. WHPRO generally excluded clean solar, wind & renewables: that differing WHPRO theme was for reducing CO2 and better efficiency in major energy retired and the Index & tracker closed in Q1 2019. WHPRO was the first-ever for the low-carbon theme, unique, and arguably was well ahead of its time.

ECO had 1 Deletion of FCEL to start Q1 2019; and 1 Addition of NIO to Energy Storage Sector. 4 Additions to NEX were: Bloom; Nio; Meridian; Neoen; 4 Deletions there were: China Singyes Solar; Panda Green Energy; China Power Energy; LSI Industries. (No Deletions from retired WHPRO that ended its calculations in Q1 2019; a final add there was BMI to New Energy Sector, ending WHPRO/tracker alone). As always, we welcome your thoughts and suggestions.

Sincerely,



r. Rob Wilder
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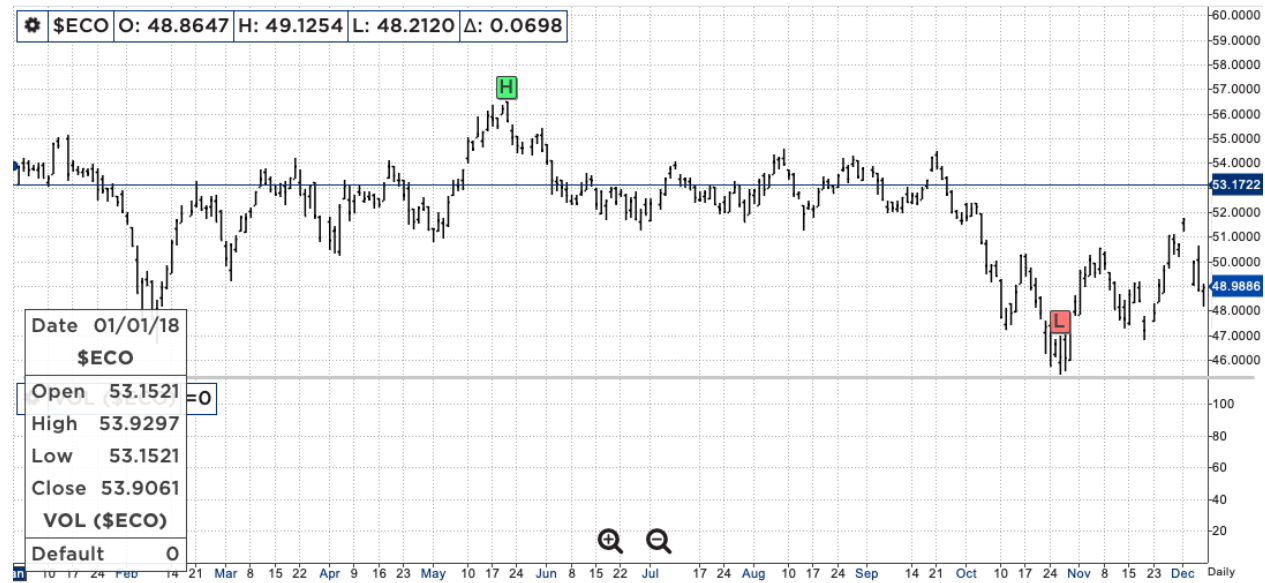
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Appendix I:
ECO Index (via independent tracker PBW) Descending Weights & Components seen latter-Q4 on 12/10/2018, about ~2 weeks before rebalance for Q1 2019. 39 stocks:

<u>Name</u>	<u>Symbol</u>	<u>Weight</u>
Enphase Energy Inc	ENPH	4.77
Tesla Inc	TSLA	4.14
Canadian Solar Inc	CSIQ	3.95
Sunrun Inc	RUN	3.69
Willdan Group Inc	WLDN	3.60
JinkoSolar Holding Co Ltd ADR	JKS	3.49
Ormat Technologies Inc	ORA	3.48
Cree Inc	CREE	3.42
TPI Composites Inc	TPIC	3.31
Pattern Energy Group Inc	PEGI	3.30
Sociedad Quimica y Minera Chile	SQM	3.22
Ameresco Inc	AMRC	3.18
Hexcel Corp	HXL	3.17
TerraForm Power Inc	TERP	3.12
First Solar Inc	FSLR	3.09
SunPower Corp	SPWR	3.07
Atlantica Yield plc	AY	3.03
Albemarle Corp	ALB	2.97
Daqo New Energy Corp ADR	DQ	2.89
SolarEdge Technologies Inc	SEDG	2.87
Renewable Energy Group Inc	REGI	2.86
Air Products & Chemicals Inc	APD	2.75
Gentherm Inc	THRM	2.75
Quanta Services Inc	PWR	2.72
MYR Group Inc	MYRG	2.62
Plug Power Inc	PLUG	2.59
Advanced Energy Industries Inc	AEIS	2.43
Itron Inc	ITRI	2.32
Universal Display Corp	OLED	2.32
Veeco Instruments Inc	VECO	2.16
Ballard Power Systems Inc	BLDP	2.06
Bloom Energy Corp	BE	1.45
American Superconductor Corp	AMSC	0.90
LSI Industries Inc	LYTS	0.48
Amtech Systems Inc	ASYS	0.48
Aqua Metals Inc	AQMS	0.41

Hydrogenics Corp	HYGS	0.34
Maxwell Technologies Inc	MXWL	0.34
FuelCell Energy Inc	FCEL	0.32

ECO Index for the Year To Date through latter-Q4 (December 10) 2018:



Source: NYSE.com

ECO independent Tracker (PBW) Past 5 Years to latter-Q4 (late November) 2018:



Source: NASDAQ.com

Appendix II, ECO Index for Start of the New Quarter:

INDEX (ECO) SECTOR & STOCK WEIGHTS FOR START OF Q1 2019. 39 STOCKS.

Each stock freely floats according to its share price after rebalance.

*Stocks below \$200 million in size at rebalance are *banded with a 0.50% weight.

Renewable Energy Harvesting - 26% weight (8 stocks @3.25% each)

Canadian Solar, CSIQ. Solar, vertically integrated solar manufacturer, China.

Daqo New Energy, DQ. Solar, polysilicon/wafer manufacturer; China-based.

First Solar, FSLR. Thin film solar, CdTe a low-cost alternate to polysilicon.

Hexcel, HXL. Light composites, in wind blades & spars, aerospace, vehicles.

JinkoSolar, JKS. Solar, wafers through solar modules, China-based OEM.

Ormat, ORA. Geothermal, works too in areas of recovered heat energy.

SunPower, SPWR. Solar, efficient PV panels have all-rear-contact cells.

TPI Composites, TPIC. Wind Blades; also light-weighting for transportation.

Energy Conversion - 20% sector weight (7 stocks @2.78% each; +1 *banded)

Advanced Energy, AEIS. Power conditioning: inverters, thin film deposition.

Ballard Power, BLDP. Mid-size fuel cells; R&D, PEM FCs as in transportation.

Bloom Energy, BE. Stationary fuel cells, distributed, but not-renewable energy.

Cree, CREE. LEDs, manufacturer in power-saving lumens, efficient lighting.

Gentherm, THRM. Thermoelectrics, waste heat to energy, power harvesting.

**LSI Industries*, LYTS. Lighting, LEDs, is vertically integrated U.S. manufacturer.

Plug Power, PLUG. Small fuel cells, for e.g. forklifts; drop in replacements.

SolarEdge Technologies, SEDG. Inverters, makes solar optimizers, inverters.

Power Delivery & Conservation - 22% sector weight (7 stocks @3.00%; +2 *banded)

Ameresco, AMRC. Energy saving performance contracts, also in renewables.

**American Superconductor*, AMSC. Wind, grid conditioning; superconductors.

**Amtech*, ASYS. Equipment Manufacturer, solar, LEDs lights, semiconductors.

Itron, ITRI. Meters, utility energy monitoring, measurement & management.

MYR Group, MYRG. Transmission and Distribution, includes solar & wind farms.

Quanta Services, PWR. Infrastructure, modernizing grid & power transmission.

Universal Display, OLED. Organic light emitting diodes, efficient displays.

Veeco, VECO. Thin film equipment, for LEDs, energy efficient electronics.

Willdan, WLDN. Efficiency, distributed energy, renewables, engineering.

Greener Utilities - 11% sector weight (4 stocks @2.75% each)

Atlantica Yield, AY. Yieldco, Contracted renewables assets, also transmission.

Pattern Energy, PEGI. Wind farms, solar may be added too for GW sized PPAs.

Sunrun, RUN. Residential solar systems, lease, PPA or purchase rooftop PV.

TerraForm Power, TERP. Owns operates solar/wind, developed nations, yieldco.

Energy Storage - 15% sector weight (5 stocks @2.80% each; + 2 banded stocks)

Albermarle, ALB. Lithium, specialty materials in batteries; for energy storage.

**Aqua Metals*, AQMS. Recycling lead acid batteries, eliminating toxic wastes.

Enphase, ENPH. Microinverters, also energy storage systems and software.

**Maxwell*, MXWL. Ultracapacitors, an alternative to batteries as in hybrids.

NIO Inc, NIO. Electric vehicles, China-based, also other accessories.

Chemical & Mining Co. of Chile, SQM. Lithium, energy storage, large producer.

Tesla Motors, TSLA. Electric vehicles, solar; purer-play in EVs & energy storage.

Cleaner Fuels - 6% sector weight (2 stocks @2.75% each; +1 *banded stock)

Air Products & Chemicals, APD. Hydrogen, is a supplier of industrial gases.

**Hydrogenics*, HYGS. Hydrogen, fuel and electrolysis for fuel cells, H2 storage.

Renewable Energy Group, REGI. Biodiesel, natural fats, oils, grease to biofuels.

ECO (bold) plus other key clean energy & fossil fuel themes over past 5 years to latter-Q4 (Nov. 25) 2018; these were mostly 'tough times' in energy with big declines:



Source: bigcharts.com

As seen by **ECO** (bold) plus several other themes above to November, these last 5 years were rough for several themes in clean and alternative energy & even traditional fossil fuels. For example despite **ECO** falling hard (then rising some) it ends this period down some -20%. Yet clean energy's theme still is well above both oil, and natural gas trackers negative by some -50% to -70%; meanwhile a coal tracker is below ECO too, but it has risen. So clean energy **ECO** is clearly down, while all fossil fuels are down even more significantly.

A tracker for Solar once at top fell hard, and re-rose some, yet its here well below ECO. An active fund for global alternative energy is also well down. Here a bit above ECO is a global clean energy Index (not ours) - though it is well below global new energy NEX. (We see similarly WHPRO and its tracker that ended in Q1 2019 were sideways mostly since 2016).

These last 5 years were remarkably tough across energy broadly including the fossil fuels & much clean and alternative energy. But Not All Energy themes suffered so harshly...

A standout for finishing just positive & doing 'better' is global NEX at top this timeframe. NEX is here just up last 5 years. Absent as being mostly non-energy, so not viewed here, are broader NASDAQ, S&P and Dow - which did much, much better than varied energy themes. That said in December, they briefly all swooned including broader markets - just after this Chart period, for a single day. In a volatile month, they then snapped back.

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Appendix III: WHPRO via a tracker - both Ended in Q1 2019; component weights seen here on 12/10/2018 or about ~2 weeks before rebalance for last Q1 2019. 40 Stocks:

Final Look at WHPRO Index: this is its Last full Quarter:

<u>Name</u>	<u>Symbol</u>	<u>Weight</u>
Cia Energetica de Minas Gerais ADR	CIG	5.20
Cosan Ltd	CZZ	4.07
Heritage-Crystal Clean Inc	HCCI	3.62
Avangrid Inc	AGR	3.07
Hannon Armstrong Sustainable Infra.	HASI	3.06
Green Plains Inc	GPRE	2.97
ESCO Technologies Inc	ESE	2.92
REX American Resources Corp	REX	2.88
Woodward Inc	WWD	2.80
WABCO Holdings Inc	WBC	2.77
EnerSys	ENS	2.76
MasTec Inc	MTZ	2.75
Covanta Holding Corp	CVA	2.73
Andersons Inc/The	ANDE	2.70
FMC Corp	FMC	2.68
Regal Beloit Corp	RBC	2.66
Luxfer Holdings PLC	LXFR	2.64
Range Resources Corp	RRC	2.63
Clearway Energy Inc	CWEN	2.61
Clean Energy Fuels Corp	CLNE	2.60
Golar LNG Ltd	GLNG	2.59
Southwestern Energy Co	SWN	2.54
Owens Corning	OC	2.51
Corning Inc	GLW	2.48
Apogee Enterprises Inc	APOG	2.42
Emerson Electric Co	EMR	2.42
Eaton Corp PLC	ETN	2.39
Chart Industries Inc	GTLS	2.37
Freeport-McMoRan Inc	FCX	2.28
Methanex Corp	MEOH	2.26
AO Smith Corp	AOS	2.25
Acuity Brands Inc	AYI	2.17
Tenneco Inc	TEN	1.94
Chesapeake Energy Corp	CHK	1.92

Altra Industrial Motion Corp	AIMC	1.92
Tata Motors Ltd ADR	TTM	1.90
Lydall Inc	LDL	1.39
McDermott International Inc	MDR	1.13
CECO Environmental Corp	CECE	0.59
Kandi Technologies Group Inc	KNDI	0.46

(retiring) WHPRO Index for the Year to Date to latter Q4 (December 10) 2018:



Source: NYSE.com

WilderHill New Energy Global Index (NEX): 2018 YTD to latter-Q4 (December 7) 2018
 Wilderhill New Energy Global Innovation Index (USD)



Source: Solactive.com

Note: the thin, smaller Chart at bottom displays all these data since 2002.

Appendix IV; Final Rebalance: WHPRO for start of Q1 (Last Partial) Quarter.
FINAL REBALANCE Sectors & Stock Weightings; WilderHill Progressive Energy
Index (WHPRO) start Q1 2019. 41 stocks. (Index Ended in Q1 2019)

Each stock freely moves according to its share price after the rebalance; *Banded stocks are those under \$400 million in size and weighted at 0.5%.

Alternative Fuel - 24% Sector Weight (8 stocks @2.93% each + 1 *banded stock)

Andersons, ANDE. Ethanol producer, corn-based; rail group is in fuel transport.
Chesapeake Energy, CHK. Natural gas, one of larger U.S. independent producers.
**Clean Energy Fuels*, CLNE. Natural gas fuel integration; for use in fleet vehicles.
Cosan, CZZ. Biofuels, Brazil-based using sugarcane feedstock, ethanol exporter.
Green Plains Energy, GPRE. Biofuel, ethanol; using U.S. domestic feedstock.
Methanex, MEOH. Methanol, liquid fuel may be derived from fossil fuels or organics.
Range Resources, RRC. Natural gas, produces in Appalachian & Gulf Coast regions.
Rex American, REX. Biofuels, with subsidiaries is a major U.S. ethanol producer.
Southwestern Energy, SWN. Natural gas, U.S. producer, also midstream services.

Conversion & Storage - 23% Sector weight (9 stocks @2.55% each)

Altra Holdings, AIMC. Mechanical power transmission, electromechanical conversion.
Chart Industries, GTLS. Natural gas, LNG; liquefied gas storage/transport, efficiency.
Covanta Holding, CVA. Incineration, converts waste to energy (WtE); conglomerate.
EnerSys, ENS. Battery maker, for telecommunications, utilities, motive power.
FMC, FMC. Lithium producer for carbonate, metal, expanding hydroxide capacity.
Freeport-McMoRan, FCX. Lithium producer; copper; also battery-grade cobalt JV.
Golar LNG, GLNG. LNG, major independent carrier, gas transport, regasification.
MasTec, MTZ. Engineering & construction, distribution of electricity, natural gas.
Wabco, WBC. Mechatronics, better vehicle mechanical/energy/braking controllers.

Better Efficiency - 18% Sector Weight (7 stocks @2.57% each)

Acuity Brands, AYI. LED lights, OLEDs, and controls for indoor & outdoor lighting.
A.O. Smith, AOS. Energy efficiency, innovations for water heating & monitoring.
Apogee, APOG. Advanced glass, for better efficiency, green building designs.
Emerson Electric, EMR. Broad work in energy efficiency, storage, lately biofuels.
Esco Technologies, ESE. Power grid, advances 2-way metering & communications.
Regal Beloit, RBC. Energy efficient motors, in commercial, industrial, homes etc.
Woodward, WWD. Energy controllers, optimization, industrial turbines in generation.

Emission Reduction - 13% Sector Weight (5 stocks @2.40% each +2 *banded)

**CECO Environmental*, CECE. End-of-pipe emissions controls and pollution reduction.
Corning, GLW. Diverse, activity includes emissions reduction, filters, and catalysts.
**Kandi Technologies*, KNDI. Developing small gasoline and urban electric vehicles.
Luxfer Holdings PLC, LXFR. Advanced material, reduced emissions, gaseous storage.
McDermott, MDR. Natural Gas; fewer emissions/CO2 vs. coal; EPCI in LNG facilities.
Tata Motors, TTM. New electric vehicles, mobility business line, India-based.
Tenneco, TEN. Automotive end-of-pipe emissions controls, catalytic converters.

New Energy Activity - 12% Sector weight (4 stocks @2.87% each + 1 *banded).

Badger Meter, BMI. Flow measurement, better communications and controls.
Eaton, ETN. Hybrids, better electric and fluid power in truck & auto applications.

Heritage Crystal Clean, HCCI. Oil re-refining, modern waste reuse and recycling.
**Lydall*, LDL. Thermal and filtration separation; innovative energy efficiency.
Owens Corning, OC. Materials lightening, building insulation composite materials.

Utility - 10% Sector weight (4 stocks @2.50% each)

Avangrid, AGR. Electricity & Natural Gas, generation, storage, distribution.
Companhia Energetica de Minas Cemig, CIG. Brazil Utility, large hydroelectric.
Hannon Armstrong, HASI. Energy efficiency, capital & finance for infrastructure.
Clearway Energy, CWEN. Contracted power generation, renewables & conventional.

5 Years to latter-Q4: NEX Tracker vs ECO (plus ended in Q1-2019 WHPRO)



Source: bigcharts.com

NEX independent tracker for Global new/clean energy (PBD) clearly 'outperforms' this period. Yet in 2018, for example, it was ECO that did so; since the start of 2017 it's still up.

Retired WHPRO tracker is also seen in **bold** last 5 years to late 2018 vs. ECO/NEX trackers. Three differing Indexing themes/stories, each moving in ways pretty unique. (WHPRO that's ended and) ECO finish down some -20%, but got here in different ways. Following modest rise for ECO to Spring 2014, and 2015 to a relative high - ECO dropped strongly to a 2016 nadir - then it rose some/and declined since. (WHPRO which has ended in Q1 2019, by contrast was sideways in 2017 + dropped hard 2018; by coincidence the 2 end 5 years near one another - although no constituent in ECO was in (now done) WHPRO at same time & visa versa).

Despite that, the Index energy themes are now all *very far* below their prior all-time highs. ECO is *much* lower - having been in 2007 many-fold higher - a crash perhaps in part due to solar sub-theme down so greatly from peaks - meanwhile NEX too is well off all-time highs. And fossil fuels have fallen even more greatly than clean energy. So various Charts can and will differ greatly depending notably and in large part on their own starting point/s. Moreover as always past movements are not an indication of future performance.

Appendix V: WilderHill New Energy Global Innovation Index (NEX) late-Q4 via independent tracker (PBD) on 12/10/18 or ~2 weeks before Rebalance to start Q1 2019. 109 stocks:

Name	Symbol	Weight
Tesla Inc	TSLA	2.28
Cree Inc	CREE	2.14
Hannon Armstrong Sustainable Infra.	HASI	2.00
Seoul Semiconductor Co Ltd	046890 KS	1.88
OSRAM Licht AG	OSR	1.87
BYD Co Ltd	1211	1.69
Vestas Wind Systems A/S	VWS DC	1.66
Xinyi Solar Holdings Ltd	968	1.65
Landis+Gyr Group AG	LAND SW	1.60
Epistar Corp	2448	1.60
Siemens Gamesa Renewable Energy SA	SGRE	1.59
Pattern Energy Group Inc	PEGI	1.58
Sociedad Quimica y Minera de Chile SA ADR	SQM	1.57
Sunrun Inc	RUN	1.57
Kingspan Group PLC	KSP	1.55
Orsted A/S	ORSTED	1.54
GS Yuasa Corp	6674	1.54
Nibe Industrier AB	NIBEB SS	1.53
Universal Display Corp	OLED	1.52
Signify NV	LIGHT	1.52
Itron Inc	ITRI	1.51
Meidensha Corp	6508	1.51
Canadian Solar Inc	CSIQ	1.50
Renewables Infrastructure Group Ltd	TRIG LN	1.48
Greencoat UK Wind PLC/Funds	UKW LN	1.47
Boralex Inc	BLX	1.47
TPI Composites Inc	TPIC	1.45
Huaneng Renewables Corp Ltd	958	1.45
Xinjiang Goldwind Science & Tech.	2208	1.44
China Longyuan Power Group Corp Ltd	916	1.42
TransAlta Renewables Inc	RNW	1.41
Clearway Energy Inc	CWEN	1.39
China High Speed Transmission Equip.	658	1.38
Samsung SDI Co Ltd	006400 KS	1.38
Acuity Brands Inc	AYI	1.37
Nordex SE	NDX1	1.34
GCP Infrastructure Investments Ltd	GCP LN	1.31

EDP Renovaveis SA	EDPR	1.30
TerraForm Power Inc	TERP	1.30
Atlantica Yield plc	AY	1.29
SolarEdge Technologies Inc	SEDG	1.27
GCL-Poly Energy Holdings Ltd	3800	1.24
Sino-American Silicon Products Inc	5483	1.21
Energy Absolute PCL	EA-R TB	1.19
First Solar Inc	FSLR	1.17
BPCPG PCL	BPCPG-R TB	1.14
Renewable Energy Group Inc	REGI	1.14
SunPower Corp	SPWR	1.14
Takuma Co Ltd	6013	1.14
Drax Group PLC	DRX LN	1.10
Green Plains Inc	GPRE	1.06
Novozymes A/S	NZYMB DC	0.96
Mercury NZ Ltd	MCY	0.87
Contact Energy Ltd	CEN	0.80
SMA Solar Technology AG	S92	0.78
Ormat Technologies Inc	ORA	0.73
Innergex Renewable Energy Inc	INE	0.73
Verbund AG	VER AV	0.70
Willdan Group Inc	WLDN	0.66
Ameresco Inc	AMRC	0.61
West Holdings Corp	1407	0.58
W-Scope Corp	6619	0.57
Wasion Holdings Ltd	3393	0.53
Lextar Electronics Corp	3698	0.52
Credit Suisse Real Estate Fund Green Prop.	GREEN SW	0.52
Everlight Electronics Co Ltd	2393	0.51
Enphase Energy Inc	ENPH	0.51
Gurit Holding AG	GUR SW	0.51
LSI Industries Inc	LYTS	0.48
Falck Renewables SpA	FKR	0.48
Scatec Solar ASA	SSO	0.45
EF-ON INC	9514	0.44
NEL ASA	NEL	0.43
Kandi Technologies Group Inc	KNDI	0.42
Ricardo PLC	RCDO LN	0.42
Vivint Solar Inc	VSLR	0.41
Veeco Instruments Inc	VECO	0.41

China Power Clean Energy Development Ltd	735	0.39
Caverion OYJ	CAV1V FH	0.39
FDG Electric Vehicles Ltd	729	0.38
CS Wind Corp	112610 KS	0.38
JinkoSolar Holding Co Ltd ADR	JKS	0.37
PNE AG	PNE3	0.36
Unison Co Ltd/South Korea	018000 KS	0.36
VERBIO Vereinigte BioEnergie AG	VBK	0.35
Tanaka Chemical Corp	4080	0.35
Encavis AG	CAP	0.35
Ecopro Co Ltd	086520 KS	0.34
SPCG PCL	SPCG-R TB	0.34
Meyer Burger Technology AG	MBTN SW	0.33
RENOVA Inc	9519	0.33
Plug Power Inc	PLUG	0.32
Canvest Environmental Protection Group	1381	0.32
Panda Green Energy Group Ltd	686	0.32
REC Silicon ASA	REC	0.32
Daqo New Energy Corp ADR	DQ	0.32
Audax Renovables SA	ADX	0.32
Maxwell Technologies Inc	MXWL	0.31
United Renewable Energy Co Ltd/Taiwan	3576	0.30
Motech Industries Inc	6244	0.30
Voltabox AG	VBX	0.29
Gigasolar Materials Corp	3691	0.28
CropEnergies AG	CE2	0.28
Super Energy Corp PCL	SUPER-R	0.26
Albioma SA	ABIO FP	0.25
Ballard Power Systems Inc	BLDP	0.25
China Singyes Solar Technologies Holdings Ltd	750	0.24
eRex Co Ltd	9517	0.22
Senvion SA	SEN	0.20

Appendix VI:

WilderHill New Energy Global Innovation Index (NEX) - for start of Q1 2019. 109 Stocks in NEX.

This also contains brief Descriptors; additionally NEX Historical Sector Weightings is below:

(subject to revision; see http://www.nexindex.com/Constituents_And_Weightings.php)

Also Index Composition at, <https://www.solactive.com/?s=wilderhill&indexmembers=US96811Y1029>

COMPANY NAME	DESCRIPTION	COU NTRY	WGT	SEC.	CUR
Bloom Energy Corp	Stationary fuel cells, distributed, but not-renewable energy	US	0.77%	ECV	USD
Meridian Energy Ltd	Operates hydroelectric power stations, some wind	NZ.	0.75%	ROH	NZD
NEOEN SA	Renewable energy mainly solar, some wind	FRANCE	0.34%	RSR	EUR
NIO INC - ADR	EVs, design, manufacture, and sale including SUVs	US	1.73%	EEF	USD
Verbund AG	Electricity supplier, hydro, a large provider for Austria.	AUS.	0.75%	ROH	EUR
Greencoat UK Wind PLC/Funds	Infrastructure fund, invested in U.K. wind power assets.	BRITAIN	1.45%	RWD	GBp
Drax Group PLC	Electric power company, biomass wood pellet thermal, U.K.	BRITAIN	1.14%	RBB	GBp
Ricardo PLC	Global Engineering, energy, environment, transportation.	BRITAIN	0.49%	EEF	GBp
Boralex Inc	Renewables generation, develops wind, hydro, solar.	CANADA	1.45%	RWD	CAD
TransAlta Renewables Inc	Renewables, operating facilities in wind power, some hydro.	CANADA	1.45%	RWD	CAD
Canadian Solar Inc	Solar, vertically integrated solar manufacturer, China.	CANADA	1.20%	RSR	USD
Innergex Renewable Energy	Renewable power, in run-of-river hydroelectric, wind, solar.	CANADA	0.75%	ROH	CAD
Ballard Power Systems Inc	Mid-size fuel cells; R&D, PEM FCs as in transportation.	CANADA	0.22%	ECV	CAD
Sociedad Quimica y Minera	Lithium, produces a key element in advanced batteries, Chile	CHILE	1.64%	ENS	USD
China Longyuan Power	Wind, also in solar, biomass, geothermal, tidal.	CHINA	1.45%	RWD	HKD
Huaneng Renewables	Large power plants, R&D into better efficiency upstream.	CHINA	1.45%	RWD	HKD
Xinjiang Goldwind Science.	Wind, large turbine manufacturer, China.	CHINA	1.45%	RWD	HKD
Daqo New Energy Corp	Solar, high-purity polysilicon for producing solar wafers, China.	CHINA	0.34%	RSR	USD
JinkoSolar Holding Co Ltd	Solar, wafers through solar modules, China-based OEM.	CHINA	0.34%	RSR	USD
Xinyi Solar Holdings Ltd	Clear solar glass products, solar farms, EPC, China.	CHINA	1.20%	RSR	HKD
BYD Co Ltd	Batteries, potential use in EVs, rail, solar farms, forklights.	CHINA	1.64%	ENS	HKD
Kandi Technologies Group	EVs, developing small gasoline and electric urban vehicles.	CHINA	0.49%	EEF	USD
Orsted A/S	Sustainable wind, biomass, large energy co in Denmark.	DEN.	1.45%	RWD	DKK
Vestas Wind Systems A/S	Wind, major pioneer wind turbine manufacturer, Denmark.	DEN.	1.45%	RWD	DKK
Novozymes A/S	Biofuels, enzymes used in partnerships, Denmark.	DEN.	1.14%	RBB	DKK
Caverion OYJ	Energy efficiency, buildings, industrial infrastructure, Europe.	FIN.	0.49%	EEF	EUR
Albioma SA	Biomass, sugarcane, hybrid combustion and cogeneration.	FRANCE	0.33%	RBB	EUR
Nordex SE	Wind turbines, based in Germany/Europe and sells worldwide.	GER	1.45%	RWD	EUR
PNE AG	Wind, both onshore and offshore globally.	GER	0.41%	RWD	EUR
Senvion SA	Wind sector engineering services.	GER	0.41%	RWD	EUR
Encavis AG	Solar, large solar park operator, also wind, Germany.	GER	0.34%	RSR	EUR
SMA Solar Technology AG	Inverters for solar, industrial scale and storage, Germany	GER	1.20%	RSR	EUR
CropEnergies AG	Bioethanol, from cereals and sugarbeet, Germany.	GER	0.33%	RBB	EUR
VERBIO Vereinigte BioEnergie	Biofuels, manufacturer and supplier to Germany and Europe.	GER	0.33%	RBB	EUR
Voltabox AG	Lithium-ion batteries, energy storage.	GER	0.47%	ENS	EUR
OSRAM Licht AG	Lighting manufacturer, also auto, semiconductors, Germany.	GER	1.73%	EEF	EUR
Renewables Infrastructure Group	Wind Farm & Solar Park revenues assets, U.K.	GUER.	1.45%	RWD	GBp
China High Speed Transmission	Wind power, turbine gear boxes & transmissions.	HK	1.45%	RWD	HKD
GCL-Poly Energy Holdings Ltd	Solar, polysilicon for upstream PV manufacturing.	HK	1.20%	RSR	HKD
Canvest Environmental Prot.	Waste to Energy, China-focused.	HK	0.33%	RBB	HKD
FDG Electric Vehicles Ltd	EV manufacturer including cars, buses, batteries, China.	HK	0.47%	ENS	HKD
Wasion Holdings Ltd	Metering, integrated smart energy management, China.	HK	0.49%	EEF	HKD
Kingspan Group PLC	Buildings, innovative insulation for conservation, Ireland.	IRE.	1.73%	EEF	EUR
SolarEdge Technologies Inc	Inverters, panel-level solar optimizers, micro-inverters.	ISRA.	1.20%	RSR	USD

Falck Renewables SpA	Renewables wind, biomass, solar, waste-to-energy.	ITALY	0.41%	RWD	EUR
RENOVA Inc	Solar, Biomass, Wind, Geothermal in Asia.	JAPAN	0.41%	RWD	JPY
West Holdings Corp	Solar, Japan-focused residential and commercial PV.	JAPAN	0.34%	RSR	JPY
eRex Co Ltd	Power generation, for businesses and residential, biomass.	JAPAN	0.33%	RBB	JPY
Takuma Co Ltd	Thermal Plants, uses biomass, palm, corn, wood wastes.	JAPAN	1.14%	RBB	JPY
GS Yuasa Corp	Battery technologies, also includes Lithium for EVs, Japan.	JAPAN	1.64%	ENS	JPY
Tanaka Chemical Corp	Battery technologies, positive electrode materials.	JAPAN	0.47%	ENS	JPY
W-Scope Corp	Lithium-ion batteries, advanced separator membranes	JAPAN	0.47%	ENS	JPY
EF-ON INC	Energy services, energy conservation, biomass, Japan	JAPAN	0.49%	EEF	JPY
Meidensha Corp	Energy management, power generation & transmission.	JAPAN	0.49%	EEF	JPY
GCP Infrastructure Invest.	Trust invests in renewables, based in Jersey U.K.	JERSEY	1.20%	RSR	GBp
Signify NV	Lighting, connected systems efficiency, Netherlands.	NETH.	1.73%	EEF	EUR
Contact Energy Ltd	Electric Utility, offers power from geothermal and hydro.	NZ.	0.75%	ROH	NZD
Mercury NZ Ltd	Clean power provider, 100% renewables hydro, geothermal.	NZ	0.75%	ROH	NZD
Scatec Solar ASA	Solar power parks worldwide.	NORW.	0.34%	RSR	NOK
NEL ASA	Hydrogen, to power fuel cell vehicles renewably, Norway.	NORW.	0.22%	ECV	NOK
CS Wind Corp	Wind towers onshore, also offshore.	S. KOR.	0.41%	RWD	KRW
Unison Co Ltd/South Korea	Wind power generation, wind parks.	S. KOR.	0.41%	RWD	KRW
Ecopro Co Ltd	Battery materials, Pollution Controls, CO catalyst.	S. KOR.	0.47%	ENS	KRW
Samsung SDI Co Ltd	Batteries, innovative energy storage, EVs, South Korea	S. KOR.	1.64%	ENS	KRW
Seoul Semiconductor Co Ltd	Lighting, automotive, LEDs, South Korea	S. KOR.	1.73%	EEF	KRW
Audax Renovables SA	Wind power, mainly, in Europe and Americas.	SPAIN	0.41%	RWD	EUR
EDP Renovaveis SA	Wind power, among largest producers in world, Spain.	SPAIN	0.41%	RWD	EUR
Siemens Gamesa Renewable	Wind, onshore & offshore, turbines and gearboxes, Spain	SPAIN	1.45%	RWD	EUR
Atlantica Yield plc	Yieldco, Contracted renewables assets, also transmission.	SPAIN	1.20%	RSR	USD
Nibe Industrier AB	Heating & cooling, diverse sustainable tech., Sweden.	SWED.	1.73%	EEF	SEK
Gurit Holding AG	Composite Materials in wind, lightens cars, planes.	SWIT.	0.41%	RWD	CHF
Meyer Burger Technology AG	Solar, manufacturing equipment, Switzerland and worldwide.	SWIT.	0.34%	RSR	CHF
Credit Suisse Real Estate	Sustainability in buildings, real estate.	SWIT.	0.49%	EEF	CHF
Landis+Gyr Group AG	Advanced meters, modernizing grid, Switzerland.	SWIT.	1.73%	EEF	CHF
Gigasolar Materials Corp	Solar, conductive pastes in PV panel manufacturing.	TAIWAN	0.34%	RSR	TWD
Motech Industries Inc	Solar, large producer of cells, modules, Taiwan.	TAIWAN	0.34%	RSR	TWD
Neo Solar Power Corp	Solar, aiming to be vertically-integrated, Taiwan.	TAIWAN	0.34%	RSR	TWD
Sino-American Silicon Prod.	Solar, semi-conductor silicon wafer materials, Taiwan.	TAIWAN	1.20%	RSR	TWD
Epistar Corp	LEDs, large LED manufacturer in Taiwan, much IP.	TAIWAN	1.73%	EEF	TWD
Everlight Electronics Co Ltd	LEDs, large manufacturer in optoelectronics, Taiwan.	TAIWAN	0.49%	EEF	TWD
Lextar Electronics Corp	LEDs and efficient lighting.	TAIWAN	0.49%	EEF	TWD
BCPG PCL	Solar and other renewable energy.	THAI.	1.20%	RSR	THB
SPCG PCL	Solar, rooftops and solar farms, Thailand and Asia.	THAI.	0.34%	RSR	THB
Super Energy Corp PCL	Solar, wind, and waste to energy, Thailand.	THAI.	0.34%	RSR	THB
Energy Absolute PCL	Alternative energy power producer, biodiesel, Thailand.	THAI.	1.14%	RBB	THB
Clearway Energy Inc	Contracted power generation, thermal, some renewables.	US	1.45%	RWD	USD
Pattern Energy Group Inc	Wind farms, solar may be added for GW sized PPAs.	US	1.45%	RWD	USD
TPI Composites Inc	Wind Blades; also light-weighting for transportation.	US	1.45%	RWD	USD
Enphase Energy Inc	Inverters, micro-products for each solar panel, storage.	US	0.34%	RSR	USD
First Solar Inc	Thin film solar, CdTe as a low-cost alternate to polysilicon.	US	1.20%	RSR	USD
REC Silicon ASA	Silicon, large solar-grade silicon producer, Norway-based.	US	0.34%	RSR	NOK
SunPower Corp	Solar, efficient PV panels have all-rear-contact cells.	US	1.20%	RSR	USD
Sunrun Inc	Residential solar, leasing, PPA or purchase rooftop PV.	US	1.20%	RSR	USD
TerraForm Power Inc	Owns and runs solar/wind, in developed nations, yieldco.	US	1.20%	RSR	USD
Vivint Solar Inc	Solar, one-stop installer of panels on homes in much of U.S.	US	0.34%	RSR	USD
Ormat Technologies Inc	Geothermal, works too in recovered heat energy.	US	0.75%	ROH	USD
Green Plains Inc	Biofuel, ethanol; using U.S. domestic feedstock.	US	1.14%	RBB	USD
Renewable Energy Group Inc	Biodiesel, natural fats, oils, grease to biofuels.	US	1.14%	RBB	USD

Maxwell Technologies Inc	Ultracapacitors, an alternative to batteries as in hybrids.	US	0.47%	ENS	USD
Acuity Brands Inc	LEDs, OLEDs, controls for indoor & outdoor lighting.	US	1.73%	EEF	USD
Ameresco Inc	Energy savings, performance contracts, also in renewables.	US	0.49%	EEF	USD
Cree Inc	LED manufacturer power-saving lumens, efficient lighting.	US	1.73%	EEF	USD
Hannon Armstrong Sustain.	Energy efficiency, capital & finance for infrastructure.	US	1.73%	EEF	USD
Itron Inc	Meters, Utility energy monitoring, measuring & management.	US	1.73%	EEF	USD
Tesla Inc	Electric vehicles, solar; in EVs & energy storage.	US	1.73%	EEF	USD
Universal Display Corp	Organic light emitting diodes, efficient displays.	US	1.73%	EEF	USD
Veeco Instruments Inc	Thin film equipment, for LEDs, energy efficient electronics.	US	0.49%	EEF	USD
Willdan Group Inc	Energy efficiency in infrastructure, engineering.	US	0.49%	EEF	USD
Plug Power Inc	Small fuel cells, e.g. in forklifts; drop in replacements.	US	0.22%	ECV	USD

Additions for Q1 2019 in **yellow** above.

Additions for Q1 2019: Bloom; NIO; Meridian; NEOEN.

Deletions: China Singyes Solar Tech.; Panda Green Energy; China Power Energy Development; LSI Industries.

Historical Sector Weight Information: NEX

See also, https://nexindex.com/Constituents_And_Weightings.php

https://nexindex.com/historical_sectors.php

And for several variants, <https://www.solactive.com/?s=wilderhill>

Sector Weights At Start Of Quarter*	ECV Energy Conversion	EEF Energy Efficiency	ENS Energy Storage	RBB Renewables - Biofuels & Biomass	ROH Renewables - Other	RSR Renewable - Solar	RWD Renewable - Wind
Q4 2018	1.05%	30.25%	9.00%	7.94%	3.63%	21.78%	26.34%
Q3 2018	0.79%	29.62%	8.48%	6.60%	3.71%	23.67%	27.12%
Q2 2018	0.80%	30.50%	8.80%	7.90%	3.90%	22.50%	25.50%
Q1 2018	1.00%	30.67%	7.64%	7.74%	3.92%	23.37%	25.66%
Q4 2017	1.14%	29.36%	6.75%	8.21%	4.68%	20.58%	29.28%
Q3 2017	0.76%	30.88%	5.91%	9.11%	4.55%	18.80%	29.98%
Q2 2017	0.67%	33.68%	6.50%	8.75%	4.92%	18.73%	26.75%
Q1 2017	1.00%	31.83%	5.64%	9.03%	5.43%	17.92%	29.14%
Q4 2016	0.71%	32.00%	3.58%	8.48%	5.20%	18.84%	31.19%
Q3 2016	1.12%	31.00%	4.54%	7.76%	5.87%	21.09%	28.61%
Q2 2016	1.02%	32.18%	3.69%	7.15%	5.18%	21.60%	29.18%
Q1 2016	1.01%	34.83%	3.61%	9.38%	4.26%	20.14%	26.77%
Q4 2015	0.95%	33.54%	3.09%	9.19%	5.19%	20.40%	27.65%
Q3 2015	0.95%	32.97%	3.18%	8.05%	4.52%	24.65%	25.67%
Q2 2015	1.22%	33.68%	2.26%	9.55%	6.90%	24.88%	21.50%
Q1 2015	1.68%	33.88%	2.14%	11.54%	6.84%	24.86%	19.06%
Q4 2014	1.42%	33.67%	2.26%	12.31%	8.45%	24.67%	17.22%
Q3 2014	1.42%	33.42%	2.30%	12.44%	9.09%	23.78%	17.56%
Q2 2014	1.11%	34.20%	2.00%	12.16%	9.86%	23.16%	17.52%
Q1 2014	1.17%	33.13%	2.34%	12.17%	10.33%	23.95%	16.91%
Q4 2013	1.28%	35.26%	2.28%	14.02%	12.47%	19.58%	15.10%
Q3 2013	1.25%	35.04%	2.35%	14.61%	13.06%	19.10%	14.58%
Q2 2013	1.31%	33.43%	2.63%	15.42%	14.05%	17.54%	15.62%
Q1 2013	1.31%	33.43%	2.63%	15.42%	14.05%	15.90%	14.14%
Q4 2012	1.50%	33.93%	2.97%	14.50%	14.50%	19.59%	13.04%
Q3 2012	2.32%	28.30%	6.70%	14.22%	8.35%	21.17%	19.00%
Q2 2012	1.34%	28.14%	4.16%	14.61%	13.98%	22.00%	15.96%
Q1 2012	1.60%	28.01%	4.01%	13.85%	14.70%	20.83%	17.00%
Q4 2011	1.14%	25.06%	4.12%	12.13%	11.63%	26.48%	19.45%
Q3 2011	1.28%	22.72%	6.24%	10.17%	10.49%	24.60%	24.32%
Q2 2011	1.50%	23.34%	8.06%	10.69%	9.53%	25.76%	21.04%
Q1 2011	1.50%	26.95%	6.99%	10.50%	9.46%	24.59%	20.00%
Q4 2010	1.79%	24.32%	8.80%	11.21%	6.02%	24.16%	23.71%
Q3 2010	1.97%	20.31%	8.86%	11.70%	6.59%	24.42%	26.16%
Q2 2010	1.90%	17.29%	8.53%	12.36%	6.58%	24.29%	29.05%

Q1 2010	2.04%	16.93%	8.65%	12.25%	6.73%	25.03%	28.36%
Q4 2009	2.25%	15.20%	7.10% ¹	11.26%	7.10%	27.51%	29.58%
Q3 2009	2.59%	13.77%	5.38%	10.76%	6.81%	29.24%	31.45%
Q2 2009	2.42%	12.89%	4.79%	12.21%	6.49%	30.57%	30.63%
Q1 2009	2.77%	15.14%	5.29%	14.19%	8.25%	25.70%	28.68%
Q4 2008	2.25% ²	23.93%	3.57%	12.09%	6.48%	26.63%	25.05%
Q3 2008	3.31%	20.03%	3.33%	13.14%	6.54%	27.27%	26.39%
Q2 2008	3.81%	17.85%	2.81%	14.32%	6.47%	27.03%	27.71%
Q1 2008	3.93%	13.56%	2.94%	14.26%	6.99%	30.00%	28.34%

*NEX Sector Weights are based on a regularly-performed survey of market capitalizations of companies that are active in New Energy and that are quoted on non-OTC exchanges. The results are adjusted for several factors including exposure to New Energy and some exchange restrictions particularly limiting investability. If the results were not adjusted, the sector numbers would be significantly different.

¹ PWS (Power Storage) changed name to ENS (Energy Storage) at the end of the 4th Quarter of 2009.

² HFC (Hydrogen & Fuel Cells) changed name to ECV (Energy Conversion) end of 4th Quarter of 2008.

³ HF (Hydrogen And Fuel Cells) became HFC (Hydrogen & Fuel Cells) after 2007 and then changed name to ECV (Energy Conversion) at the end of the 4th Quarter of 2008.

⁴ DS (Demand Side Energy Savings) and GE (Generation Efficiency And Smart Distribution) were combined into EEF (Energy Efficiency) after 2007.

See also, https://nexindex.com/Constituents_And_Weightings.php
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