



Q1 2020 Quarterly Report: WilderHill Clean Energy Index[®], March 31, 2020

The Clean Energy Index[®] ([ECO](#)) began 1st Quarter 2020 around 70 and it ended Q1 near 56, down -20%; but there was more to this Q1. A remarkable, volatile, exhilarating, frightening, roller coaster Q1 first had gone up sharply +30%, over 90 in mid-February, then crashed latter Q1 to below 50. Intra-day moves were abrupt: in a few hours March 24, ECO sprang up +15%. Or seen longer since 2017, when the ECO Index[®] was 38, last 3 years it's risen some +55%. An independent tracking fund at start of 2017 was about 18.5, start of 2018 was about 25.5, start of 2019 was about 21.5, start of 2020 around 34 and at end of Q1 fell to around 27.

ECO passively captures an emerging highly volatile theme; it thusly can & does at times also 'drop like a rock' - as was amply proven for instance Q1 2020. Big gains have occurred here - as well too as bigger declines. Plus we offer a mere observation: it's counter-intuitive perhaps yet ECO's theme has now spiked up at times in Bush II & Trump Presidencies - though neither greatly promoted green energy. Meanwhile drops were seen 8 years of an Obama Presidency that favored this sector (yet 2008-2016 was a bit singular as China undertook to enter and gain major market share in clean energy, a goal that since came to fruition).

Look back last 5 years at Benchmark ECO Index[®], live since 2004 & 1st for climate solutions, and it's near nil, negligibly up a few percent. Yet this too is notable; over these same 5 years traditional dominant energy themes are instead all far negative, as fossil fuels have plunged. Coal is off some -50% so trails ECO badly, oil down about -70%, gas is off -75%. Coal, oil, & gas are thus far behind 'green' energy last 5 years. For 10 years too energy is down widely, fossils again down most, the green energy themes having 'strongest' relative returns here.

Clean energy *worldwide* can also be seen by WilderHill[®] New Energy Global Index (NEX) and by a 2nd global index (not ours) with fewer constituents; they've traded places the last 1, 5, 10 years, etc. Still, both green baskets have similarly outperformed too vs. dominant energy. A result is the clean benchmark ECO, along with global clean stories have all done relatively 'much better' mostly all periods here - sharply contrasting against fossil fuel stories.

Live performances since 2004 strongly indicate that traditional coal, oil, & natural gas arguably no longer cover a broad energy story: we therefore hypothesize clean energy has become more than just 'niche.' Best-known is the ECO Index[®] that has outperformed vs. fossil fuels last 1, 5, 10, 15 years & more; plus, ECO, NEX & OCEAN all offer 'climate solutions'. Benchmark ECO, NEX, OCEAN show non-correlation vs. fossil fuels, and each embodies ESG perspectives that may help diversify a model portfolio.

Very volatile, even more so past Q1, here's Clean Energy Index[®] ECO to late 1st Quarter:



Source: NYSE.com

This Quarter was noteworthy several ways, so let's look more-closely at a Chart to late Q1. One intriguing item is currently crashing oil prices. Oil demand is collapsing due to global undertakings to refrain from activity and avoid auto/air travel: as businesses slow, oil supplies have begun stockpiling. So much so, that where to put the oil in a few months has become a real question. Normally given slackening demand, oil supply can & will be curtailed.

Instead Saudi Arabia & Russia have *Ramped Up* production wrestling for control. Thusly prices crashed -60%, oil dropping from \$60 to near \$20. Bigger still, *demand* is recently dropping tremendously by some -20%, -25% (or more) due to activity halting in pandemic. End of first half-2020 there may be 1.8 billion surplus barrels of crude, yet 'only' 1.6 billion barrels of storage capacity. Prices may later bounce up ahead: the pandemic can become endemic; a million oil patch jobs could disappear, and some rigs be shut-ins, all conditions for price rises ahead once production capacity is well-gutted - but for now, Q1 2020 this is as it was.

An unusual facet too is that it meant coal - long the dirtiest yet very cheapest energy source - became the most-costly. Fracking years ago pushed-down natural gas costs as seen in charts ahead; the gas theme is down -90% (and 15% of U.S. coal power plants have lately closed). Now even Brent Sea crude is down to \$26/barrel; with Australian coal at some \$57/metric ton, it puts coal roughly as equivalent by an analysis to oil at \$27; thus broadly-speaking has crude gone cheaper than coal. As storage capacity fills, low grades may grow even negative in cost, less than zero! These 2 fossils don't much compete; coal's used in stationary power - unlike say, light sweet crude oil made into gasoline or heavy sour crude for asphalt, but a thing is coal became the most-dear. Tellingly as leveled Solar & Wind power costs fall too, not only has coal been turning into the most-costly vs. oil & natural gas - but indeed coal has even been getting more costly many places than much cleaner, better renewables.

Another item of intrigue was the plunge in markets worldwide, as well as a steep brief bounce-back late Q1 in Indexes, even more so within clean energy. All made Q1 noteworthy indeed. Here then is a Q1 Chart to March 26, 2020 showing a clean energy story via ECO & NEX trackers - plus for the three fossil fuel themes - and two U.S. Indexes, Dow, and S&P500.

These two 'best performers' here are ECO & NEX - seen in independent trackers (PBW & PBD) down 'just' some -15% to -20%. By contrast, oil is far down some -60%, coal down near -40%. ECO & NEX are doing a bit 'better' too than major Index Dow, and S&P500. All are clearly down Year to Date. But, the two ECO & global NEX clean energy stories were earlier far up near +30% and +20% respectively in 2020 (solar much up too), maybe of small interest.



Source: yahoofinance.com

Next is ECO the prior rolling 12 Months - here in a Chart going late-March 2019 to late-March 2020 - along with several green as well as the dominant brown energy themes. In this 1-year period we see at very bottom that both oil & coal are yet again most down via 2 passive Indexes/trackers; both themes similarly down some -55%. Only somewhat 'above' them and therefore *still much down* is the 3rd fossil, natural gas down about -45%. Thus the 3 dominant dirty/brown fossil fuels are clumped lower via their trackers off about -45% to -55%.

Next up is the DowJones, a major Index that's 'only' off near -18%. After a large gap and doing substantially 'better' are rather-related much greener themes. There's an independent NEX tracker for global clean energy mainly outside the U.S., similarly a passive competing tracker for global green energy albeit having fewer constituents, the ECO Index tracker, and then a Solar tracker that's highest up. Unlike the 3 traditional fuels, these 4 greener stories are all near or just above water/positive, even after a tremendous fall.

Last 1 Year to late-March 2020:



Source: yahoofinance.com

Interestingly perhaps these 4 green energy alternatives had all been very positive to mid-Feb. 2020, just before a March global crash. Two most up were a solar Index and ECO clean stories, going well up over +70% & +60%; 2 others across global green energy were up too to February. Only with a tremendous fall in March 2020, did these greener themes go underwater. By contrast all 3 brown fossil fuels started out & remained almost entirely, quite down.

That March crash wasn't negligible. ECO went from most all of its components well up Year to Date (YTD), and Index itself up +30% in mid-February - to being far down YTD late March, each ECO component but one then down as seen in a table below. All but 5 components in the NEX, & OCEAN went negative YTD too by late March, shown in a table below.

Consider too that at the end of 2019, this past 1-year clean energy story & so ECO had gained some +59% over 12 months. Hence not only as compared to dirty energy - but also vs major market Indexes, ECO had out-performed even vs. broad markets. So much so, it turned in a very positive 5 years at end of 2019. ECO hitting highs in Q4, extending to mid-Feb. 2020.

So let's look farther back at Past 5 years. Note though that until recently each rolling Past 5-Year Chart had shown most all energy-related, clean energy & dirty energy, as negative - extending fully across energy. Yet that monolithic view is lately changing, a lot.

Back at end of 2019, the past 5-year Chart suddenly broke sharply with the past. Clean energy & solar-alone showed very positive last 5 years - up near +50% and +60% and therefore well up - unlike any fossil fuel - for striking divergence of clean vs. dirty. Two factors were at play in ECO's recent 5-year Chart in that it a) began leaving 3 Down years, 2014-2016, and b) was capturing 3 strongly Up years, 2017-2019 - this in the ECO NEX, OCEAN, & Solar-themes.

Late Q1 2020 things fell very fast, so changing 5 years feel as well. As seen below in early 2020, ECO is the most up in energy - yet it's near nil, NEX is just negative, and a global clean theme is below that. Clear out-performance by clean vs dirty persists, but most all, most everywhere, is in dramatic free-fall. More broadly mid-Feb. to mid-March the S&P500, and Dow declined -30%, fastest-ever onset of a bear market. Benchmark Dow dropped enormously from near 30,000 to 20,000(!); Oil plummeted more. ECO fell strongly latter Q1 from over 90, to under 50, down -50%. Hence latter Q1 all dropped, if only to differing degrees, globally. (But Past 5 Years benchmarks Dow, S&P and Nasdaq have remained well positive here).

What Rolling 5-year charts in Energy may show ahead may be interesting as 2010s scroll away. It's impossible to know of course, what in store: *clean* energy could perhaps, unlike recently see more singular drops as 2020s arrive, especially post-big-gains here 2017-2019. Or not. But a Rolling view will soon move past a 2014-2016 lag period in energy vs. major Indexes. And, notably, the 2010s once-long-viewed as very tough times across energy - *may instead* show it as a period just tough only for fossil fuels. A long out-performance shown by clean vs dirty over 2010s had long persisted in that decade - and it conceivably **might** well continue.

On the other hand (there's always 'the other hand!'), 2020 as noted is seeing fast-slowning in attention, auctions, deals in clean energy - with the sudden unexpected pandemic. Attentions of government are very understandably, suddenly elsewhere. Regardless of that in Jan. 2020 China proposed a 50% cut in subsidies for large new solar projects as they near parity.

ECO tracker & NEX tracker plus varied other clean & fossil fuels themes a past Rolling 5 years from early 2015 to early 2020; What were once 'tough times' across all energy widely has increasingly differentiated of late - with clean greatly outpacing dirty:



Source: bigcharts.com

Let's look back to rolling prior 10 years, roughly a decade from early 2010 - to early 2020. Tangentially note a Great Recession had happened here just *before* 2010; it thundered over stocks and dropped many to nadirs around mid-2009. That made bottoms for many varied **non-energy** stories, with some rebounding post-2009. But **not so here in energy**. As seen below, many energy themes went on falling even after 2009, no great-rebounding.

Hence unlike gains in 3-year view from 2017 to 2019, a rolling 10 years below has all far Down. Included are several clean as well as brown CO2-laden fossil themes for a consistent tale of pervasive huge declines - the pain is felt very broadly. Below all 3 fossil fuels plus solar-alone story here trail behind clean energy themes, again by inarguably large amounts.

Natural Gas is lowest in this rolling 10 years down over -90%! - as it becomes a lower-cost fuel. 'Above it' albeit still down deeply is a passive Oil story: even after spiking at times, oil is steeply down near -90%. Near it and far down too is Coal; despite rising some at times it's down hard by over -80%: that CO2-laden coal story has rallied briefly perhaps on political hopes, but it mainly fell as coal faces fundamental economic headwinds.

'Somewhat above' the 3 fossil fuels this time is a passive Solar-only tracker; despite the recent gains coming prior to latter-Q1 2020 fall - it's here down over a past decade off roughly -65%. Unusually then a focused green Solar-only theme joins nearby Natural Gas, Oil & Coal - with all 4 much down **when seen over a past decade**.

Above them after a large gap, is another independent global clean energy theme down about -47%. Then a tracker for clean energy benchmark ECO, off here near -43%. After a sizable gap well 'above' those 6 stories - is Global clean energy story highest via passive NEX; that said *it's still down* some -15%. In sum ECO is down here even *after* rising hard 2019. Yes, both ECO & NEX are **less down** than Solar, Oil, Coal, and Gas - yet they're both *still down*. On the other hand these passive clean energy stories for NEX, ECO, and a 3rd for global clean energy did clearly 'best' these last 10 years - vs. all these other energy stories here.

Rolling Past 10 Years from early 2010 to early 2020:



Source: yahoofinance.com

Thinking about these last 10 notable years in energy above, another broadly significant point is quietly standing out. This needn't be mused as a possibility ahead, nor predicted; it's the fact that *coal has already lost tremendous portion of the energy pie last 10 years*. As Yogi Berra said, "It's tough to make predictions, especially about the future" - and so let's first observe this important shift that's already unfolded strongly over the past decade.

Back say in 2005, there was little thought given to the idea coal might see such dramatic loss. At that time, 'king coal' made up neatly 50% of electric power generation. Given increases (small in absolute terms, large as percentage gains) in renewables solar & wind that cut coal in incremental amounts - natural gas more so - they took coal 'down' to some 45% by 2010.

But in a last 10 years, coal really dropped from accounting for nearly ½ - to now down under ¼ of power generation. Now, the renewables are 20%+ and rising, natural gas near 40%. The Why, is easy. A noted shale revolution last decade drove down natural gas cost tremendously, seen in all charts above. That cut into coal badly. If a power plant's to be built to have a 40 year-life, it's only sensible to choose a clearly inexpensive fuel long-term. It became natural gas which doesn't suffer opprobrium & pollution that vexes coal, has ample domestic supply, is embraced as safe & smart by the power industry. Smaller plants can be started/ stopped for peaking demand - unlike coal. Natural gas was an easy choice over coal, delivering dispatchable firm power, safe fuel-term cost dynamics; it was popular and unquestioned.

What's perhaps more interesting, is a change long in making we're just beginning to see unfold. It's that lately (even) with a pandemic, a shutting-in of people & shutting-down of much industry - renewables are now poised to perhaps gain further market share - this even in a tough market - and in fact **due to** current/new conditions. It's well-explained in a recent piece from Raymond James, March 30, 2020 so we'll except it unusually at length:

"Amid COVID, U.S. Power Use Set for Record Fall in 2020 - Renewables Gain Record Share

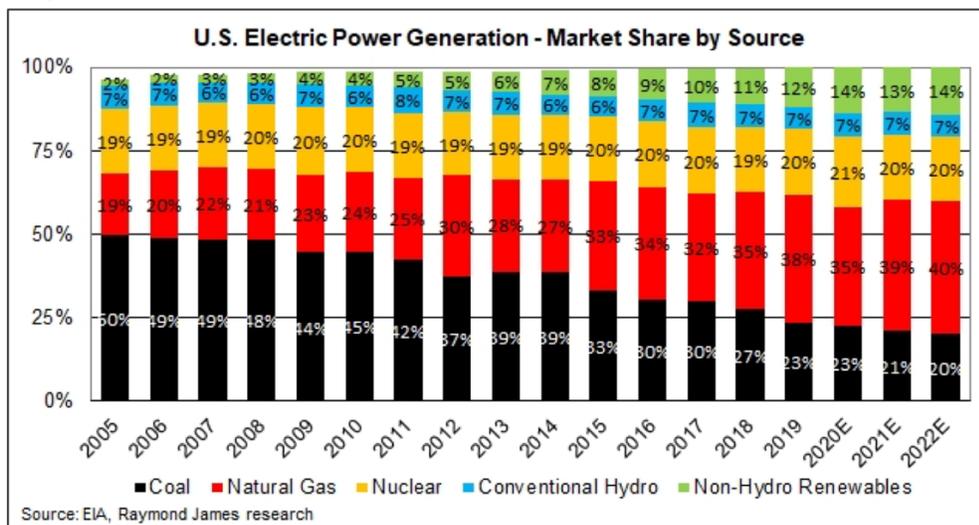
RENEWABLE ENERGY AND CLEAN TECHNOLOGY

*"... It may not "feel" like much has changed in the electric power sector - in contrast to how much you pay for fuel at the pump, your personal utility bill is **not** about to plummet - but that simply reflects the largely regulated nature of the sector. In actuality, U.S. power usage is set to drop more steeply in 2020 than in any year at least over the past two decades. However - and this is why we are writing about this through the lens of clean tech - renewables are poised to gain more share in 2020 than ever before. This is **not despite** the tough industry backdrop - in fact, it is **because** of that backdrop.*

*".... **U.S. power usage was down 5% in 2008 and 2009 combined - the drop in 2020 will likely be even steeper.** Not surprisingly, the last significant drop was in 2009: 4.1%. Combined with the 0.9% drop in 2008, the combined drop over the two years of the financial crisis was 5.0%. So, how bad will 2020 be? With the important caveat that the duration of the lockdown policies as well as other economic dislocation is still very much an open question at this early stage, we are modeling 2020 down 7.0%, followed by a commensurate recovery in 2021 (again, following the pattern of the financial crisis).*

....
....

“Renewables are set to surpass 20% of the electricity mix, while coal and (to some extent) gas feel the pain of the fall-off in usage. When power usage falls abruptly - whether due to weather or economic factors - which power plants are most resilient? The short answer is: those with the lowest cash operating costs - "cash" being the key word. The upfront (capital) cost of the plants is a moot point when generators decide which plants to keep operating, and which to temporarily shut down. Accordingly, it makes sense that wind and solar plants - which have close to zero cash costs - will keep operating no matter how long the pandemic lasts. Essentially the same holds true of hydro. Combining non-hydro renewables (which are growing in absolute terms) with hydro (which is static), we forecast that the share of renewables in the U.S. electricity mix will be 20.7% in 2020, up from 18.3% in 2019, as shown below. This 240 bp share gain is the largest ever - albeit in the context of a smaller market, i.e. reduced power usage. So, who will lose share? Coal, of course, would have lost share even under normal circumstances, reflecting the relentless continuation of pre-planned plant retirements. As things stand, it is likely that some additional coal plants will be temporarily shut down - and a few of those shutdowns may be converted into permanent retirements. Perhaps less intuitively, gas is set to lose share as well, though this is purely a temporary phenomenon. We estimate that one-quarter of the power sector's gas consumption is used in peaking power plants. In periods of ultra-depressed demand, peakers are, by definition, some of the first plants to shut down. Even though the economics of gas-fired generation are certainly attractive at sub-\$2.00/Mcf Henry Hub gas prices, gas peakers still have higher cash costs as compared to wind and solar.



Source: Raymond James, Industry Brief.

Briefly, that RJ analysis above is a fascinating perspective. Fuel costs doubtless play a major role in prioritizing power generation; we saw that when falling natural gas fuel prices, grew prospects for more gas-fired power plants. More recently we've seen oil prices plummet - though it pays to be wary - this 'ain't the first rodeo' for cheap oil - it seems to always sow seeds of cyclical oil-rises later as rigs are shut-ins, expertise and production capacity lost. This time too the lack of oil storage capacity may have depressive effects, distorting matters. Note then *Renewable Fuel is Free*: the sun doesn't cost, nor wind.

Lastly in terms of these charts, a small problem alluded to in *rolling* Charts like past 10, 15 years etc is in a few years they *may* begin to show stronger relative returns for ECO. Once Charts leave a fall in ECO like 2008-2012, relative drops removed ahead, then ECO *may* show far stronger relative gains. For that reason, a view is needed with ECO's declines preserved: hence this new Chart below; it starts from a fixed 2008 going into 2020s ahead. While a long-running ECO tracker could have allowed this to begin farther back, mid-2005, other trackers didn't all commence until later - so earliest feasible start for all is mid-2008.

Over then 12 years & growing, this last *non-rolling* chart shows again a tale of pervasive declines. Unsurprisingly all fossil fuels again trail far behind green energy by big amounts. But relative to the rolling past 10 years above, another new difference stands-out; a global crash in 2008 / 2009 is now brightly highlighted here and very strongly forever preserved.

So this shows Enormous(!) drops all across energy, starting just after steep run up mid-2000s. That prior bull run had been largely captured earlier by ECO which increased mid-decade. But starting here mid-2008 as other trackers commence, it's near peaks of an about to be global Plunge. That crisis/crash would similarly catch-up countless themes globally, yet the bog & a mire afterwards here is definitely preserved and seen across clean and dirty energy:

Last Roughly 12 Years starting from a Fixed July 1, 2008, to early 2020:



Most at bottom again like a past 10 years are fossil fuels, oil, and gas - plus now solar-only; the 3 + coal fell greatly. 'Higher' is a separate global clean energy index (not ours) and then an active-managed alternative energy fund. Next is ECO Index; and as noted clearly 'highest' here is the Global clean energy NEX tracker though it is still quite negative.

Just parenthetically we'll repeat that the major Indexes capturing themes far outside energy did much 'better' these years. Yet, they're much different; energy may make-up say only 5% of S&P500. And after 2017-2019 plus huge drops early 2020, much yet may change.

A memorable 1st Quarter crash in late February to mid-March left only one ECO component still positive for the Year to Date (YTD) on March 18, 2020(!), so we'll now take a closer look at big downturns to that day. Below are the individual components for their YTD % changes, and Past 52 weeks % changes at the March 18 low for the three Indexes, ECO, NEX, and OCEAN. (ECO composition seen as of Q1; the latter 2 Index compositions are as of coming new Q2).

Lest this Quarterly Report overly dwell on negative downturns, following this, we'll next look at a brief, sharp +25% gain within 1-week too. Increases were significant and abrupt at times: on March 24th, heavy moves in that morning pushed up ECO some +15%, one of the strongest changes seen in just hours. From a close March 23rd of 48.75 (on fears of possible 25% U.S. Unemployment & global Depression), ECO Index jumped in those few hours to a high of 55.87, closing at 55.74 on hopes for Phase 3 U.S. Rescue/Stimulus of an unprecedented \$2 Trillion(!). It then looked like no green stimulus might be in Phase 3, as indeed came to pass, yet clean energy is increasingly cost-competitive without subsidies (unlike fossil fuels/nuclear, which always need support). So a reviving economy could help boost renewables - though they're under *huge* pressure, now. In 3 days ECO rallied up +25% - followed by another fall.

But first let's see these Down figures at a so-far low on March 18, 2020. That memorable day the ECO Index first opened at 51.88, then dropped to intra-day low of just 45.85 and so lost -12.57% in a day as it closed at 47.37. That was about half a 93.65 high it recently saw intra-day on Feb. 20, 2020, when it had closed at 92.53. In about a month then ECO had plummeted -50%, a time major Indexes worldwide too were crashing amidst huge fears of a possible new Depression ahead. Fear was rampant including throughout clean energy as seen here:

ECO Index, 3/18/2020. Components Ascending Order; % Change YTD very roughly -33%.

<u>Name</u>	<u>YTD % Change</u>	<u>52-week % Change</u>
Bloom Energy Corp	-58.9%	-76.3%
Hexcel Corp	-57.2%	-54.9%
Vivint Solar Inc	-54.7%	-36.5%
Woodward Inc	-53.0%	-42.2%
Advanced Energy Industries Inc	-50.1%	-27.4%
Itron Inc	-49.4%	-15.2%
MYR Group Inc	-48.9%	-53.2%
Workhorse Group Inc	-48.4%	103.9%
TPI Composites Inc	-48.0%	-67.9%
Universal Display Corp	-47.8%	-32.2%
First Solar Inc	-46.0%	-45.5%
Veeco Instruments Inc	-45.9%	-31.8%
JinkoSolar Holding Co Ltd	-44.4%	-39.9%
Sociedad Quimica y Minera	-40.5%	-60.0%
Willdan Group Inc	-40.2%	-46.7%
American Superconductor Corp	-40.1%	-65.9%
NIO Inc	-39.6%	-59.2%

Canadian Solar Inc	-39.0%	-42.6%
Sunnova Energy International Inc	-37.3%	----
SunPower Corp	-36.9%	-26.0%
Renewable Energy Group Inc	-36.3%	-24.5%
Sunrun Inc	-35.6%	-39.4%
Gentherm Inc	-34.6%	-22.9%
Quanta Services Inc	-33.3%	-27.4%
Livent Corp	-32.5%	-55.9%
Atlantica Yield PLC	-27.0%	-2.4%
ESCO Technologies Inc	-25.3%	-0.2%
Cree Inc	-25.1%	-39.7%
Solaredge Technologies Inc	-19.3%	94.4%
Daqo New Energy Corp	-16.3%	21.5%
TerraForm Power Inc	-14.2%	-6.2%
Air Products and Chemicals Inc	-14.2%	9.0%
Tesla Inc	-13.7%	35.1%
Plug Power Inc	-10.4%	11.9%
Ormat Technologies Inc	-10.2%	25.8%
Enphase Energy Inc	-8.2%	160.8%
Albemarle Corp	-5.5%	-19.5%
Ameresco Inc	-2.1%	-0.9%
Ballard Power Systems Inc	2.1%	124.2%

NEX Index, 3/17 & 3/18/2020. Components Ascending; % Change YTD very roughly -25%.

<u>Name</u>	<u>YTD % Change</u>	<u>52-week % Change</u>
Bloom Energy Corp	-58.9%	-76.3%
Ricardo PLC	-58.0%	-52.3%
Vivint Solar Inc	-54.7%	-36.5%
Itron Inc	-49.4%	-15.2%
Hannon Armstrong Sustainable	-48.8%	-32.8%
TPI Composites Inc	-48.0%	-67.9%
Universal Display Corp	-47.8%	-32.2%
Nordex SE	-47.4%	-53.9%
GS Yuasa Corp	-47.3%	-45.2%
First Solar Inc	-46.0%	-45.5%
Veeco Instruments Inc	-45.9%	-31.8%
JinkoSolar Holding Co Ltd	-44.4%	-39.9%
Verbio Vereinigte Bioenergie AG	-44.3%	-9.7%
Meidensha Corp	-42.7%	-12.2%

SMA Solar Technology AG	-42.5%	-14.2%
CropEnergies AG	-41.8%	15.0%
Landis+Gyr Group AG	-41.1%	0.9%
Gigasolar Materials Corp	-40.8%	-25.3%
Sociedad Quimica y Minera	-40.5%	-60.0%
Willdan Group Inc	-40.2%	-46.7%
Lextar Electronics Corp	-40.2%	-45.7%
CS Wind Corp	-39.6%	-45.9%
NIO Inc	-39.6%	-59.2%
Canadian Solar Inc	-39.0%	-42.6%
Caverion Oyj	-38.3%	-25.5%
eREX Co Ltd	-37.8%	4.5%
Sunnova Energy International	-37.3%	----
SunPower Corp	-36.9%	-26.0%
Renewable Energy Group Inc	-36.3%	-24.5%
Sunrun Inc	-35.6%	-39.4%
Verbund AG	-35.1%	-24.7%
Xinjiang Goldwind Science	-34.0%	-42.9%
GCP Infrastructure Investments	-33.9%	-39.8%
Gurit Holding AG	-32.9%	1.3%
Signify NV	-32.8%	-24.7%
Everlight Electronics Co Ltd	-32.4%	-34.7%
Greencoat UK Wind PLC	-31.4%	-24.3%
Renova Inc	-31.2%	-14.3%
Audax Renovables SA	-29.8%	-28.8%
Nibe Industrier AB	-27.1%	9.5%
Atlantica Yield PLC	-27.0%	-2.4%
Vestas Wind Systems A/S	-26.8%	-14.5%
Renewables Infrastructure	-26.3%	-14.1%
Eolus Vind AB (publ)	-25.8%	64.2%
Kingspan Group PLC	-25.1%	-8.3%
Cree Inc	-25.1%	-39.7%
Encavis AG	-24.0%	12.6%
Ecopro Co Ltd	-23.8%	-54.4%
TransAlta Renewables Inc	-22.2%	-9.2%
Falck Renewables SpA	-21.7%	31.0%
Solaredge Technologies Inc	-19.3%	94.4%
Siemens Gamesa Renewable	-18.8%	-12.5%
Epistar Corp	-17.9%	-4.6%
Xinyi Solar Holdings Ltd	-17.0%	8.2%

Daqo New Energy Corp	-16.3%	21.5%
Mercury NZ Ltd	-16.2%	10.9%
Contact Energy Ltd	-16.2%	-17.2%
Meridian Energy Ltd	-16.0%	7.5%
Sino-American Silicon	-15.3%	11.8%
TerraForm Power Inc	-14.2%	-6.2%
Tesla Inc	-13.7%	35.1%
Orsted A/S	-13.0%	12.2%
Neoen SA	-12.9%	38.7%
Northland Power Inc	-11.6%	2.3%
EDP Renovaveis SA	-11.5%	5.5%
Tilt Renewables Ltd	-11.5%	22.2%
Credit Suisse Real Estate Green	-11.2%	0.7%
Plug Power Inc	-10.4%	11.9%
Ormat Technologies Inc	-10.2%	25.8%
Terna Rete Elettrica Nazionale SpA	-9.1%	3.4%
Enphase Energy Inc	-8.2%	160.8%
Innervex Renewable Energy Inc	-8.2%	8.6%
Byd Co Ltd	-6.9%	-30.3%
Novozymes A/S	-6.3%	-1.5%
Samsung SDI Co Ltd	-6.1%	-12.0%
Albioma SA	-5.8%	14.2%
West Holdings Corp	-5.4%	44.6%
Solaria Energia y Medio	-4.5%	34.6%
Canvest Environmental	-2.8%	-8.6%
Ameresco Inc	-2.1%	-0.9%
Boralex Inc	-2.0%	25.3%
Powercell Sweden AB	-1.6%	144.2%
Scatec Solar ASA	0.1%	24.5%
Nel ASA	1.5%	62.6%
Acciona SA	2.4%	2.2%
Xinyi Energy Holdings Ltd	10.3%	----
Ballard Power Systems Inc	13.3%	140.5%

OCEAN, 3/17 & 3/18/2020. Components Ascending; % Change YTD very roughly -23%.

<u>Name</u>	<u>YTD % Change</u>	<u>52-week % Change</u>
Itron Inc	-49.4%	-15.2%
Evoqua Water Technologies Corp	-48.7%	-28.9%
First Solar Inc	-46.0%	-45.5%
Wartsila Oyj Abp	-45.3%	-62.0%
Cargotec Corp	-44.5%	-50.4%
Pentair PLC	-44.0%	-41.3%
Bollore SE	-41.5%	-37.0%
Landis+Gyr Group AG	-41.1%	0.9%
CS Wind Corp	-39.6%	-45.9%
Canadian Solar Inc	-39.0%	-42.6%
Sunnova Energy International Inc	-37.3%	----
Pure Cycle Corp	-37.0%	-20.7%
SunPower Corp	-36.9%	-26.0%
Sunrun Inc	-35.6%	-39.4%
Grieg Seafood ASA	-35.4%	-10.6%
Verbund AG	-35.1%	-24.7%
Xinjiang Goldwind Science	-34.0%	-42.9%
Torm PLC	-33.0%	1.2%
Signify NV	-32.8%	-24.7%
Nomad Foods Ltd	-31.1%	-22.4%
Beyond Meat Inc	-28.5%	----
Alfa Laval AB	-28.5%	-16.3%
Nibe Industrier AB	-27.1%	9.5%
Veolia Environnement SA	-27.0%	-9.4%
Kurita Water Industries Ltd	-26.9%	1.5%
Vestas Wind Systems A/S	-26.8%	-14.5%
Intertek Group PLC	-26.6%	-12.3%
Eolus Vind AB (publ)	-25.8%	64.2%
Kingspan Group PLC	-25.1%	-8.3%
Cree Inc	-25.1%	-39.7%
Koninklijke Boskalis Westminster NV	-23.9%	-34.2%
Tassal Group Ltd	-23.8%	-40.5%
Watts Water Technologies Inc	-23.6%	-5.4%
Kuehne und Nagel International AG	-22.7%	-6.5%
Austevoll Seafood ASA	-22.3%	-28.6%
Cia Pesquera Camanchaca SA	-21.3%	-34.3%
Badger Meter Inc	-21.3%	-10.8%

Solaredge Technologies Inc	-19.3%	94.4%
Metawater Co Ltd	-18.9%	19.2%
Mowi ASA	-17.9%	-1.8%
Norway Royal Salmon ASA	-17.7%	10.3%
Xinyi Solar Holdings Ltd	-17.0%	8.2%
Clearwater Seafoods Inc	-16.7%	-12.1%
Xylem Inc	-16.6%	-16.5%
P/F Bakkafrøst	-16.5%	30.1%
Meridian Energy Ltd	-16.0%	7.5%
Sino-American Silicon Products Inc	-15.3%	11.8%
Leroy Seafood Group ASA	-13.8%	-16.9%
SalMar ASA	-13.7%	1.0%
Tomra Systems ASA	-13.4%	6.9%
Essential Utilities Inc	-13.1%	12.4%
Orsted A/S	-13.0%	12.2%
Neoen SA	-12.9%	38.7%
EDP Renovaveis SA	-11.5%	5.5%
Tilt Renewables Ltd	-11.5%	22.2%
Samsung SDI Co Ltd	-6.1%	-12.0%
Solaria Energia y Medio Ambiente SA	-4.5%	34.6%
Powercell Sweden AB (publ)	-1.6%	144.2%
Nel ASA	1.5%	62.6%
California Water Service Group	5.4%	2.1%
American Water Works Company Inc	6.3%	24.7%
American States Water Co	7.7%	31.8%
Ballard Power Systems Inc	13.3%	140.5%

Let's also see a brief very sharp +25% upturn in ECO near end of March, when conversely most everything shot Up: only 4 components negative that week in ECO. This 1-week snapshot was taken Thursday, March 26th, 2 days after the heavy buying morning of March 24th drove up ECO some +15%, one of fiercest gains in hours (Dow was up too +9.4% that day). From a close Monday March 23rd at 48.75, ECO jumped up to a 55.87 high closing at 55.74 on the 24th. On the 25th ECO closed at 58.11, up another +4.25% (Dow up +1.2%). On the 26th, ECO got into 60 (Dow up +6.2%). Those 3 up days were notable, as was a +25% gain in ECO, and Dow up 12%. (All steeply fell on the 4th day). Here's that 1-week % change for ECO components,

ECO Index 3/26/2020. Components Ascending Order; 1-Week % Change, all about +25%.

Albemarle Corp	-12.6%
Livent Corp	-6.4%
Air Products and Chemicals Inc	-5.2%
Ameresco Inc	-3.2%
Ormat Technologies Inc	0.2%

Willdan Group Inc	4.2%
Cree Inc	10.9%
Gentherm Inc	11.5%
Quanta Services Inc	12.0%
Ballard Power Systems Inc	13.1%
NIO Inc	13.6%
Canadian Solar Inc	14.7%
First Solar Inc	15.2%
American Superconductor Corp	15.5%
ESCO Technologies Inc	15.6%
Atlantica Yield PLC	15.7%
Renewable Energy Group Inc	16.9%
Solaredge Technologies Inc	17.2%
Woodward Inc	18.1%
TerraForm Power Inc	18.6%
Veeco Instruments Inc	22.9%
Universal Display Corp	24.8%
FuelCell Energy Inc	26.4%
Hexcel Corp	28.5%
Advanced Energy Industries Inc	30.3%
Workhorse Group Inc	30.6%
JinkoSolar Holding Co Ltd	31.7%
MYR Group Inc	34.6%
SunPower Corp	35.6%
Plug Power Inc	35.7%
Itron Inc	35.8%
Sunrun Inc	36.6%
Sociedad Quimica y Minera de Chile SA	38.8%
Daqo New Energy Corp	39.7%
Tesla Inc	49.3%
TPI Composites Inc	51.4%
Enphase Energy Inc	53.4%
Vivint Solar Inc	54.1%
Sunnova Energy International Inc	70.4%
Bloom Energy Corp	73.6%

Best Gainers this 1-Week have no clear pattern, as they're in Solar, Wind Power composites, Fuel Cells, Electric Vehicles, Lithium for Advanced Batteries, Energy Efficiency etc. But they so show some inverse relationship to Biggest Losers in the past 52-weeks farther above, so perhaps not-too-surprisingly meant some possible component regression to mean.

So mid-Feb. to mid-March, the DowJones had fallen -26%(!), most down in a month since the -30% crash in Sept 1931 during the Depression. Likewise ECO dropped that and more so, down -50% from Feb. peaks. And yet: ECO snapped up too, even more than general markets: it jumped +25% in 3 days when it went from near 46 to 60 in March 24/25/26 (it then fell back on the 27th). That was a leap in 3 days. It was of course unpredictable; timing markets is always an extremely vexing thought. Instead, might there be factor/s specific to clean energy that once again may cause acute impacts? Adding volatility, perhaps, even to upside?

Looking near-term for factor/s that may conceivably apply say chiefly to renewables, consider that a new Phase 4 or 5 Rescue Stimulus, (Green) tax credit *might* possibly give support for clean energy & EVs. If so they *could* e.g. extend the 30% Investment Tax Credit (ITC) for Solar, and the Production Tax Credit (PTC) for Wind - both are otherwise stepping down.

Either could be green stimuli to clean energy. In this pandemic China has slowed renewable energy manufacturing, and demand is slowing as well. Already a major auction for enormous new solar energy farms there has been halted, as China addresses this pandemic. Gears of a modern world economy are seizing of late, as velocity of money slows, and prospects clean energy growth dim during the slump. It's been decades since less solar was installed than in the year before, but it might happen this year. Yet that said, there's always new areas too potentially for real growth in clean energy; think of better batteries as a hardy perennial for improvement - and as a lodestone to expanding intermittent renewables & EVs. A new Paper March 9, 2020 in Nature Energy shows possibly higher energy & power density - in Li-Ion cathodes by oxygen redox, <https://www.nature.com/articles/s41560-020-0573-1>.

There's precedent for a green stimulus. A 2009 U.S. rescue package boosted climate-friendly sectors and action thanks to \$90 billion of \$800 billion. That tripled U.S. solar & wind power installations, it grew U.S. clean energy jobs from a few hundred thousand to 3+ million. While Europe considers a new green deal Carbon Tax, the U.S. Phase 3 rescue in 2020 instead helped heavily polluting carbon-spewing industries; it could be better in Phase 4 and more relevant. Energy was a challenge in Q1 as oil fell in an historic price collapse, but that sows seeds for future price jumps there - only lowest-cost producers can lift oil from ground for under \$10 /barrel like in the Middle East. Different then from more cyclical oil & natural gas industries, the renewables can earn and keep price declines that are stickier and welcome.

True, oil doesn't compete very directly with renewables. Power is generated by Natural Gas-fired-plants (less & less so from oil, or even coal). But the damage a pandemic wreaks, the crash in equities, and oil take our eyes off of the prize that's new climate change 'solutions'. A rising juggernaut that was clean energy just months ago is now throttled by a host of factors: economies prostate on their backs, a prior focus on climate change & CO2 lately diverted, demand for clean energy lightened (but cf. a possible European green carbon tax), solar & wind auctions waylaid, ITC/PTC incentivizing solar/wind stepping-down, and no one knows when economies or clean energy may regain recent robust confidence & growth. But... all this sets a stage for a *possible* snap-back - or alternatively, ECO could drop like a rock!

Long term clean energy alone can survive & thrive without subsidies. That cannot be said of fossil fuels with brittle supply chains, nor risky costly nuclear. Beside fuel risk, climate change always bedevils dirty energy, making *clean* seem a wiser choice very long-term.

Conclusion:

The Clean Energy Index® ([ECO](#)) began 1st Quarter 2020 around 70 and it ended Q1 near 56, down -20%; but there was more to this Q1. A remarkable, volatile, exhilarating, frightening, roller coaster Q1 first had gone up sharply +30%, over 90 in mid-February, then crashed latter Q1 to below 50. Intra-day moves were abrupt: in a few hours March 24, ECO sprang up +15%. Or seen longer since 2017, when the ECO Index® was 38, last 3 years it's risen some +55%. An independent tracking fund at start of 2017 was about 18.5, start of 2018 was about 25.5, start of 2019 was about 21.5, start of 2020 around 34 and at end of Q1 fell to around 27.

Look back last 5 years at Benchmark ECO Index®, live since 2004 & 1st for climate solutions, and it's near nil, negligibly up a few percent. Yet this too is notable; over these same 5 years traditional dominant energy themes are instead all far negative, as fossil fuels have plunged. Coal is off some -50% so trails ECO badly, oil down about -70%, gas is off -75%. Coal, oil, & gas are thus far behind 'green' energy last 5 years. For 10 years too energy is down widely, fossils again down most, the green energy themes having 'strongest' relative returns here.

Near-term, potentially a 4th Rescue Package ahead *might* include provisions for U.S. clean energy. If so, that could potentially be a catalyst for sizable volatility here once more.

There was 1 re-Addition of FCEL to clean energy ECO Index to start Q2 2020, and no Deletions. At the Global New Energy NEX Index, 2 Additions for Q2 were: Acciona (Spain) & Terna SpA (Italy); and there were 6 Deletions of China High Speed Transmission, Kandi Technologies, Meyer Berger, Seoul Semiconductor, Takuma Power, and United Renewable Energy.

As always, we welcome your thoughts and suggestions.

Sincerely,



Rob Wilder
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Appendix I:
ECO Index (via independent tracker PBW) Descending Weights latter-Q1 on 3/15/2020,
or about ~2 weeks before rebalance to start Q2 2020, 39 Stocks:

<u>Name</u>	<u>Symbol</u>	<u>Weight</u>
Tesla Inc	TSLA	3.94
NIO Inc ADR	NIO	3.77
Enphase Energy Inc	ENPH	3.73
Ballard Power Systems Inc	BLDP	3.56
Daqo New Energy Corp ADR	DQ	3.37
Plug Power Inc	PLUG	3.33
Ameresco Inc	AMRC	3.11
Renewable Energy Group Inc	REGI	3.08
TerraForm Power Inc	TERP	2.96
Sunnova Energy International Inc	NOVA	2.93
SolarEdge Technologies Inc	SEDG	2.93
Albemarle Corp	ALB	2.88
Bloom Energy Corp	BE	2.84
Willdan Group Inc	WLDN	2.61
Atlantica Yield plc	AY	2.60
ESCO Technologies Inc	ESE	2.58
Ormat Technologies Inc	ORA	2.58
Quanta Services Inc	PWR	2.57
Air Products & Chemicals Inc	APD	2.57
Sociedad Quimica y Minera	SQM	2.48
Vivint Solar Inc	VSLR	2.47
Gentherm Inc	THRM	2.46
Itron Inc	ITRI	2.39
Sunrun Inc	RUN	2.34
Universal Display Corp	OLED	2.34
JinkoSolar Holding Co Ltd ADR	JKS	2.32
Canadian Solar Inc	CSIQ	2.32
TPI Composites Inc	TPIC	2.30
MYR Group Inc	MYRG	2.24
Livent Corp	LTHM	2.23
Veeco Instruments Inc	VECO	2.21
Cree Inc	CREE	2.14
Hexcel Corp	HXL	2.10
Woodward Inc	WWD	2.02
Advanced Energy Industries Inc	AEIS	1.99
SunPower Corp	SPWR	1.93

First Solar Inc	FSLR	1.90
Workhorse Group Inc	WKHS	1.48
American Superconductor Corp	AMSC	0.40

ECO Year to Date via Tracker to a March 18 Low; Big Declines Across Many Varied Themes:



Source: bigcharts.com

ECO via Independent Tracker Rolling 3 Years to March 18 Low; seen here is a fall in 2018 just before 2019 perhaps 'amplifying' Year 2019's Returns; also a Big plunge late Q1 2020:



Source: bigcharts.com

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

INDEX (ECO) SECTOR & STOCK WEIGHTS FOR START OF Q2 2020. 40 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 - 20% weight (8 stocks @2.50% 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 - 22% sector weight (9 stocks @2.44% each)

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

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

Bloom Energy, BE. Stationary fuel cells, not-yet cleanest/renewable fuels.

Cree, CREE. Power electronics, moved into power devices including for EVs.

ESCO Technologies, ESE. Power management, shielding, controls, testing.

FuelCell Energy, FCEL. Stationary fuel cells, for distributed power generation.

Gentherm, THRM. Thermoelectric, waste heat energy, battery management.

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

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

Power Delivery & Conservation - 20% sector weight (7 stocks @2.78% plus one *banded)

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

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

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 - 13% sector weight (5 stocks @2.60% each)

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

Sunnova, NOVA. Solar provider, operating fleet for residential plus storage.

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

TerraForm Power, TERP. Owns and operates solar/wind, a yieldco.

Vivint Solar, VSLR. Solar, residential plus storage, long-term contracts.

Energy Storage - 20% sector weight (7 stocks @2.78% each plus one banded)

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

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

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

Livent, LTHM. Lithium, and compounds for batteries in energy storage.

NIO Inc, NIO. Electric vehicles, China-based startup but loss-making so far.

Tesla Motors, TSLA. Electric vehicles, solar; pure-play EVs & energy storage.
Woodward, WWD. Converters, controls for wind power and energy storage.
**Workhorse*, WKHS. Electric Vehicles, electric delivery trucks early-stage.

Cleaner Fuels - 5% sector weight (2 stocks @2.50% each)

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

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

Appendix III: WilderHill New Energy Global Innovation (NEX) descending weights late-Q1 via independent tracker (PBD) on 3/15/20 or ~2 weeks before Rebalance for Q2 2020. 91 stocks:

Name	Symbol	Weight
Tesla Inc	TSLA	1.64
Samsung SDI Co Ltd	006400 KS	1.61
NIO Inc ADR	NIO	1.57
PowerCell Sweden AB	PCELL SS	1.55
Enphase Energy Inc	ENPH	1.55
Ballard Power Systems Inc	BLDP	1.49
Xinyi Energy Holdings Ltd	3868	1.48
BYD Co Ltd	1211	1.45
Daqo New Energy Corp ADR	DQ	1.40
Plug Power Inc	PLUG	1.38
Renewable Energy Group Inc	REGI	1.35
NEL ASA	NEL	1.32
EDP Renovaveis SA	EDPR	1.32
Albioma SA	ABIO FP	1.32
Neoen SA	NEOEN FP	1.30
Xinyi Solar Holdings Ltd	968	1.28
Solaria Energia y Medio Ambiente SA	SLR	1.28
Canvest Environmental Protection Group	1381	1.27
Credit Suisse Real Estate Fund Green Prop.	GREEN SW	1.26
Scatec Solar ASA	SSO	1.25
Boralex Inc	BLX	1.25
Eolus Vind AB	EOLUB SS	1.25
TerraForm Power Inc	TERP	1.24
Ecopro Co Ltd	086520 KS	1.23
Sunnova Energy International Inc	NOVA	1.23
SolarEdge Technologies Inc	SEDG	1.22
Innergex Renewable Energy Inc	INE	1.22
Ameresco Inc	AMRC	1.22
Epistar Corp	2448	1.20
Sino-American Silicon Products Inc	5483	1.19
Bloom Energy Corp	BE	1.18
Northland Power Inc	NPI	1.18
Encavis AG	CAP	1.17
Orsted A/S	ORSTED DC	1.14
Kingspan Group PLC	KSP	1.13
Gurit Holding AG	GUR SW	1.12
Novozymes A/S	NZYMB DC	1.11

Renewables Infrastructure Group Ltd/The	TRIG LN	1.11
Tilt Renewables Ltd	TLT	1.10
Seoul Semiconductor Co Ltd	046890 KS	1.10
Mercury NZ Ltd	MCY	1.09
China High Speed Transmission Equipment	658	1.09
Greencoat UK Wind PLC/Funds	UKW LN	1.09
Atlantica Yield plc	AY	1.09
GCP Infrastructure Investments Ltd	GCP LN	1.08
Vestas Wind Systems A/S	VWS DC	1.08
Meridian Energy Ltd	MEL	1.08
Takuma Co Ltd	6013	1.08
Ormat Technologies Inc	ORA	1.08
Xinjiang Goldwind Science & Technology Co Ltd	2208	1.07
Contact Energy Ltd	CEN	1.06
Gigasolar Materials Corp	3691	1.04
Vivint Solar Inc	VSLR	1.03
Sociedad Quimica y Minera de Chile SA ADR	SQM	1.03
TransAlta Renewables Inc	RNW	1.03
Falck Renewables SpA	FKR	1.02
Willdan Group Inc	WLDN	1.02
Siemens Gamesa Renewable Energy SA	SGRE	1.02
Everlight Electronics Co Ltd	2393	1.02
Nibe Industrier AB	NIBEB SS	1.01
West Holdings Corp	1407	1.01
Hannon Armstrong Sustainable Infrastructure	HASI	0.99
Sunrun Inc	RUN	0.98
Canadian Solar Inc	CSIQ	0.97
JinkoSolar Holding Co Ltd ADR	JKS	0.97
TPI Composites Inc	TPIC	0.96
CS Wind Corp	112610 KS	0.96
Audax Renovables SA	INVALID	0.95
Verbund AG	VER AV	0.95
United Renewable Energy Co Ltd/Taiwan	3576	0.94
Itron Inc	ITRI	0.94
Caverion Oyj	CAV1V FH	0.93
Universal Display Corp	OLED	0.92
Lextar Electronics Corp	3698	0.90
Signify NV	LIGHT	0.90
Cree Inc	CREE	0.89
SMA Solar Technology AG	S92	0.89

RENOVA Inc	9519	0.89
Veeco Instruments Inc	VECO	0.87
CropEnergies AG	CE2	0.85
Landis+Gyr Group AG	LAND SW	0.83
Nordex SE	NDX1	0.81
eRex Co Ltd	9517	0.81
Meidensha Corp	6508	0.81
VERBIO Vereinigte BioEnergie AG	VBK	0.80
SunPower Corp	SPWR	0.80
First Solar Inc	FSLR	0.79
GS Yuasa Corp	6674	0.78
Ricardo PLC	RCDO LN	0.77
Kandi Technologies Group Inc	KNDI	0.76
Meyer Burger Technology AG	MBTN SW	0.70

*NEX Index Methodology: After a 2019 Market Consultation & Announcement, NEX components have gone from Large / or Small weightings - to straight-equal-weights starting Q3 2019; additionally the NEX Sector Weights are assigned starting Q3 2019 according to # of Constituents in each NEX Sector (rather than by external Survey); these changes were effective Q3 2019.

** Effective 2019, WilderHill New Energy Global Innovation Index (NEX) calculated in \$ U.S. Dollars. (Previously also calculated in theoretical way in Euros, Yen, GB Pounds; now only in \$ USD).

Appendix IV:

WilderHill New Energy Global Innovation (NEX) - for start of Q2 2020. 87 Stocks.

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

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

Name	Description	Sector	Currency	Activity
Acciona	Operates Wind, Solar/Thermal, Hydro, Biomass plants.	RWD	EUR	SPAIN
Albioma SA	Biomass, sugarcane, hybrid combustion, cogeneration.	RBB	EUR	FRANCE
Ameresco	Energy savings, performance contracts, in renewables.	EEF	USD	US
Atlantica Yield plc	Yieldco, Contracted renewables, also transmission.	RSR	USD	SPAIN
Audax Renovables SA	Wind power, in Europe and the Americas.	RWD	EUR	SPAIN
Ballard Power Systems	Fuel cells; R&D, used in transportation and more.	ECV	CAD	CANADA
Bloom Energy	Stationary fuel cells, distributed but non-renewable.	ECV	USD	US
Boralex	Renewables generation, operates wind, hydro, solar.	RWD	CAD	CANADA
BYD Co.	Batteries, potential use in EVs, rail, solar farms, more.	ENS	HKD	CHINA
Canadian Solar	Solar, vertically integrated solar manufacturer, China.	RSR	USD	CANADA
Canvest Environmental	Waste to Energy, China-focused.	RBB	HKD	CHINA
Caverion OYJ	Energy efficiency, buildings, infrastructure, Europe.	EEF	EUR	FINLAND
Contact Energy	Electric Utility, offers power from geothermal, hydro.	ROH	NZD	NEW ZEALAND
Cree Inc.	LED manufacturer power-saving, efficient lighting.	EEF	USD	US
CropEnergies AG	Bioethanol, from cereals and sugarbeet, Germany.	RBB	EUR	GERMANY
Credit Suisse R. E. Grn.	Sustainability in buildings, real estate.	EEF	CHF	SWITZERLAND
CS Wind	Wind power, both onshore, also offshore.	RWD	KRW	S. KOREA
Daqo New Energy	Solar, high-purity polysilicon for solar wafers, China.	RSR	USD	CHINA
EcoPro	Battery materials, Pollution Control catalysts, S. Korea.	ENS	KRW	S. KOREA
EDP Renovaveis SA	Wind power, among largest producers in world, Iberia.	RWD	EUR	SPAIN
Encavis AG	Solar, large solar park operator, also wind, Germany.	RSR	EUR	GERMANY
Enphase	Inverters, micro-products for solar panels, storage.	RSR	USD	US
Eolus Vind	Wind power, also consulting services for wind.	RWD	SEK	SWEDEN
Epistar	LEDs, large LED manufacturer in Taiwan.	EEF	TWD	TAIWAN
eRex Co. Ltd.	Power generation, bus./ residential, biomass, Japan.	RBB	JPY	JAPAN
Everlight Electronics	LEDs, large manufacturer in optoelectronics, Taiwan.	EEF	TWD	TAIWAN
Falck Renewables SpA	Renewable wind, biomass, WtE, solar, Europe.	RWD	EUR	ITALY
First Solar	Thin film solar, CdTe low-cost alternate to polysilicon.	RSR	USD	US
GCP Infrastructure	Trust invests in renewables, based in Jersey U.K.	RSR	GBP	BRITAIN
Gigasolar Materials	Solar, conductive pastes in PV panel manufacturing.	RSR	TWD	TAIWAN
Greencoat UK Wind plc	Infrastructure fund, invested in U.K. wind power assets.	RWD	GBP	BRITAIN
GS Yuasa	Battery technologies, also Lithium for EVs, Japan.	ENS	JPY	JAPAN
Gurit Holding AG	Composite Materials in wind, lightens cars, planes.	RWD	CHF	SWITZERLAND
Hannon Armstrong	Energy efficiency, capital & finance for infrastructure.	EEF	USD	US
Innergex Renewable	Renewable power, run-of-river hydro, wind, solar.	ROH	CAD	CANADA

Itron	Meters, Utility energy monitor, measuring & manage.	EEF	USD	US
JinkoSolar	Solar, wafers through solar modules, China OEM.	RSR	USD	CHINA
Kingspan Group plc	Efficient Buildings, insulation for conservation, Ireland.	EEF	EUR	IRELAND
Landis+Gyr Group AG	Advanced meters, modernizing grid, Switzerland.	EEF	CHF	SWITZERLAND
Lextar Electronics Corp	LEDs and efficient displays and lighting.	EEF	TWD	TAIWAN
Meidensha Corp	Energy management, power generation & transmission.	EEF	JPY	JAPAN
Mercury NZ	Clean power, 100% renewable hydro, geothermal.	ROH	NZD	NEW ZEALAND
Meridian Energy	Hydroelectric power stations, some wind, New Zealand.	ROH	NZD	NEW ZEALAND
Nel ASA	Hydrogen, fuel cell vehicles, renewably, Norway.	ECV	NOK	NORWAY
Neoen SA	Renewable energy mainly solar, some wind.	RSR	EUR	FRANCE
Nibe Industrier AB	Heating & cooling, sustainable technologies, Sweden.	EEF	SEK	SWEDEN
Nio	EVs, design, manufacture, and sale including SUVs	EEF	USD	CHINA
Nordex SE	Wind turbines, based in Germany/Europe, worldwide.	RWD	EUR	GERMANY
Northland Power	Wind, solar, biomass; power producer, Canada.	RWD	CAD	CANADA
Novozymes A/S	Biofuels, enzymes used in partnerships, Denmark.	RBB	DKK	DENMARK
Ormat	Geothermal, works too in recovered heat energy.	ROH	USD	US
Orsted A/S	Sustainable wind, also biomass, thermal, Denmark.	RWD	DKK	DENMARK
Plug Power	Small fuel cells, e.g. in forklifts; drop in replacements.	ECV	USD	US
Powercell Sweden	Fuel cells, transportation, marine, stationary uses.	ECV	SEK	SWEDEN
Renewable Energy Grp	Biodiesel, natural fats, oils, grease to biofuels.	RBB	USD	US
Renewables Infrastr.	Wind Farm & Solar Park revenues assets, U.K.	RWD	GBP	BRITAIN
Renova	Wind, Solar, Biomass, power generation in Asia.	RWD	JPY	JAPAN
Ricardo plc	Global Engineering, energy, environment, transport.	EEF	GBP	BRITAIN
Samsung SDI	Batteries, innovative energy storage, EVs, South Korea.	ENS	KRW	S. KOREA
Scatec Solar ASA	Solar power parks worldwide.	RSR	NOK	NORWAY
Siemens Gamesa	Wind, onshore & offshore, turbines, gearboxes, Spain	RWD	EUR	SPAIN
Signify NV	Lighting, systems increasing efficiency, Netherlands.	EEF	EUR	NETHERLANDS
Sino-American Silicon	Solar, semi-conductor silicon wafer materials, Taiwan.	RSR	TWD	TAIWAN
SMA Solar Technologies	Inverters for solar, industrial scale storage, Germany.	RSR	EUR	GERMANY
Sociedad Quimica Chile	Lithium, a key element in advanced batteries, Chile.	ENS	USD	US
Solaria Energia	Solar, renewable power generation, Iberia.	RSR	EUR	SPAIN
SolarEdge	Inverters, panel-level solar optimizers, micro-inverters.	RSR	USD	US
Sunnova	Residential solar and energy storage installation.	RSR	USD	US
SunPower	Solar, efficient PV panels with rear-contact cells.	RSR	USD	US
Sunrun	Residential solar, leasing, PPA or purchase rooftop PV.	RSR	USD	US
Terna SpA	Transmission of electricity, increasingly is renewables.	EEF	EUR	ITALY
TerraForm Power	Owns runs solar/wind, in developed nations, yieldco.	RSR	USD	US
Tesla	Electric vehicles, solar; in EVs & energy storage.	ENS	USD	US
Tilt Renewables	Wind Farms, Australia and New Zealand, some solar.	RWD	NZD	NEW ZEALAND
TPI Composites	Wind Blades; also light-weighting for transportation.	RWD	USD	US

TransAlta Renewables	Renewables, operating wind power, some hydro.	RWD	CAD	CANADA
Universal Display	Organic light emitting diodes, efficient displays.	EEF	USD	US
Veeco instruments	Thin film equipment LEDs, energy efficient electronics.	EEF	USD	US
Verbio Vereinigte BioEn.	Biofuels, manufacturer supplier to Germany, Europe.	RBB	EUR	GERMANY
Verbund AG	Electricity supplier, hydro, a large provider for Austria.	ROH	EUR	AUSTRIA
Vestas Wind A/S	Wind, wind turbine manufacturing & services, Denmark.	RWD	DKK	DENMARK
Vivint Solar	Solar, one-stop installer direct to homes sales model.	RSR	USD	US
West Holdings	Solar, Japan-focused residential and commercial PV.	RSR	JPY	JAPAN
Willdan Group	Energy efficiency in infrastructure, engineering.	EEF	USD	US
Xinjiang Goldwind	Wind, large turbine manufacturer, China.	RWD	HKD	CHINA
Xinyi Energy Holdings	Solar Farms, a spin-off from Xinyi solar glass, China.	RSR	RSR	CHINA
Xinyi Solar Holdings	Solar, ultra-clear glass products, China.	RSR	HKD	CHINA

Appendix V: NEX Sector Weights for start of New Quarter Q2 2020

Changes to NEX Index for Q2 2020:

2 NEX ADDITIONS for Q2 2020: ANA.MC; TRN.MI

Acciona (ANA.MC)

Terna SpA (TRN.MI)

6 NEX DELETIONS for Q2 2020

China High Speed Transmission (0658.HK)

Kandi Tech. (KNDI.OQ)

Meyer Burger
(MBTN.S)

Seoul Semiconductor (046890.KQ)

Takuma (6013.T)

United Renewable Energy (3576.TW)

WEIGHT EACH COMPONENT

1.14942529

87 stocks/100 = Individual Weights for Q2 2020

87 Stocks for Start of Q2 2020.

NEX SECTOR

WEIGHTS for Q1 2020:

	<u>SECTOR</u>	<u>QUANTITY</u>	<u>% Sector Weight</u>
Energy Conversion	ECV	5	5.7%
Energy Efficiency	EEF	20	23.0%
Energy Storage	ENS	6	6.9%
Renew. Biofuels & Biomass	RBB	7	8.0%
Renewables - Other	ROH	6	6.9%
Renewable - Solar	RSR	23	26.4%
Renewable - Wind	RWD	20	23.0%
		<hr/>	<hr/>
		87	100.0 %

Appendix VI:

Historical Weights: WilderHill New Energy Global Innovation Index (NEX).

Sector Weight Start of Each Quarter*	ECV Energy Conversion	EEF Energy Efficiency	ENS Energy Storage	RBB Renewables - Biofuels & Biomass	ROH Renewables - Other	RSR Renewable - Solar	RWD Renew - Wind
Q4 2019	4.00%	23.00%	8.00%	10.00%	6.00%	26.00%	23.00%
Q3 2019	3.77%	22.64%	9.43%	9.43%	5.66%	26.41%	22.64%
Q2 2019	1.40%	29.72%	9.11%	6.13%	4.41%	21.75%	27.49%
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%

*To early 2019, NEX Sectors and Weights had been based partly on dividing companies into either large or small and an external survey of companies deemed active in new energy: results adjusted for factors including exposure to new energy and some exchange restrictions. Subsequently, starting Q3 2019 components instead were equal weighted, and respective sector weights assigned in accordance with number of Index components assigned to each NEX sector, adjusted if necessary as determined by Index Provider and reviewed each quarter.

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

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

³ HF (Hydrogen And Fuel Cells) became HFC (Hydrogen & Fuel Cells) after 2007 and then changed it's 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.

[Appendix VII, Clean Ocean Index \(OCEAN\) Composition in late Q1 2020:](#)
[INDEX \(OCEAN\) SECTOR & STOCK WEIGHTS Q1 \(as of latter March\) 2020. 63 STOCKS.](#)

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

*Stocks all equal-weighted; for more on OCEAN, see <https://cleanoceanindex.com>

<u>Clean Ocean (OCEAN) Components</u>	<u>Theme</u>	<u>Activity</u>	<u>Sector</u>
Alfa Laval AB	Fluid Handling, controls, on vessels.	Sweden	WT
American States Water	Water and Wastewater Services.	USA	WT
American Water Works	Water and Wastewater Systems.	USA	WT
Aqua America	Water and Wastewater Services.	USA	WT
Austevoll Seafood ASA	Seafood in Norway; also pelagics Chile, Peru.	Norway	SF
Badger Meter	Water Metering.	USA	PP
Ballard Power	Fuel Cells, mid-sized PEM.	Canada	CE
Beyond Meat	Plant-based meats, less impactful proteins.	USA	PP
Bolloré SA	Ports, Terminals, Logistics, Transportation.	France	GS
California Water Service	Water and Wastewater Utility Services.	USA	WT
Canadian Solar Inc	Solar, panel manufacturer.	Canada	CE
Cargotec OYJ	Ports & Terminals, attention to Sustainability.	Finland	GS
Cia Pesquera Camanchaca SA	Fishing, aquaculture, sustainability, Chile.	Chile	SF
Clearwater Seafoods	Wild Caught Seafoods, Nova Scotia, Argentina.	Canada	SF
CREE	LEDs Lighting.	USA	PP
CS Wind	Wind, towers.	S. Korea	CE
EDP Renovaveis SA	Renewables, across wind, hydro, solar.	Spain	CE
Eolus Vind AB	Wind power projects in Sweden, US, Estonia.	Sweden	CE
Evoqua	Water, wastewater treatment.	USA	WT
First Solar	Solar, thin film panels.	USA	CE
Grieg Seafood ASA	Seafood, aquaculture with high ESG scores.	Norway	SF
Intertek Group plc	Cargo and Trade services, quality assurance.	Britain	PP
Itron	Smart Grid Power and Water Management.	USA	PP
Kingspan Group PLC	Building Insulation.	Ireland	PP
Koninklijke Boskalis Westminster	Dredging for Ports, Maritime Transportation.	Netherlands	GS
Kuehne und Nagel	Shipping Logistics, clean cargo group.	Switzerland	PP
Kurita Water	Water Treatment, wastewater systems.	Japan	WT
Landis & Gyr	Smart Metering, Better Grid	Switzerland	PP
Leroy Seafood Group	Seafood, with high FAIRR Report score.	Norway	SF
Meridian Energy	Power generation 100% from renewables.	New Zealand	CE
Metawater	Water purification, sewage treatment plants.	Japan	WT
Mowi ASA	Seafood, with high FAIRR Report score.	Norway	SF
Nel ASA	Hydrogen, made from renewable resources.	Norway	PP
Neoen S.A.	Renewables, using wind, solar, biomass.	France	CE
Nibe Industrier AB	HVAC, other areas in sustainability.	Sweden	PP

Nomad Foods	Moving to 100% Certified-sustainable seafood.	USA	SF
Norway Royal Salmon ASA	Fish farming, has low carbon footprint vs. beef.	Norway	SF
Orsted A/S	Wind, Offshore; also in bioenergy and thermal.	Denmark	CE
P/F Bakkafrøst	Seafood, with high FAIRR Report score.	Norway	SF
Pentair PLC	Water Efficiency and Treatment.	Britain	WT
PowerCell Sweden	Hydrogen, fuel cells, reformers, marine uses.	Sweden	CE
Pure Cycle	Water, supply and treatment.	USA	WT
SalMar ASA	Seafood, aquaculture with high ESG scores	Norway	SF
Samsung SDI	Li Ion Batteries.	S. Korea	CE
Signify NV	LEDs, was Philips Lighting.	Netherlands	PP
Sino-American Silicon	Solar feedstock, wafers.	Taiwan	CE
SolarEdge	Solar MicroInverters	USA	CE
Solaria Energia y Medio	Solar, Wind, power from renewables plants.	Spain	CE
Sunnova Energy	Residential Solar and Energy Storage.	USA	CE
SunPower Corp	Solar, efficient panels manufacturer.	USA	CE
Sunrun Inc	Solar, residential Installer.	USA	CE
Tassal	Seafood, aquaculture with high ESG scores.	Australia	SF
Tilt Renewables	Wind Farms, Australia & New Zealand, solar.	New Zealand	CE
Tomra Systems ASA	Recycling wastes, materials recovery.	Norway	PP
TORM plc	Shipping tankers, bulk, CSR, exhaust reduction.	Denmark	GS
Veolia Environnement	Water and Wastewater Treatment.	France	WT
Verbund AG	90% of power from Hydro, Austria.	Austria	CE
Vestas Wind Systems A/S	Wind power, in both products and services.	Denmark	CE
Wartsila OYJ	Ports, Terminals, energy with sustainability.	Finland	GS
Watts Water Technologies	Water quality, rainwater harvest, flow control.	USA	WT
Xinjiang Goldwind Science & Tech.	Wind, turbine manufacturer, also in services.	China	CE
Xinyi Solar Holdings Ltd	Solar glass, has spun off solar farms.	China	PP
Xylem	Water Technologies.	USA	WT

For Rebalance in Q1 2020 of OCEAN Index
4 Deletes: VBKG.DE; AOS.N; PNEGn.DE;
HLF.TO

2 Adds: EOLUb.ST; LSG.OL

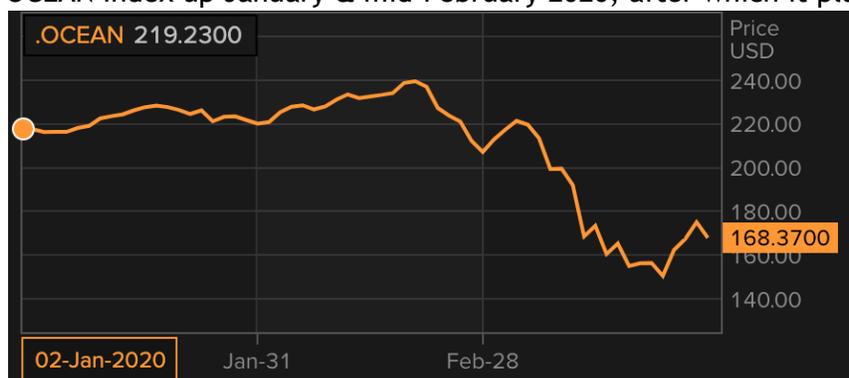
Equal Weight = 63/100 = 1.5873015%
each:

1.58730

<u>SECTOR</u>	<u>#</u>	<u>Approx %</u>
GREENER SHIPPING (GS) =	5	8%
CLEAN ENERGY LOW CO2 (CE) =	21	33%
WATER TREATMENT (WT) =	13	21%
SUSTAINABLE FISHERIES (SF) =	11	17%
POLLUTION PREVENTION (PP) =	13	21%
TOTAL CONSTITUENTS =	63	

WilderHill Clean Ocean Index (OCEAN)
2020 Year to Date through March 27, 2020

The healthy ocean story first gained like other green themes and many Indexes globally, the OCEAN Index up January & mid-February 2020, after which it plunged to late March for Q1:



Source: screen TR Eikon

OCEAN Index,
 Or here is a longer view for OCEAN going almost 5 years November 2015 to March 27, 2020 (seen with Index Backtesting going back prior to inception November 18, 2019):



Source: screen TR Eikon

Guidelines: Clean Ocean Index (OCEAN) (Oct. 2019),
<https://cleanoceanindex.com/wilderhill-clean-ocean-index-guidelines>

To be eligible for potential Index inclusion, each financial instrument must have:

1. a primary listing in one of the countries that are part of the Developed Markets as defined by the Solactive Country Classification, plus South Korea, Taiwan or Chile; and
2. a Total Market Capitalization of at least USD 150 million.

Based on the Index Universe, the initial composition of the Index as well as any selection for an ordinary rebalance is determined on the Selection Day in accordance with the following rules:

For a company to be reviewed for consideration for inclusion in the Index, it must pass a screen by achieving an internal score of 3 or better out of 5 for oceans and sustainability. The scores are assigned based on recommendations of an Advisory Committee with experts in marine science and related fields.

The scores are qualitative emphasizing impacts for ocean health, biodiversity, preventing pollution, or lowering greenhouse gases. Sustainability & environment are emphasized. In determining the scores, there is a strong bias in favor of purer-play companies focused on products, goods, services for

- (i) clean healthy oceans;
- (ii) robust marine ecosystems;
- (iii) renewable energy and efficiency;
- (iv) sustainability;
- (v) water treatment;
- (vi) greener ports;
- (vii) better efficiency in shipping;
- (viii) pollution prevention upstream such as greener alternatives, eco-thinking such as in agriculture, non-meat substitutes; or
- (ix) climate change solutions.

Companies in emerging related fields ahead may be considered too with respect to their advancing or reflecting this clean ocean sector. In addition, the purer-play companies need to derive significant value from their environmental-relevant activities. There is a clear focus on companies providing more sustainable solutions with a particular focus on advancing healthy oceans. These include for example companies reflecting certified fishing practices, low-carbon renewable energy, and prevention of coastal pollution in the first place.

In addition, external ESG scores of B- (or equivalent) or better for E (Environmental) criteria are generally required to be held by at least 90% of those companies reviewed for consideration for inclusion in the OCEAN Index that do have an ESG score. Scores for the ESG filter process are derived from recognized ESG data providers.

Owing to the fact attention to oceans is in early stages, with sustainability an emerging theme, smaller-cap and mid-sized companies may have a leading role in Index composition. High volatility is expected. Sustainability is 'baked in' here. So too is attention to environment among Environmental, Social, and Governance (ESG) considerations, and concern for climate solutions, and impact investing.

On each Selection Day, each Index Component is assigned equal weight.

Philosophy Behind the newest WilderHill Clean Ocean Index

As the world's first for healthy marine life, vibrant seas and climate change solutions, a priority of WilderHill® Clean Ocean Index (OCEAN) is to define and track this new sector: specifically, businesses that stand to benefit substantially from a societal transition towards more robust healthy seas, use of cleaner energy, renewables, and conservation.

The ***Precautionary principle*** which aims to avoid harms in the first place, is noted. We emphasize new solutions that make both ecological and economic sense, and aim to stay the leader in this field. Visit the website of the Calculation Agent, **Solactive**, for specifications, history, **developed** countries/exchanges list, and other information for live calculations of this WilderHill Index. Investors who wish to trade the clean ocean and climate solutions sector as defined by this WilderHill Index — via an independent fund — can contact their Broker. We note that Exchange-Traded Funds (ETFs) generally carry the characteristics of intra-day trading and transparency.

We subscribe to modern portfolio theory and believe that advantages of a passive transparent indexing approach are persuasive. We pursue qualitative, analysis-based stock selection according to ecological and technical considerations. Notably we don't change composition more often than Index rebalancings. We don't try to 'beat the market', nor try to pick perhaps 'under-valued' stocks. **Guidelines** for the Index are above and [here](#).

We do not take defensive positions within the Index when markets decline, appear over-valued, or the Index is experiencing unusual volatility. Rather than try to select Index components based on futuristic predictions or potential financial or market data, we robustly look at clean healthy oceans and climate solutions broadly conceived, and review stocks and sectors on their ecological, environmental and technical criteria. We judge our performance by how well the Index tracks the movements of a still-emerging clean healthy oceans & climate solutions sector – downwards and upwards – and anticipate significant ongoing volatility and risks in this new sector.

We apply qualitative analysis to determine OCEAN Index components, equal-weighted at the rebalances for start of each Quarter. Criteria include importance of the stock and sector to clean healthy oceans, relevance to climate change solutions, to pollution prevention, technological significance, intellectual property rights, salience to preserving marine biodiversity, ecosystems structure, function, integrity, and other non-financial criteria. The Index may be a diversification tool. Given inherent volatility of this sector with many small companies and strong price changes both down or up, this WilderHill Index is expected to be notably very volatile as well.

Companies in emerging related fields will be considered with respect to impact upon marine biodiversity, carbon impact, and the degree to which they advance or reflect the clean ocean sector. While private, non-public companies cannot be included in the Index – we look forward to considering emerging public companies in exciting areas ahead such as sustainable alternatives to plastic, vegan seafood, and alternate foods & processes with much lower-carbon footprint.

