



Q1 2019 Quarterly Report: WilderHill Clean Energy Index[®], March 31, 2019

The Clean Energy Index[®] (ECO) began 1st Quarter 2019 near 44 and it ended Q1 near 55, up some +23. At first January pushed the ECO Index[®] up almost daily, gaining some +20%. February increased roughly another +10%, going from 53 to 58. March then declined firmly from peak giving up February's gains. Or roughly 2+ years since start of 2017 when ECO Index[®] was near 38, it's gained close to +45%. A separate independent tracker start of 2017 was near 18.50, early 2018 was near 25.50, early 2019 near 21.50, and closed Q1 near 26.50.

A +23% gain over Q1 isn't sustainable. Plus, ECO passively captures an emerging theme so also can & does at times 'drop like a rock.' That said, such gains in ECO have been seen before; January of 2006 had a +26% rise in WilderHill Clean Energy Index[®], and +31% gain Q1 2006: an excerpt from Q1 2006 Report is below. And we offer a mere small observation: counter-intuitively perhaps ECO's theme has spiked up at times in a Bush II, & early-on in a Trump Presidency - though neither greatly had promoted clean 'green' energy - meanwhile, some big drops were seen in 8 years of an Obama Presidency that had favored this sector.

Last 5 years the clean energy theme that ECO aims to capture is clearly down, off some -25%. Yet over these 5 years many energy themes have strongly downwards stories as well; two major fossil fuels dropped hard, an oil story down some -60%, & natural gas down some -70%. Hence passive 'brown' dominant themes for oil, & for natural gas fell more than a 'green' clean energy theme last 5 years. Coal rose steeply 2016/2017 to nearer but below ECO. Past 10 years presents a tremendous crash in clean energy, some fossil fuels falling even more.

The WilderHill[®] New Energy Global Innovation (NEX) that's *worldwide* mostly outside the U.S., is also up YTD & past 2 years, though less so than ECO. NEX started 2019 near 162, and closed Q1 near 185. Past 5 years NEX is off around -10%, yet among the few energy themes we view, it was here 'less down' than many Indexes & active Funds focusing on energy.

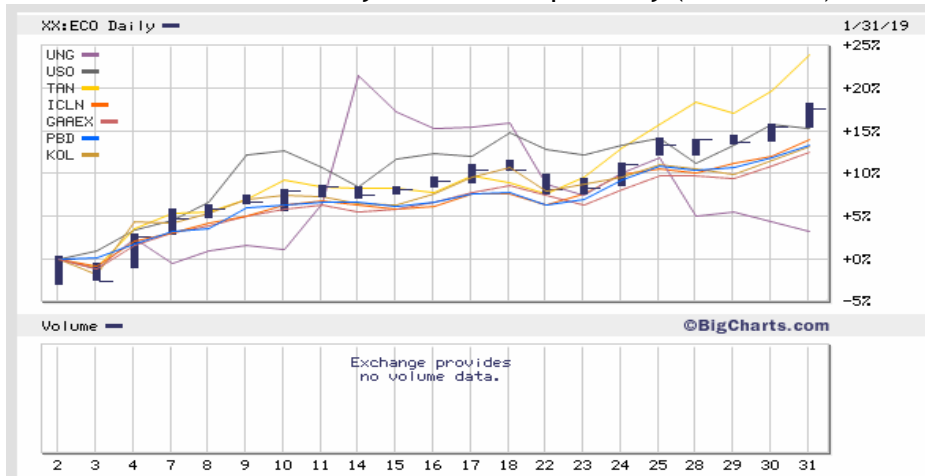
This Quarter was last for Progressive Energy Index[®] (WHPRO): it alone was ended Q1 2019 - along with an independent tracker (PUW) just for it. WHPRO mainly excluded solar, wind & renewables; that unique WHPRO theme was for reducing CO2 & getting better efficiency from major energy/'brown' fossil fuels. WHPRO started in 2006 and closed in 2019; it was first to capture a lower-carbon from dominant energy story and arguably was ahead of its time.

Let's look now at the volatile clean energy story captured by ECO in 1st Quarter:



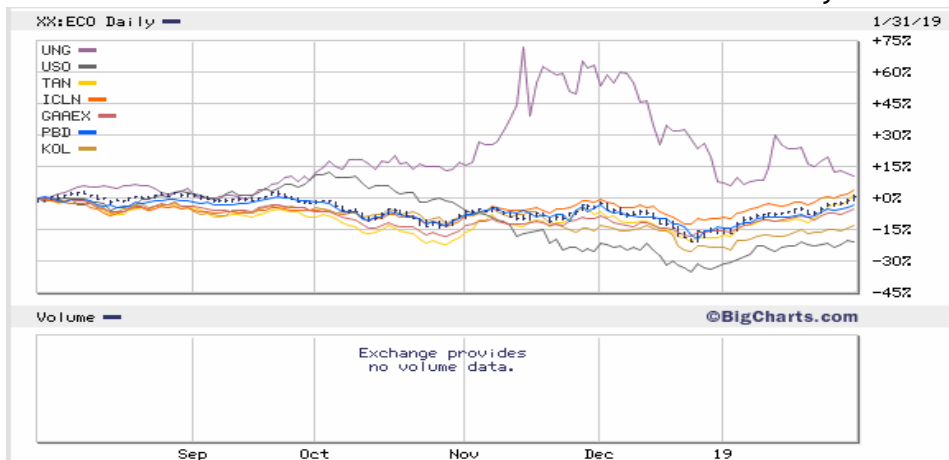
Source: NYSE.com

With that volatility both up and then down, we'll be a bit granular to consider first January alone which started about 44 and ended near 53, so initially up near +20%. In that first month ECO 'outperformed' 3 notable energy themes/stories (at least as regards 3 trackers we utilize here) for Oil, Natural Gas, & Coal, as well vs. as an active Fund for alternative energy. Why? Some insight may be seen in a fact only 1 other theme we view here did 'better' 1st month; it was a narrower-Solar-only theme and up sizably (even more) January some +25%:



Source: bigcharts.com

Arguably then the Solar story did quite well first month. Yet look farther back from January's end, say back over 6 months so including late 2018, and then Solar & ECO moves dissipate. Natural Gas here is most prominently volatile, upside & downside, ending 'just' some +10%. That +10% has it end above other themes here - albeit not very far from those stories:



Source: bigcharts.com

Little doubt thenm but January 2019 was rather notable for a Solar sub-sector. Plus, given a key role that 'Year to Date' (YTD) can play as both dividing line & as new start, some declines that had come just before start of 2019 among both solar/clean energy themes, with ECO just beforehand down by some -15% in Q4 2018, meant coincidentally maybe some 'regression to mean' after new year, just perhaps, maybe helped add to (upward) January moves.

As we noted, 3rd month, March, would bring a decline. But before that, let's just look midway during an upwards-moving Q1 and so February 14th, ask: which constituents in ECO were then up most, & which 'lagged'? That may be of interest for Q1, with ECO then so up. Top 50-Day 'best-up' names for their Daily Moving Averages (DMA) mid-Q1 reveal these data:

Top Performers within ECO: highest Past 50-day DMA (up > +20%):

- AMSC +27.86%
- AQMS +20.06%
- ENPH +22.56%
- HYGS +22.06%
- JKS +24.00%
- MXWL +53.07% (a one-time change as was being bought out)
- RUN +23.44%
- VECO +25.73%

Top sub-sector themes above include: superconductors, batteries recycling, solar inverters, hydrogen fuel cells, solar manufacturing & installations, and semiconductors; a diverse lot.

Also up based on 50-day DMA percent changes for at least > +11%:

- BLDP +12.94%
- CSIQ +16.93%
- DQ +19.57%
- HXL +12.11%
- ITRI +13.31%
- OLED +18.96%
- PLUG +15.99%
- SEDG +14.71%
- SPWR +19.53%

Themes up include too solar manufacturing & installations, plus fuel cells again at top; there's also lightweight carbon fiber materials, metering, organic LEDs; once again fuel cells, solar inverters, and solar non-commodity manufacturing. Hence solar, and hydrogen fuel cells were strong gainers on DMA 50 gains and were fairly-focused near top first-half of Q1.

Only a few in ECO were 'laggards' past 50-day DMA, and those barely off:

- AY -2.47%
- LYTS -6.50%
- REGI -0.89%
- TSLA -4.09%

Near the 'bottom' names has a holder of renewable energy generating assets, one in LED lighting, in biofuels, and a world leader in electric vehicles & energy storage. Those however may be merely off higher highs Q4 2018, showing only modestly low 50-day DMA here. In sum two sub-sector themes that had stood out some midway into Q1 were Solar, and Fuel Cells. There's no way to tell if such *past* DMA performance, here midway in Q1, might continue.

Still in mid-February, here's too many 'top performers' in the Global NEX Tracker. Not based on each DMA, but instead what's moved into higher rankings in an independent NEX tracker,

On Feb. 15th, these were Top ~25 in an independent Tracker (PBD) for the NEX:

<u>Name</u>	<u>Weight</u>
Universal Display Corp	2.04
Cree Inc	1.92
Itron Inc	1.92
Seoul Semiconductor Co Ltd	1.88
Acuity Brands Inc	1.82
NIO Inc ADR	1.81
Hannon Armstrong Sustainable Infra.	1.78
TPI Composites Inc	1.73
Signify NV	1.73
Nibe Industrier AB	1.71
Landis+Gyr Group AG	1.60
Nordex SE	1.62
Xinjiang Goldwind Science & Tech.	1.60
China High Speed Transmission Equip.	1.59
OSRAM Licht AG	1.58
TransAlta Renewables Inc	1.56
Siemens Gamesa Renewable Energy	1.54
Kingspan Group PLC	1.53
Epistar Corp	1.52
Sociedad Quimica y Minera de Chile	1.52
Samsung SDI Co Ltd	1.51
Huaneng Renewables Corp Ltd	1.49
Canadian Solar Inc	1.48
Sunrun Inc	1.44
Pattern Energy Group Inc	1.43
Tesla Inc	1.42
GCL-Poly Energy Holdings Ltd	1.40
Boralex Inc	1.39

So the Global NEX story too has some Solar in its top, no surprise given that Solar advance Q1 in ECO Index. Also seen here are constituents in Wind, LEDs, Battery Materials, Metering, Electric Vehicles, Lightweight Materials, Better Building for Energy Efficiency, etc. There's diversity among the Countries of Listing too, across the Americas, Europe, & Asia. Next too in later February the NEX continued to see some up moves among several Index constituents; that following week one 'Top performer' here, OLED, went from 2.04%, to 2.4%.

Late February of brief note was the 22nd when ECO gained some 3.85%; it opened about 57.18, and closed that day about 58.81. (An independent tracker, PBW, rose about +3.79% that day when it opened about 27.33 and closed about 28.20). Which ECO constituents & themes were large movers that day? They included OLED in organic LEDs (up +23.0%), AQMS in battery recycling (up +16.2%), JKS, DQ, CSIQ in solar panel manufacturing (up by +14.3%, +11.8, and +9.6% respectively), and BE in fuel cells up +8.5%. Rather few 'losers' were seen among ECO constituents on that particular day, just 5, and each only declined less than -1.00%.

ECO Index then closed February about 58.57. An independent tracker (PBW) closed at 28.13. NEX Index closed February about 191.80. An independent tracker (PBD) closed at 12.35. So in February ECO's theme was up another +10%, a remarkably (upwards) volatile first 2/3rds Q1. Looking back January & February first showed 'strength' - for U.S.-listed clean energy in ECO - & for the Global new energy innovation mainly outside the U.S. in the NEX theme.

Look again at 50 DMA % changes in ECO for 'gainers' at the end of February - so moves within First Quarter, and on Feb. 28th the sub-sectors with biggest gains were broad:

Top Performers within ECO: seen relative to Past 50-day DMA (up >20%):

BE +24.78%
CSIQ +21.95
ENPH +28.16
HYGS +23.37
JKS +32.16%
MXWL +26% (but one-time change as it was being bought out)
NIO +28.42%
OLED +35.72%
PLUG +20.95

Also still up based on past 50-day DMA that are up at least +11%:

ALB +13.42%
AQMS +18.19%
DQ +11.11%
RUN +14.36%
SPWR +11.70%
VECO +12.97%

Once again we see Solar, Fuel Cells, Electric Vehicles, LEDs, as well as batteries materials & recycling, semiconductor manufacturing equipment etc - for some noteworthy diversity.

Just a few in ECO were down 50-DMA here and those by only small amounts:

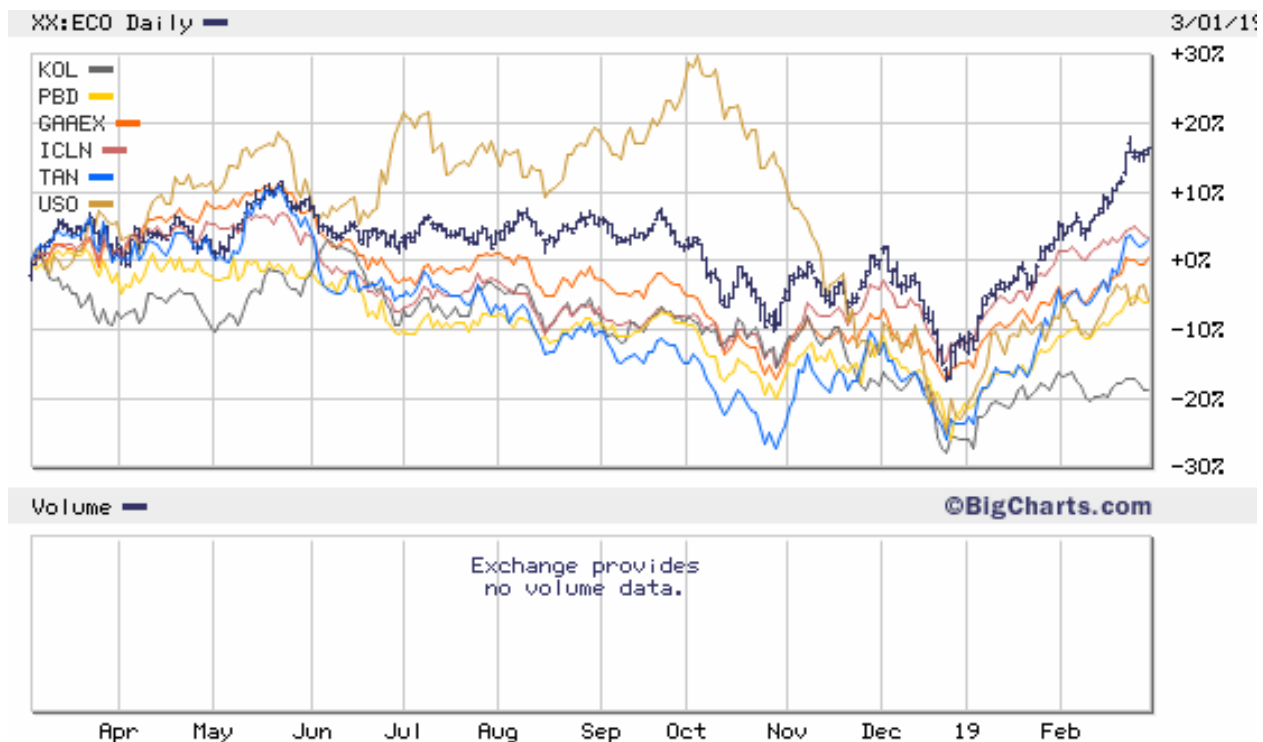
ASYS -2.04%
SQM -2.67%
THRM -3.18%
ITRI -5.59%
LYTS -0.19%
ORA - 0.41%
REGI -1.81%
TPIC -0.02%

As usual we'll pause to look next at last 12 Months - here from March 2018 to March 1st 2019 - including varied clean, alternative as well as non-renewable 'dirty' energy themes. Wide differences among many 'green' & more 'brown' themes/stories as typical stand out.

In a Chart below this particular period a story at bottom was a passive Coal Index via tracker, a major theme down here some -20%. Following a quite large gap 'above' it, next are 2 other stories, both down about a similar -5% this period: an independent tracker for a global new energy innovation story mainly outside U.S. as captured by passive NEX Index; and closely next to it is a tracker for a passive Oil Index, both here off as noted about -5%.

Next 'up' but only back to nil past year is an active Fund for a global alternative energy story. Then in positive territory, just, roughly tied are a Solar tracker after 2019 runup to near +4%; and a tracker for (another) global cleaner energy theme up some +4% as well. Next up, but not shown here due to volatility that can be distorting to any Chart is Natural Gas, +10%

Most Up here is passive WilderHill Clean Energy Index (ECO) at up around +17%. But that's up off the prior declines late 2018, so 2019 YTD as a dividing line was perhaps impactful here:



Source: bigcharts.com

We'll next look back since 2010 so for last 9 years, close to a decade - to March 1, 2019 in a chart below. Included are the fossil fuels, oil, coal, & (shown again is) natural gas as seen through these same themes - and most dramatic again at bottom is Natural Gas, which even after recent 2018 gains crashed by over ~90%! Although if going back a full 10 years to Spring 2009, would have marked a bottoming nadir for some stories - not so all energy: numerous passive energy themes fell after with some down following Spring of 2009. And we see here the lowest since 2010 is a passive Natural Gas story via an independent tracker.

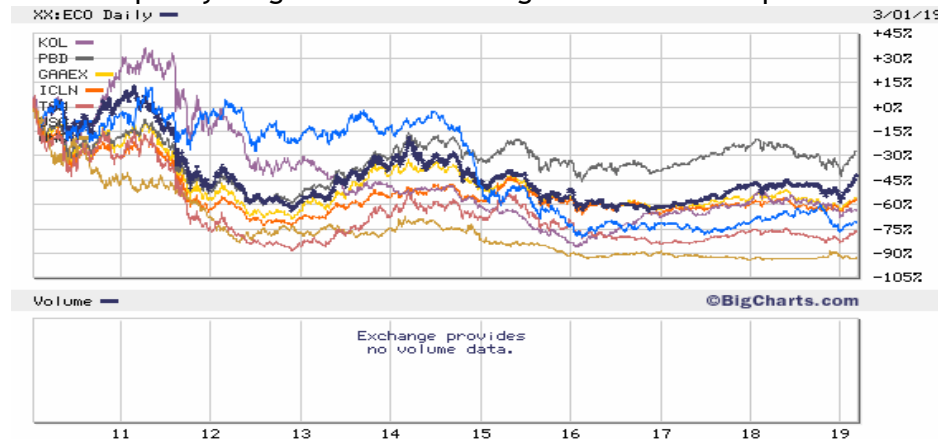
Just above it is a passive Index/tracker for a Solar story: that has big rises recently, yet it's down for the last near-decade by some -75%. Moving on 'up' next at bit less down is a passive Oil theme also fallen hard; though risen/fallen, it's still steeply off here some -70%.

Hence a bright green Solar theme - and 2 browner fossil fuel themes for Natural Gas, and Oil - are stories strongly down over the past roughly 9 years, nearly a decade.

Next 'up' (yet far down) is passive Coal, it's still well down by some -60%. Most-CO2 laden energy story here it had earlier trailed more - but its tracker rose hard 2016 & 2017 despite facing some pretty dismal economics - then faced headwinds again since early 2018. And yet if one looks back fully 10 years to a nadir February 2009, that coal-story has recovered fully. Just 'above' it is a tracker (not ours) for a Global Cleaner Energy passive Index / tracker - plus there's an active global alternative energy mutual fund - both down some -50%.

After a sizable gap so above those 6 stories, higher than 1 for solar, 3 fossil fuels, 2 for global alternative energy so both passive & active - we next see clean energy story via passive ECO. That said it's still *very, very far down* by some -40%. While far down -40% over some 9 years, that's after rising hard in Q1 to 'above' (*down less*) than Natural Gas, Solar, Oil, Coal stories and an active Fund for global cleaner energy - and even so it's *still well down*.

At top 'highest' here is a WilderHill Global New Energy (NEX) story well down near -25%. (And if viewed for a full 10 years since Spring 2009 then it too has recovered fully - rather like coal - and is better since). Among these varied themes, Global New/Clean Energy did 'best' - with many showing big falls off 2x the NEX. We note too NEX & ECO long-term performances show that 'it's pretty tough for active-managed Funds to beat passive Indexes':



Source: bigcharts.com

Very importantly broad (and so mostly non-energy) Indexes for markets generally such as an S&P 500, NASDAQ, MSCI - that are neither seen nor discussed here since they capture much more than only energy-very-narrowly - did far, far, far 'better' these last 10 years.

Q1 may be one of S&P 500's best Quarters since Q3 2009. It happened to have shown an upwards story too, for energy themes. Yet over the last 10 years, the S&P clearly did far, far, far 'better' than these energy themes-alone. Of the S&P, its energy component already small, fell from some 14% in 2009 as energy stories were plummeting, to some 6% by 2019. In sum an extremely useful S&P 500 basket - is also far different than energy-focused portraits.

Unusually upwards-volatility in January/February Q1 was significant, but not unprecedented. It was enough though, to be big and important for all Q1, and has been seen before.

Look back in time at ECO, and there's many examples instead of *strongly downwards plunges*. Yet spikes upwards like in this Q1 can also be seen, with Quarterly gains in ECO Index: one example was Q1 (by coincidence?) of 2006. That Quarter saw too a robust January, first going up +26%, followed by an overall First Quarter Q1 gain up +31%. To be sure Q1 back in 2006 was not an identical situation to our recent Q1 2019 - but noting it may lend some interesting observations if we glance back 13 years ago. Mark Twain is reputed to have said that, "History doesn't repeat itself, but it often rhymes". With that in mind let's look at a few excerpted pages from our Q1 Quarterly Report written end of Q1 2006. While not a mirror-image scenario, one arguably finds a few elements that just perhaps, may be of interest:

Noteworthy Events in 2006 Q1

A remarkable event starting with the very beginning of 2006 was to see the Index (ECO) coincidentally, yet interestingly close up each day well into the month; thus its first close down didn't come until January 20th. Thereafter, there were only two more days in which ECO closed down in the month. The Index ... in January had an unusual one-month performance of +26%. Although such a volatile up January might have prompted some declines in February or March, this Q1 2006 nonetheless closed +31%.

We'd emphasize in the strongest terms this Monthly & Quarterly performance of the Index isn't sustainable; it's unlikely to be repeated soon. Moreover, seeing such a one-sided volatility to upside-only and starting from the very first trading day of 2006 was in part a mathematical coincidence, and one spotlighted by the start of a new calendar year. Because it follows after the 2005 Q4's strongly downward move of -9.2%, that maybe helped to set the stage for January's 'regression to the mean' up and beyond.

January and 1st Quarter results are nonetheless bound to be noticed going forward, since the 'Year-to-Date' is such a universal way of measuring performance. To be sure, such a one-sided volatility is something that we'd earlier observed at times in the predecessor WilderHill Index as well (it began calculating in 1999 albeit not then on Wall Street); however as we always emphasize, dramatic downturns must be expected and the Index also declines sharply. Volatility in short is still part and parcel of clean energy stocks.

On the other hand, this non-negligible, 'indefatigable January' was grounded in real causes. Consider that the January data can be nicely explained by very elegant rotation of leadership in ECO, as different stocks were performing well at differing times. Initially it was specifically the solar stocks that turned in a distinguishing performance, the first few weeks of January. Solar pure-plays SunTech Power (STP), Evergreen Solar (ESLR), and SunPower (SPWR) moved upwards at such smart pace, they 'dragged' ECO upwards – even on the days when broader markets or sectors in the Index otherwise closed downwards.

Then, around the time those solar stocks paused their own price-escalation mid-month, other components within the Index 'took turns' in helping to still move the Index upwards. The result was elegant albeit de facto, rotation. Geothermal component Ormat Technologies (ORA) and carbon fiber-producer Zoltek (ZOLT) both happened to turn up as solar slacked off, with news of new orders coming in for those two firms.

Specific catalysts brought sharp increases among other ECO components too, helping turn the Index upwards around this time. A few were one-off events unlikely to be oft repeated, like an announcement of an offer to buy Index industrial-gases component BOC Group (BOX): that news moved that stock sharply higher late in January. (The offer was rejected as too low, but a follow-up offer later in Q1 was accepted and the purchase of BOC is likely to be consummated in latter 2006). Q1's rotation among ECO sectors in January had a fairly profound impact on the Index and was fascinating to observe.

Later in January, it was the turn of Quantum Fuel Systems (QTWW) as a maker of hydrogen storage systems and integrator for hybrid vehicles. Their stock moved higher on an analyst's upgrade and report of an order from the Defense Department – this followed a long pronounced downward drift of their stock price over the preceding two years. Because Quarterly rebalancings are partly designed to allow stocks coming off of prior lows to have some impact (and conversely re-weights downwards equities that had an abnormally strong one-Quarter's performance), QTWW too helped tug ECO higher.

The last days of January then saw strongly upwards volatility at Pacific Ethanol (PEIX): this company aims to become a West Coast supplier of ethanol. The President on eve of his State of the Union speech was expected to spotlight ethanol in a new energy initiative; he did, and both PEIX and another Index component MGP Ingredients (MGPI) saw sharp increases in valuation. Widespread reports indicated U.S. car-makers were increasingly interested in ethanol, and in flex-fuel vehicles using E85. Moreover biofuels could help displace fossil fuels domestically while assisting America's farmers, help replace additive MTBE (but with short-term supply bottlenecks), and enhance energy security to boot. In this way, clean energy was drawing support from disparate ends of political spectrum.

And yet, confounding investors is something stock markets have done throughout history and will always do: thus clean energy stocks broadly declined sharply on February 1st, the day after the President's speech – immediately after he'd just highlighted clean energy! Given some anticipation of profit-taking after the President's speech, plus a 26% increase through January 31st, that stocks declined on that notable day is understandable. But it was remarkable still and this one-day's unexpected gyrations did make some news.

WilderHill Clean Energy Index (ECO) at end of February, 2006:

	<i>Name</i>	<i>3 Month Volume*</i>	<i>Index Weight*</i>
ACPW	Active Power Inc.	4,654	2.59%
AMSC	American Superconductor Corp.	6,344	2.46%
APCC	American Power Conversion Corp.	30,218	1.86%
APD	Air Products & Chemicals Inc.	22,261	1.49%
BLDP	Ballard Power Systems Inc.	12,915	2.95%
BOX	BOC Group PLC	575	1.80%
CPST	Capstone Turbine Corp.	83,181	2.18%
CREE	Cree Inc.	22,113	2.31%
CY	Cypress Semiconductor Corp.	90,882	2.67%
DESC	Distributed Energy Systems Corp.	19,496	2.66%
ELON	Echelon Corp.	2,569	1.92%
EMKR	EMCORE Corp.	15,916	2.14%
ENER	Energy Conversion Devices Inc.	40,498	2.83%
ESLR	Evergreen Solar Inc.	64,074	3.22%

FCEL	FuelCell Energy Inc.	15,690	2.56%
HYGS	Hydrogenics Corp.	10,692	2.88%
IDA	IDACORP Inc.	5,449	1.73%
IMCO	IMPCO Technologies Inc.	3,167	2.59%
IMGC	Intermagnetics General Corp.	7,470	2.68%
IRF	International Rectifier Corp.	25,727	2.28%
ITRI	Itron Inc.	11,928	2.91%
KYO	Kyocera Corp.	1,387	2.59%
MAG	MagneTek Inc.	4,530	2.56%
MDTL	Medis Technologies Ltd.	3,540	2.61%
MGPI	MGP Ingredients Inc.	3,147	1.54%
MKTY	Mechanical Technology Inc.	4,142	2.56%
MXWL	Maxwell Technologies Inc.	2,554	2.70%
ORA	Ormat Technologies Inc.	3,697	2.95%
PEIX	Pacific Ethanol Inc.	14,619	2.68%
PLUG	Plug Power Inc.	22,366	1.92%
POWI	Power Integrations Inc.	7,426	2.16%
PX	Praxair Inc.	28,090	1.40%
QTWW	Quantum Fuel Systems Technologies	16,887	3.73%
SPI	ScottishPower PLC	2,647	1.69%
SPWR	SunPower Corp. (Cl A)	12,207	3.06%
STP	Suntech Power Holdings Co. Ltd.	46,644	3.38%
ULBI	Ultralife Batteries Inc.	3,643	2.22%
UQM	UQM Technologies Inc.	1,539	2.25%
WFR	MEMC Electronic Materials Inc.	63,502	3.17%
ZOLT	Zoltek Cos.	7,218	4.15%

* Data are as of February 28, 2006.

Of keen interest in January were similarities, and yet also, some robust non-correlation as between 1) WilderHill Clean Energy Index – versus 2) oil/fossil-fuel Indexes at this time. At first and despite (nearly) zero overlap as between ‘green’ stocks in our clean Index (ECO) – and the stocks found in oil Indexes for carbon-laden fossil fuels, both kinds of Indexes increased strongly at the early start of the year. But soon the similarity ended. By late January, this WilderHill Index essentially had ‘de-coupled’ from other energy Indexes by going higher and more sharply so. ECO showed further variance in February, declining relatively little when oil-and common energy indexes dropped back more considerably.

In February, on news of ample oil & gas reserves compounded by the warmest January on record (further dampening natural gas demand), oil & gas Indexes showed noticeable declines. Meanwhile, sector rotation within ECO as noted above caused this Index to close February at a still relatively lofty ... , for a virtually unchanged month – while oil & gas Indexes were then mainly dropping. Non-correlation with fossil-fuel stocks ... is more visually evident in a Graph below,....

For those seeking to create a Model Energy Portfolio these data seem to indicate fossil fuels oil, gas and coal alone will no longer fully cover the broadening energy sector. We thus hypothesize that clean energy including conservation, has become more than ‘niche’: it’s arguably now an arena that stands on its own, and helps diversify a Model Portfolio.

An added reason for this useful non-correlation as between ECO and fossil fuel Indexes, is all four additions put into the WilderHill Index at start of this Quarter - PEIX, SPWR, STP, WFR each moved strongly upwards – and most usefully, all moved for key reasons distinctly

... tied to clean energy. Because of the strong clean energy nexus, we believe the additions were timely. Of course volatile movement (while upwards in January) in ECO stocks just as easily go the opposite direction (as happened just a tiny bit in March). Clean energy can go 'out of favor' anytime and we expect ECO should then move more sharply downward, fulfilling its mission to "capture and track" movements of clean energy!

We thus repeat as we so often do, this Index is designed to allow for volatility: it can and does 'drop like a rock' and turn sharply negative. Unlike an actively-managed Fund, it is an Index and so we don't seek any defensive positions when the Index appears 'over-valued', nor generally do we change Index composition between rebalancings. Passive Indexing reflects modern portfolio theory, which generally indicates passive Indexing can produce highly notable results over time relative to actively managed funds. We see return as a function of risk; we're mindful Indexing can lend some value by simply assembling a 'basket' and that in turn may help moderate for singularly often-risky stocks.

Also notable is unlike September 2005, when the Index rose sharply on negative news of Hurricane Katrina and the consequential brief spikes in oil prices, January 2006 movement was partly borne of more positive news. These were product orders, growing interest in clean energy, and government actions like at California PUC as expected and noted in our last Report, all emphasizing growth in renewable energy. On balance going forward those stimuli may be beneficial; of course, a large number of variables on the other hand (there's always 'the other hand') favor sharp Index downturns as well. These include the rich stock valuations, great difficulties in expanding solar, ethanol and wind, etc.

Indeed in March a few solar stocks turned rather sharply downwards, and the PV space was relatively out of favor at that time. News for instance that Evergreen Solar (ESLR) which could no longer source specialized granular polysilicon from MEMC Electronic Materials (WFR), led to its stock sharply declining, though analysts were divided on the importance of this set-back, given that ESLR also sources polysilicon from its new EverQ partner, REC of Norway and is experimenting with chunk polysilicon. Plus solar stock SunTech Power (STP) also was trailing downwards, since its very sharp January increases.

At this time, Medis Technology (MDTL) and a few other small fuel cell developers were increasing in valuation, which again meant 'sector rotation' in the WilderHill Index. It helped to raise the Index at a time solar stocks otherwise had downwards pressure. Throughout the fuel cell sector, the question of whether these costly & speculative products will ever get to commercially viable numbers is vexing: the entire fuel cell sector as seen now may never become profitable.

....

Looking outside the Index, a few noteworthy developments in clean energy merit brief mention. Wind power and related emerging technologies continue to grow well in the U.S. and Asia-Pacific along with quickening growth of offshore wind too in Europe. And a 150 MW offshore wind farm has even been proposed off Texas, which could be a first for North America. However, a variety of technical problems continue to vex wind power – although as systems mature those continue to be engineered away through better designs. Thorny wind problems at present include severe turbine gearbox faults, insufficient rigidity, under-dimensioning of components by seeking low top head mass, and poor reliability. An interesting development here is vertical axis design that offers some advantages over the horizontal axis that leads to big blade stretching and compaction.

For solar, shortages of polysilicon we'd discussed on our last Report for Q4 continue to overshadow news, with near-term pricing pressures & constraints on growth a result.

Yet poly producers are responding and attention continues to mount too for non-crystalline technologies, including thin-film, CIS, and other means to make electricity from the sun with little or no silicon. Nanotechnology is developing for solar, as are the very large-scale efforts for solar concentrating technologies, and for important (although often overlooked) solar thermal. This includes thermocouple devices to harvest electricity from waste/heat. As always, recovering power from waste can be a smart option.

In the scientific realm, an article published in Science suggested the presently accepted models forecasting sea-level-rise ahead may potentially, be unduly low. Of course, we'd dearly hope for the contrary given serious global implications 100 years out, but this piece: Julian Dowdeswell, 'The Greenland Ice Sheet and Global Sea-Level Rise', 311, p.963 (17 February) is lately turning scientific attention to the 'wisdom' of the very low priority now given to preventing CO2 and greenhouse gases. Consider impacts stemming from freshwater flows from Greenland's ice shelf into the North Atlantic, should the Gulf Stream weaken, as a result. Those regions long warmed by the current could be seriously impacted, let alone the globe: this arguably merits attention of the most serious sort.

The 24 March issue of Science had a number of research articles on currently melting glaciers and ancient sea-level rise, indirectly but undoubtedly framing new attention on climate-forcing greenhouse gases. It placed particular attention on melting ice sheets and deep past climate change, pushing back baselines and broadening thinking of how robustly sea level can rise. And a piece on cellulosic ethanol (Jan. 27th) pointed to the role biofuels may play, even as scaling difficulties in ramping corn-based ethanol grows thorny. Finally by March's end, the Index (ECO) was perhaps a bit surprisingly still 'able to hold onto' sharp January changes in valuation, and closed out Q1 at even a marginally higher level.

We now return to 2019 and this current latest Report, so to March & end of Q1 2019

Back to Q1 2019, a sharp downturn next came at March, with several days of declines. Some drops were larger: on March 6th ECO fell by about -3.2%, NEX dropped too around ½ that. Contributors included a China-startup electric car manufacturer (NIO) that plummeted -20% announcing bigger than expected losses. Also a constituent in solar commodity manufacturing (JKS) dropped some -10%. That day also saw some sizable declines among several other cleaner-themed Indexes so this drop wasn't just a story of ECO, NEX, & Solar.

Next morning, March 7th again brought declines in ECO, albeit mainly early in intra-day. Any sharper drop was arrested partly by gains in one constituent not having had much role, YTD: MYRG in transmission & distribution / grid construction that gained +13%; also offsetting was a +9% gain at PLUG (and the fuel cells have played more visibly some role here YTD).

By March 8th for the past 5 days the Clean Energy story (ECO) had dropped -7%, while Solar's story dropped a similar amount. The NEX dropped too, here by -5% past 5 days. Clean Energy & Solar however had already gained YTD, so ECO was still up some +26% (off highs near +33%), and global new energy NEX story was up some 15% YTD. After a modest rebound mid-month, late-March then again saw big drops; the 22nd ECO fell almost -4%, the NEX falling too. So March was volatile but here to downside, and generally giving up February's gains, falling strongly after recent gains. No way to tell of course, what April and Q2 might bring.

Finally let's take a closer look at some stronger downsides seen March so late Q1 - a Quarter characterized by some robust volatility (upside and unusually so).

This is in essence an opposite of the look taken in January & February when many constituents in the ECO Index were then broadly ascending. Let's look here at the individual symbols going more to negative latter part of First Quarter, highlighting those most down.

Looking again at 50 DMA % changes in ECO this time negative performances late March - hence at moves still within First Quarter, on March 28th these names had bigger losses:

'Bottom' Performers within ECO: seen relative to Past 50-day DMA (down >-14%):

- CSIQ -17.92%
- ITRI -14.82%
- LYTS - 18.42%
- NIO -33.20%

Also down based on past 50-day DMA that are off at least -9%:

- AMSC -9.65%
- BLDP -9.63%
- REGI -9.19%
- SEDG -10.49%

Fewer in ECO were Up 50-DMA here, and generally much less so than January/February:

- APD +4.76%
- ASYS +6.83%
- CREE +3.49%
- ENPH +4.91
- OLED +8.38%
- PEGI +5.55%
- PLUG +23.17%
- TERP +8.51%

ECO Index over the Year to Date to late March of Q1 2019:



Source: NYSE

Conclusion:

In sum the Clean Energy Index® (ECO) began 1st Quarter 2019 at near 44 and it ended Q1 near 55, up some +23. At first January pushed the ECO Index® up almost daily, gaining some +20%. February increased roughly another +10%, going from 53 to 58. March then declined firmly from peak giving up February gains. Or roughly 2+ years since start of 2017 when ECO Index® was near 38, it has gained close to +45%. A separate independent tracker start of 2017 was near 18.50, early 2018 near 25.50, early 2019 near 21.50, and it closed Q1 near 26.50.

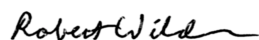
For last 5 years however, clean energy as captured by ECO is clearly well down some -25%. Yet notably, 2 of 3 major fossil fuel themes have fallen much harder here, with oil down some -60%, & natural gas down some -70%. The Global NEX past 5 years did 'less badly' than many stories we view, -10% is 'less down' than passive Indexes, & active Funds for energy themes. Past 10 years reflects a tremendous crash in clean energy, some fossil fuels falling more.

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 (and its independent tracker) for reducing CO2 and better efficiency in major energy closed in Q1 2019. The WHPRO was the first-ever for the low-carbon theme, unique and was arguably ahead of its time.

There were No Additions to ECO for Q2; the 1 Deletion here was MXWL for start of Q2 2019. At the NEX Index, 1 Addition for start of Q2 2019 was Northland Power; and 4 Deletions from NEX were: Energy Absolute, Green Plains, Maxwell, and Senvion SA.

As always, we welcome your thoughts and suggestions.

Sincerely,



Rob Wilder
rwilder@wildershires.com

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Appendix I:
ECO Index (via independent tracker PBW) Descending Weights & Components in
latter-Q1 on 3/14/2019, about ~2 weeks before rebalance for Q2 2019. 39 stocks:

<u>Name</u>	<u>Symbol</u>	<u>Weight</u>
Plug Power Inc	PLUG	4.73
JinkoSolar Holding Co Ltd ADR	JKS	4.59
Enphase Energy Inc	ENPH	4.11
Universal Display Corp	OLED	4.10
Canadian Solar Inc	CSIQ	4.02
Daqo New Energy Corp ADR	DQ	3.53
Veeco Instruments Inc	VECO	3.52
SunPower Corp	SPWR	3.36
First Solar Inc	FSLR	3.30
TPI Composites Inc	TPIC	3.16
Hexcel Corp	HXL	3.04
MYR Group Inc	MYRG	2.95
Ballard Power Systems Inc	BLDP	2.87
Quanta Services Inc	PWR	2.86
Cree Inc	CREE	2.83
Sunrun Inc	RUN	2.80
Bloom Energy Corp	BE	2.72
Ameresco Inc	AMRC	2.65
Ormat Technologies Inc	ORA	2.61
Willdan Group Inc	WLDN	2.58
Pattern Energy Group Inc	PEGI	2.50
Air Products & Chemicals Inc	APD	2.47
Itron Inc	ITRI	2.47
Advanced Energy Industries	AEIS	2.47
TerraForm Power Inc	TERP	2.43
SolarEdge Technologies Inc	SEDG	2.42
Albemarle Corp	ALB	2.40
NIO Inc ADR	NIO	2.25
Sociedad Quimica y Minera	SQM	2.22
Atlantica Yield plc	AY	2.05
Renewable Energy Group Inc	REGI	2.04
Gentherm Inc	THRM	2.02
Tesla Inc	TSLA	1.99
Aqua Metals Inc	AQMS	0.87
Maxwell Technologies Inc	MXWL	0.81
Hydrogenics Corp	HYGS	0.71

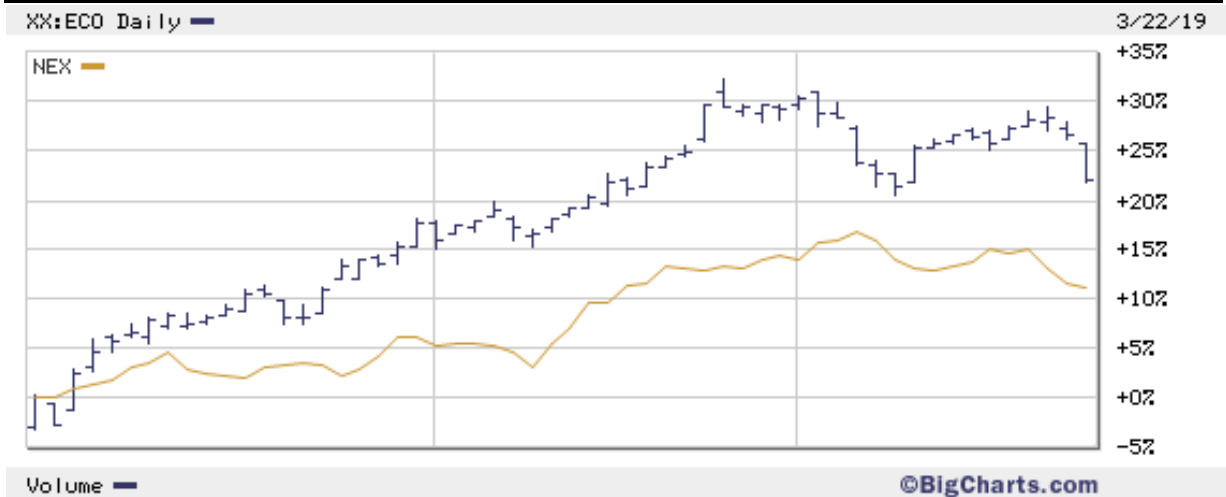
American Superconductor	AMSC	0.61
Amtech Systems Inc	ASYS	0.45
LSI Industries Inc	LYTS	0.32

ECO via an Independent Tracker (PBW) for the Past 2 Years to March 1, 2019:



Source: NASDAQ.com

The ECO Index and the NEX Index, early in 2019 over first ~11 weeks of Q1 to March 22:



Source: BigCharts.com

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

INDEX (ECO) SECTOR & STOCK WEIGHTS FOR START OF Q2 2019. 38 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 - 25% weight (8 stocks @3.12% 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 - 23% sector weight (8 stocks @2.81%; +1 *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 and operates solar/wind, a yieldco.

Energy Storage - 15% sector weight (5 stocks @2.90% each; + 1 *banded stock)

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

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

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

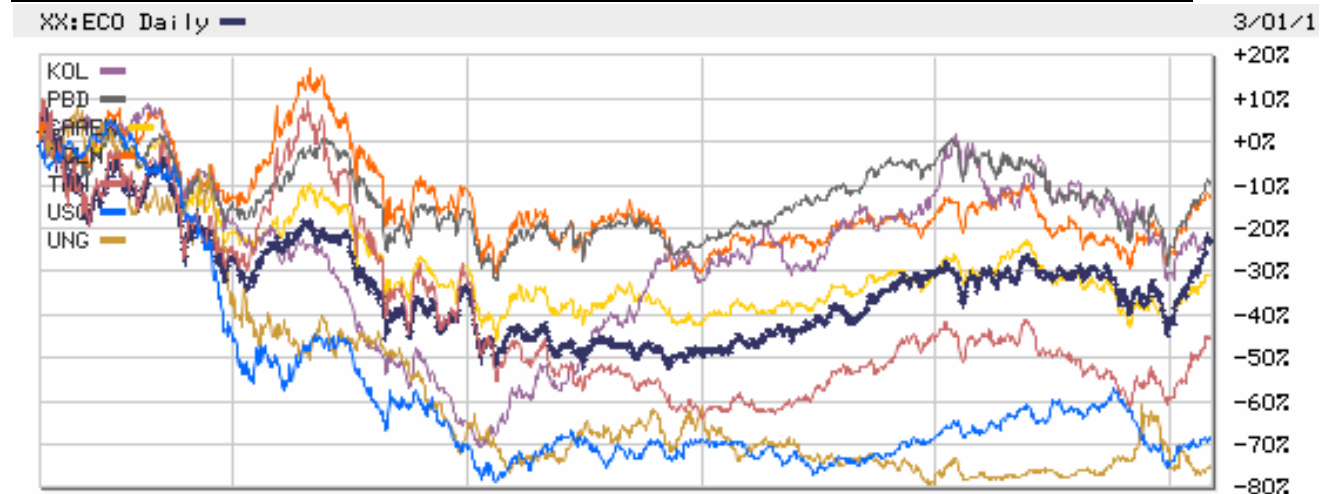
Enphase, ENPH. Microinverters, also energy storage systems and software.

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

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, REGL. Biodiesel, natural fats, oils, grease to biofuels.

ECO in bold, and NEX tracker in gray - plus other themes in clean energy, & fossil fuels past 5 years to March 1, 2019; this includes ‘tough times’ with big declines in energy:



Source: bigcharts.com

As seen by **ECO** (in bold) plus several other key themes to March 1, the last 5 years were rough for several clean, alternative energy & even traditional fossil fuel stories. For example despite **ECO** falling hard (then rising Q1) it's still here down near -24%. Even that clean energy figure is well above oil, & natural gas trackers farther negative by some -65% and by -70%. Meanwhile a coal tracker rose greatly 2016/2017 to near **ECO**. So clean energy and coal are clearly down, yet 2 of 3 fossil fuels, oil & natural gas are down by much more.

A tracker for Solar too, once at very top, fell hard, and is here at -45%. An active fund for global alternative energy is well down some -31%. Of the only two nearer to nil here, one is a global clean energy index (not ours) down -11%. And it's still below the global new energy NEX, via its independent tracker, here down around -10% for the past 5 years.

So nearest to nil & ‘best’ here is global NEX ***though it's still well down**** this timeframe.

Last 5 years were arguably very tough across energy broadly, fossil fuels, and clean energy. But Not all themes (if one merely steps outside of energy stories) suffered harshly...

Absent here for not being in-energy, are much broader passive pictures, e.g., S&P 500 or MSCI - which did much, much ‘better’ than narrower energy themes. The **ECO** & NEX Indexes however each aim to passively capture & track their own themes of ‘clean energy’ - and ‘global new energy innovation’ respectively - so when these go down - or up.

Appendix III: WilderHill New Energy Global Innovation Index (NEX) late-Q1 via independent tracker (PBD) on 3/14/19 or ~2 weeks before Rebalance to start Q2 2019. 110 stocks:

<u>Name</u>	<u>Symbol</u>	<u>Weight</u>
Universal Display Corp	OLED	2.63
Nordex SE	NDX1	1.97
Cree Inc	CREE	1.95
Hannon Armstrong Sustainable	HASI	1.86
Xinjiang Goldwind Science	2208	1.85
Nibe Industrier AB	NIBEB SS	1.83
Acuity Brands Inc	AYI	1.81
Kingspan Group PLC	KSP	1.69
Canadian Solar Inc	CSIQ	1.67
Signify NV	LIGHT	1.67
TransAlta Renewables Inc	RNW	1.66
Seoul Semiconductor Co Ltd	046890 KS	1.65
TPI Composites Inc	TPIC	1.61
Landis+Gyr Group AG	LAND SW	1.60
Itron Inc	ITRI	1.58
NIO Inc ADR	NIO	1.56
Huaneng Renewables Corp Ltd	958	1.49
Siemens Gamesa Renewable Energy SA	SGRE	1.48
Epistar Corp	2448	1.46
Pattern Energy Group Inc	PEGI	1.46
Sociedad Quimica y Minera	SQM	1.45
China High Speed Transmission	658	1.43
OSRAM Licht AG	OSR	1.41
SMA Solar Technology AG	S92	1.39
China Longyuan Power Group Corp Ltd	916	1.39
Greencoat UK Wind PLC/Funds	UKW LN	1.38
Boralex Inc	BLX	1.37
Sunrun Inc	RUN	1.37
Orsted A/S	ORSTED DC	1.37
GCL-Poly Energy Holdings Ltd	3800	1.36
First Solar Inc	FSLR	1.36
Samsung SDI Co Ltd	006400 KS	1.35
Xinyi Solar Holdings Ltd	968	1.35
Vestas Wind Systems A/S	VWS DC	1.34
Renewables Infrastructure	TRIG LN	1.32
Tesla Inc	TSLA	1.31
SunPower Corp	SPWR	1.30

BYD Co Ltd	1211	1.26
GS Yuasa Corp	6674	1.25
Green Plains Inc	GPRE	1.25
TerraForm Power Inc	TERP	1.20
SolarEdge Technologies Inc	SEDG	1.17
Clearway Energy Inc	CWEN	1.10
Drax Group PLC	DRX LN	1.08
Energy Absolute PCL	EA-R TB	1.06
GCP Infrastructure Investments Ltd	GCP LN	1.06
BCPG PCL	BCPG-R TB	1.05
Sino-American Silicon Products Inc	5483	1.04
Atlantica Yield plc	AY	1.02
Novozymes A/S	NZYMB DC	1.01
Renewable Energy Group Inc	REGI	1.00
Takuma Co Ltd	6013	1.00
Kandi Technologies Group Inc	KNDI	0.89
Maxwell Technologies Inc	MXWL	0.86
Bloom Energy Corp	BE	0.85
Meridian Energy Ltd	MEL	0.73
Innergex Renewable Energy Inc	INE	0.71
Contact Energy Ltd	CEN	0.71
Veeco Instruments Inc	VECO	0.69
Verbund AG	VER AV	0.69
Ormat Technologies Inc	ORA	0.68
Mercury NZ Ltd	MCY	0.67
W-Scope Corp	6619	0.61
Voltabox AG	VBX	0.58
Enphase Energy Inc	ENPH	0.57
JinkoSolar Holding Co Ltd ADR	JKS	0.56
Audax Renovables SA	INVALID	0.54
Ameresco Inc	AMRC	0.49
Meidensha Corp	6508	0.48
Ricardo PLC	RCDO LN	0.48
Willdan Group Inc	WLDN	0.48
eRex Co Ltd	9517	0.48
Caverion OYJ	CAV1V FH	0.46
Everlight Electronics Co Ltd	2393	0.45
Wasion Holdings Ltd	3393	0.45
Daqo New Energy Corp ADR	DQ	0.44
Plug Power Inc	PLUG	0.43

Credit Suisse Real Estate Green	GREEN SW	0.43
Lextar Electronics Corp	3698	0.42
Tanaka Chemical Corp	4080	0.42
CS Wind Corp	112610 KS	0.41
EDP Renovaveis SA	EDPR	0.40
Gurit Holding AG	GUR SW	0.40
Falck Renewables SpA	FKR	0.40
EF-ON INC	9514	0.39
FDG Electric Vehicles Ltd	729	0.39
RENOVA Inc	9519	0.39
Vivint Solar Inc	VSLR	0.37
United Renewable Energy Co Ltd/Taiwan	3576	0.36
Ecopro Co Ltd	086520 KS	0.36
Motech Industries Inc	6244	0.36
Meyer Burger Technology AG	MBTN SW	0.35
Scatec Solar ASA	SSO	0.34
Super Energy Corp PCL	SUPER-R TB	0.33
CropEnergies AG	CE2	0.33
PNE AG	PNE3	0.33
Unison Co Ltd/South Korea	018000 KS	0.32
REC Silicon ASA	REC	0.32
Encavis AG	CAP	0.31
Albioma SA	ABIO FP	0.31
Neoen SA	NEOEN FP	0.30
SPCG PCL	SPCG-R TB	0.29
Gigasolar Materials Corp	3691	0.29
VERBIO Vereinigte BioEnergie AG	VBK	0.27
West Holdings Corp	1407	0.27
Canvest Environmental Protection	1381	0.26
Ballard Power Systems Inc	BLDP	0.25
NEL ASA	NEL	0.24
Senvion SA	SEN	0.20
Renewables Infrastructure Group L	1702246D L	0.00

Appendix IV:

WilderHill New Energy Global Innovation Index (NEX) - for start of Q2 2019. 106 Stocks.

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

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

<u>Name</u>	<u>Country</u>	<u>Q2 2019 Weight</u>
ACUITY BRANDS INC	UNITED STATES	1.71%
ALBIOMA	FRANCE	0.32%
AMERESCO INC	UNITED STATES	0.49%
ATLANTICA YIELD PLC	UNITED KINGDOM	1.21%
AUDAX RENOVABLES SA	SPAIN	0.41%
BALLARD POWER SYSTEMS INC	CANADA	0.22%
BCPG PCL	THAILAND	1.21%
BLOOM ENERGY CORP	UNITED STATES	0.75%
BORALEX INC -A	CANADA	1.45%
BYD CO LTD	CHINA	1.68%
CANADIAN SOLAR INC	CANADA	1.21%
CANVEST ENVIRONMENT PROTECTION	CAYMAN ISLANDS	0.32%
CAVERION OYJ	FINLAND	0.49%
CHINA HIGH SPEED TRANSMISSION	CAYMAN ISLANDS	1.45%
CHINA LONGYUAN POWER GROUP-H	CHINA	1.45%
CLEARWAY ENERGY INC CLASS C	UNITED STATES	1.45%
CONTACT ENERGY LTD	NEW ZEALAND	0.73%
CREE INC	UNITED STATES	1.71%
CROPENERGIES AG	GERMANY	0.32%
CS REAL ESTATE FD GREEN PROP	SWITZERLAND	0.49%
CS WIND CORP	SOUTH KOREA	0.41%
DAQO NEW ENERGY CORP-ADR	CAYMAN ISLANDS	0.35%
DRAX GROUP PLC	UNITED KINGDOM	1.13%
ECOPRO CO LTD	SOUTH KOREA	0.48%
EDP RENOVAVEIS SA	SPAIN	0.41%
EF-ON INC	JAPAN	0.49%
ENCAVIS AG	GERMANY	0.35%
ENPHASE ENERGY INC	UNITED STATES	0.35%
EPISTAR CORP	TAIWAN	1.71%
EREX CO LTD	JAPAN	0.32%
EVERLIGHT ELECTRONICS CO LTD	TAIWAN	0.49%
FALCK RENEWABLES SPA	ITALY	1.45%
FDG ELECTRIC VEHICLES LTD	BERMUDA	0.48%
FIRST SOLAR INC	UNITED STATES	1.21%
GCL-POLY ENERGY HOLDINGS LTD	CAYMAN ISLANDS	1.21%

GCP INFRASTRUCTURE INVESTMENTS LTD	JERSEY	1.21%
GIGASOLAR MATERIALS CORP	TAIWAN	0.35%
GREENCOAT UK WIND PLC	UNITED KINGDOM	1.45%
GS YUASA CORP	JAPAN	1.68%
GURIT HOLDING AG	SWITZERLAND	0.41%
HANNON ARMSTRONG SUSTAINABLE INFRA.	UNITED STATES	1.71%
HUANENG RENEWA-H	CHINA	1.45%
INNERGEX RENEWABLE ENERGY INC	CANADA	0.73%
ITRON INC	UNITED STATES	1.71%
JINKOSOLAR HOLDING CO-ADR	CAYMAN ISLANDS	0.35%
KANDI TECHNO	UNITED STATES	0.49%
KINGSPAN GROUP PLC	IRELAND	1.71%
LANDIS+GYR GROUP AG	SWITZERLAND	1.71%
LEXTAR ELECTRONICS CORP	TAIWAN	0.49%
MEIDENSHA CORP	JAPAN	0.49%
MERCURY NZ LTD	NEW ZEALAND	0.73%
MERIDIAN ENERGY LTD	NEW ZEALAND	0.73%
MEYER BURGER TECHNOLOGY AG	SWITZERLAND	0.35%
MOTECH INDUSTRIES INC	TAIWAN	0.35%
NEL ASA	NORWAY	0.22%
NEOEN SA	FRANCE	0.35%
NIBE INDUSTRIE-B	SWEDEN	1.71%
NIO INC - ADR	CAYMAN ISLANDS	1.71%
NORDEX SE	GERMANY	1.45%
NORTHLAND POWER INC	CA	1.45%
NOVOZYMES AS CLASS B	DENMARK	1.13%
ORMAT TECHNOLOGIES INC	UNITED STATES	0.73%
ORSTED A/S	DENMARK	1.45%
OSRAM LICHT AG	GERMANY	1.71%
PATTERN ENERGY GROUP INC	UNITED STATES	1.45%
PLUG POWER INC	UNITED STATES	0.22%
PNE AG	GERMANY	0.41%
QUIMICA Y MINERA CHIL-SP ADR	CHILE	1.68%
REC SILICON ASA	NORWAY	0.35%
RENEWABLE ENERGY GROUP INC	UNITED STATES	1.13%
RENEWABLES INFRASTRUCTURE GROUP	GUERNSEY	1.45%
RENOVA INC	JAPAN	0.41%
RICARDO PLC	UNITED KINGDOM	0.49%
SAMSUNG SDI CO LTD	SOUTH KOREA	1.68%
SCATEC SOLAR ASA	NORWAY	1.21%

SEOUL SEMICONDUCTOR CO LTD	SOUTH KOREA	1.71%
SIEMENS GAMESA RENEWABLE ENERGY	SPAIN	1.45%
SIGNIFY NV	NETHERLANDS	1.71%
SINO-AMERICAN SILICON PRODUC	TAIWAN	1.21%
SMA SOLAR TECHNOLOGY AG	GERMANY	1.21%
SOLAREDGE TECHNOLOGIES INC	UNITED STATES	1.21%
SPCG PCL	THAILAND	0.35%
SUNPOWER CORP-CLASS A	UNITED STATES	1.21%
SUNRUN INC	UNITED STATES	1.21%
SUPER ENERGY CORP PCL	THAILAND	0.35%
TAKUMA CO LTD	JAPAN	1.13%
TANAKA CHEMICAL CORP	JAPAN	0.48%
TERRAFORM POWER INC	UNITED STATES	1.21%
TESLA INC	UNITED STATES	1.71%
TPI COMPOSITES INC	UNITED STATES	1.45%
TRANSALTA RENEWABLES INC.	CANADA	1.45%
UNISON CO LTD	SOUTH KOREA	0.41%
UNITED RENEWABLE ENERGY CO LTD	TAIWAN	0.35%
UNIVERSAL DISPLAY CORP	UNITED STATES	1.71%
VEECO INSTRUMENTS INC	UNITED STATES	0.49%
VERBIO AG	GERMANY	0.32%
VERBUND AG	AUSTRIA	0.73%
VESTAS WIND SYSTEMS A/S	DENMARK	1.45%
VIVINT SOLAR INC	UNITED STATES	0.35%
VOLTABOX AG	GERMANY	0.48%
WASION HOLDINGS LTD	CAYMAN ISLANDS	0.49%
WEST HOLDING	JAPAN	0.35%
WILLDAN GROUP INC	UNITED STATES	0.49%
W-SCOPE CORP	JAPAN	0.48%
XINJIANG GOLDWIND SCIENCE & TECH.	CHINA	1.45%
XINYI SOLAR HOLDINGS LTD	CAYMAN ISLANDS	1.21%

Addition for Q2 2019: Northland Power.

Deletions for Q2: Energy Absolute, Green Plains, Maxwell, Servion SA..

Appendix V:

Wilderness New Energy Global Innovation Index (NEX) - Historical Sector Weights Information.

Historical Sector Weight Information: NEX

Sector Weights At Start Of Each Quarter*	Energy Conversion - ECV	Energy Efficiency - EEF	Energy Storage - ENS	Renewables - Biofuels & Biomass - RBB	Renewables - Other - ROH	Renewable - Solar - RSR	Renewable - Wind - RWD
Q1 2019	1.42%	30.07%	9.36%	8.48%	4.49%	20.72%	25.46%
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%

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

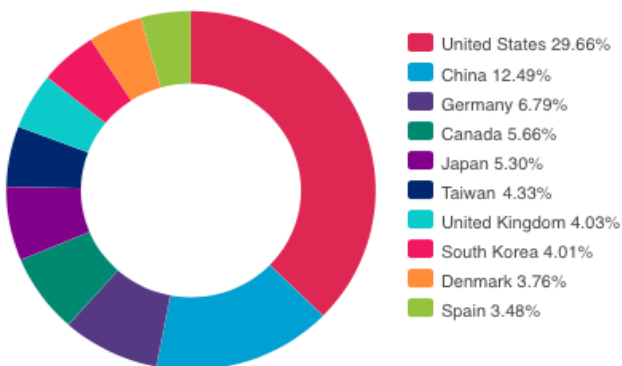
https://nexindex.com/historical_sectors.php

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

Country Allocation in an Independent tracking Fund, PBD on March 14, 2019:

Top Country Allocation

as of 03/14/2019



Source: Invesco

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>

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