



Q4 2014 Quarterly Report: WilderHill Clean Energy Index®, December 31, 2014

4th Quarter began with the Clean Energy Index® (ECO) at 66 and it closed well down at 55 for a big loss in Q4 of -16.3%. For the whole year too ECO was down quite solidly -17.2%. Yet the theme didn't start 2014 by going down: Q1 was actually sharply up; it would fall negative YTD with drops to come in Q2, Q3 & Q4. In sum clean energy's theme and hence ECO first rose +20% to March, it after submerged to red for YTD by May, again in August, and finally in October after which it would not re-emerge in green the rest the year.

As usual we'll note too a much different Progressive Energy Index® (WHPRO) that excludes solar, wind, and pure play renewables - WHPRO is instead a 'brown' theme for reducing CO2 and pollution from fossil fuels, and improving efficiency among dominant energy today. Its story as so often was less volatility in Q1+Q2 than ECO, softer moves down, up, down. WHPRO first half 2014 didn't show huge volatility of ECO 'that can and does at times drop like a rock'. A bit unusually then WHPRO was volatile in 2H firmly going down - plummeting from being up by some +5% YTD in July, to near -25% down by December.

Next look at WilderHill® New Energy Global Innovation Index (NEX) for clean energy *worldwide* mainly outside the U.S.: that theme moved differently than ECO by showing less downturn in Q3/Q4. Though it initially gained less than ECO, next 9 months it saw fewer declines and finished out 2014 well above both ECO and WHPRO. By December, when ECO / WHPRO were then down over -20%, NEX was down 'only' -5%.

A spread then between NEX & ECO grew Q2-Q4 (after they'd finished Q1 about same). From September in particular, ECO (and WHPRO) moved sharply downwards at about a same time that oil markets worldwide too also saw energy prices going into free fall.

To sum up 4th Quarter, ECO again showed aggressive declines so continuing Q2 & Q3 - quite unlike initial sharp rises in Q1. NEX did 'relatively' well in Q3/Q4 by quite a lot, while WHPRO was in middle ground. For a whole year global NEX held relatively higher values than ECO and WHPRO, and it ended down but closer towards nil. Below is the ECO Index over this very down Q4 2014 for an-entirely very ample sea of red:



A Summary of Past Year 2014 for the ECO, the NEX and WHPRO Indexes.

2014 is next summed up here for 3 Index themes: WilderHill® Clean Energy Index (ECO) in clean energy; WilderHill New Energy Global Innovation Index (NEX) for new energy worldwide mainly outside the U.S.; and WilderHill Progressive Energy Index® for improving efficiency and reducing pollution among fossil fuels and the ‘browner’ dominant energy today.

First here’s ECO Index® over a past 12 months, just through the end of November 2014:



source: Bigcharts.com

Looking above at those 52 weeks, the clean energy theme first rose as ECO hit a 2014 high early March near 82 - it next dropped to first a low in May - after which it rose a bit. Then as global Oil Prices started to plummet Q4 to levels not seen for years as OPEC kept up output, ECO joined action seen in many other energy themes including oil and it dropped strongly to end November near 55. (It would next fall strongly after this Chart ended in December 2014 to near 50, but we’ll cover just 12 months to the end-of-November in text here).

Given these moves it may be interesting to ask: What *individual* components in ECO’s theme **most** contributed to drops late November 2013 - to the end of November 2014? Here next are leading decliners in ECO expressed by % Declines from 52-week Highs (*omitting components <\$200M market cap at rebalance for Q4 because those were banded @ just 0.5% weight in the Index and thus were less impactful last Quarter*):

- SZYM **-82.30%** Solazyme: biofuels.
- BLDP **-71.35%** Ballard Power: mid-size fuel cells manufacturer.
- SSNI **-70.14%** Silver Spring Networks: smart grid.
- PLUG **-66.60%** Plug Power: small fuel cells manufacturer.
- FCEL **-62.87%** FuelCell: large fuel cells, stationary high temp.
- POWR **-61.12%** PowerSecure: smart grid, demand response.
- YGE **-60.07%** Yingli: solar panel manufacturer.
- SOL **-54.47%** ReneSola: wafers, for silicon solar PV.
- HSOL **-54.01%** Hanwha: solar panel manufacturer.
- AMRS **-50.98%** Amyris: biotech, Renewable biofuels.
- CREE **-46.60%** Cree: LED lights manufacturer.
- TSL **-45.13%** Trina: solar panel manufacturer.
- DQ **-40.71%** Daqo: solar, polysilicon/wafer manufacturer.
- OPWR **-40.15%** Opower: Utility software.

*(GTAT was removed intra-Quarter Q4 and so is not reflected here).

Glancing at this list above indicates some of the strong decliners in 2014 were in areas of:
Fuel Cells (as 3 components above are named from that universe - although
more will be said on fuel cells given their sharp volatility);
Solar (some solar names 'upstream' were down, yet others in solar increased); and
Biofuels (rather more like fuel cells since much of this theme is seen here).

To help further illuminate moves in 2014, let's look next at those that dropped *Least*.
Here next are the components that declined relatively little - compared to large drops above
- and so by late November these 'winners' were still close to their own highs:

APD **-0.60%** Air Products: hydrogen, an industrial gases supplier.
PPO **-3.18%** Polypore Intl: separator membranes in batteries.
ITC **-3.75%** ITC Holdings: advanced grid transmission.
CPN **-4.72%** Calpine: geothermal power from Utility.
SUNE **-6.12%** SunEdison: solar producer, also large solar farms.
ITRI **-6.42%** Itron: advanced metering for the grid.
ORA **-9.12%** Ormat: geothermal power.
CYT **-9.70%** Cytec: carbon fiber used in wind power, lightening.
PWR **-10.62%** Quanta Services: grid modernization.

Glancing at the above may give rise to a few thoughts. One is that **Grid-related and Metering** components in ECO, like ITC, ITRI and PWR did rise and then didn't fall as hard as say, volatile fuel cells over the 52-weeks. Another is that **Geothermal** components in ECO like CPN, ORA also were near highs not showing much decline. And while a supplier of hydrogen gas at top is near its high, it must be noted any H2 use for fuel cells is tiny in industrial gas demand and so it's no pure play wedded to fuel cell uses. Also seen here is a representative component in **battery** membranes, and a representative from lightweighting via **carbon fiber**.

But it's probably useful to look at this past year a third way too - for greatest Gainers.
So looking next at largest **Gaining** components from their 52-week lows these were:

PLUG **+537.10%** Plug Power: small fuel cells manufacturer.
ENPH **+154.63%** Enphase: microinverters, PV panel DC to grid AC.
TSLA **+112.51%** Tesla Motors: Electric vehicles, also in energy storage.
SUNE **+106.03%** SunEdison: solar producer, also large solar farms.
BLDP **+90.48%** Ballard Power: mid-size fuel cells manufacturer.
PPO **+79.38%** Polypore Intl: separator membranes in batteries.
THRM **+74.25%** Gentherm: thermoelectrics, waste heat to energy.
MXWL **+69.78%** Maxwell: ultracapacitors, energy storage.
POWR **+67.71%** PowerSecure International: smart grid, demand response.

Interestingly these names above reveal some crosscheck overlap in 2 of the 3 'extremes' lists.
PLUG for example both was farthest down from highs (down **-66.60%**) - and also had big gains
- being up a remarkable (**+537.10%**) from its past 52 week Lows. Similarly BLDP is on the
farthest down list (**-71.35%**) and farthest up off bottom list (**+90.48%**). Like BLDP, note that
PLUG is in volatile H2 fuel cells and sentiments vary strongly for that theme, from viable only
in niches like fork lifts ...to one day, maybe newer niches ahead - although near & mid-term
too technology clearly favors far, far more efficient **Battery** electric vehicles. In a BEV the
electricity is stored+used in a first place rather than made to H2 and back. (Many brilliant
engineers point out hydrogen fuel cells just *cannot* compete today - vs Li batteries).

A different crosscheck reveals components *both* near 52-week highs - and far off bottoms; clearly these names encouragingly surprised markets to upside, recently, and are near highs. This has a PV maker also in solar farms (SUNE), and a battery membrane manufacturer (PPO). Those two enjoyed some nicely freshening winds in their sails recently - but for how far ahead and how long exactly that fair sailing goes on ahead is of course unknown.

A couple simple truths may be inferred from above crosschecks. One is that the most highly volatile themes had as one might expect, strong variety of sentiments lately as to their viability and potential. Secondly no single idea overshadowed in 2014: solar had both its strong winners and its losers as e.g., users of PV downstream avoided margin-squeezes and tariffs going on upstream. That said the whole Solar-Only-theme that had gone Very Far down the past 5+ years (dropping more even than ECO), rose strongly in just the past 2 years. Meanwhile other areas like geothermal, and efficiency fared relatively 'well' in 2014.

Looking briefly at the NEX Index for Global Clean Energy Mainly Outside the U.S.

Next look at NEX in Q1. Here WilderHill New Energy Global Innovation Index (NEX) gained first a largish +11.2% and so compared to rest of 2014 to come, that first Q1 performance for NEX was rather notable. That was better than broad benchmark Indexes; for instance the S&P 500 by contrast rose +1.3%, MSCI AC World Index up +0.6%, and Nasdaq added +0.5%.

Seen more granularly the sharpest up here was an NEX Sector for Energy Conversion, up 75% (on fuel cells mainly), while Solar rose 23%, Power Storage up 11%, Biofuels/Biomass rose 8%, Energy Efficiency by 7%, and Wind Sector added 'just' 3%. Especially up then were Ballard, GT Advanced Tech., SMA Technology AG. Worst drops in Q1 included KiOR that plummeted, also big declines were seen at United Photovoltaics a Hong Kong solar developer, at Huaneng Renewables, at China Datang Renewable Power, and Fuel Systems Solutions.

2nd Quarter next saw a lesser advance (but still a Gain) for NEX: it was up +4.1% so to a robust +15% YTD. Meanwhile it was the NEX Sector for Biofuels & Biomass that led this way upwards with a gain of 17%; Power storage rose 10%, Wind 9%, Solar up 3% - with Efficiency up 2% ... and remember that Energy Conversion Sector which leapt 75% in Q1: it fell here by 20(!). In large part that reflected changing sentiments for H2 fuel cells, first Up, then Down hard.

Suzlon was s best performing name in Q3 within NEX with election of Modi seen as positive for this supplier of wind assets that potentially may add more reliable power for India. A Thai biodiesel producer Energy Absolute gained as did a Thailand solar producer, SPCG; in France there was a large gain by Blue Solutions. Losers in Q2 included PowerSecure, Quantum Fuel, Plug Power, and SMA Solar of Germany (the latter well up in Q1).

Further making Q1 gains an outlier in 2014, were Q3's strong NEX Declines of -7.4%. Broader Indexes were here near to flat, S&P 500 near nil, Nasdaq up just 1%, and MSCI AC World closing 2.8 lower. By end of Q3 NEX Index was up by 7% for YTD. Meanwhile Nasdaq was up by a roughly similar amount, S&P 500 up a little less, and the MSCI AC World Index only up by some 2% YTD. Note too in Q3 relatively 'good' performances were those down just less: here Biofuels and Biomass fell 'only' 3%, Wind dropped by a bit more, Energy Storage was off 4%, Energy Efficiency down 6%, and the often-volatile Solar was down by almost 10%. In all Q3 was a Quarter of declines for the NEX and broad benchmarks (but less so in NEX than ECO).

Best individual performers that period were Enphase, Dalian East, Intl. Rectifier, Xinjiang Goldwind Science & Technology, Energy Absolute PCL. Most down here was Suzlon (down 53% after prior Q2 gains), Rubicon, Maxwell, GT Advanced, and Seoul Semiconductor. Thus at start of September things were really moving to downside, and quickly so. Next 3-4 months would capture declines in NEX, but they were as noted much larger in ECO and WHPRO.

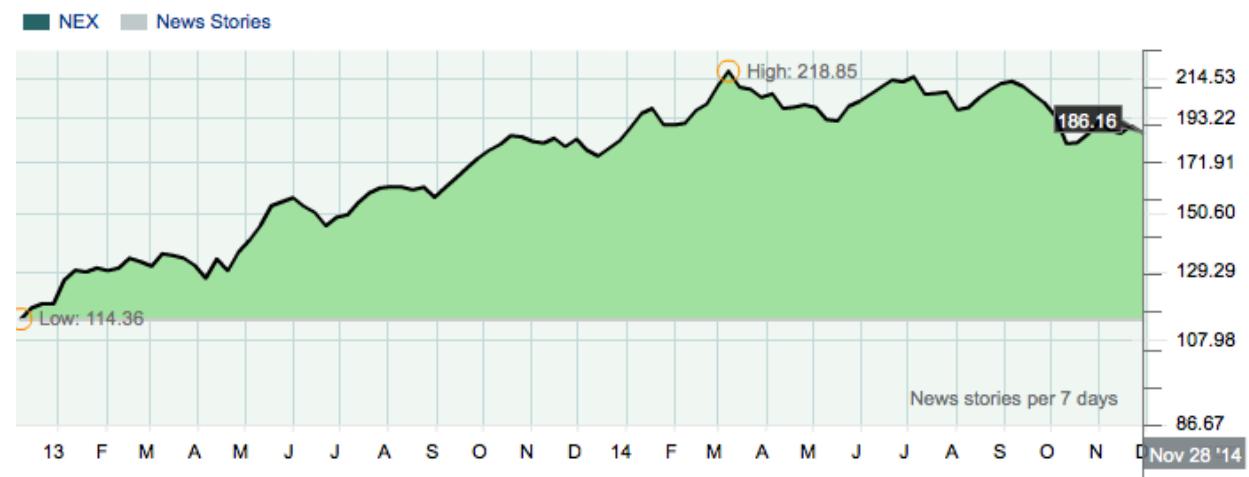
Unlike ECO that dipped several times YTD and then moved far into negative territory dropping near 20%, the NEX was just moving into the red YTD by late in November. Here is a Chart for NEX for 2014 YTD to end of November: it's almost all green - unlike ECO that displayed so much red over the latter part of the year - especially late in 2014:



source: Bigcharts.com

By 4th Quarter the NEX too like many energy Indexes was caught up in a swath of declines as oil plummeted on world markets. Oil globally dropped to levels not seen in some time - then dropped more, causing energy to swoon. NEX that had spent most 2014 positive after Q1, and still again after Q2, by November became negative YTD. Individual strong performers in Q4 included Hanergy Thin Film, AO Smith, China Longyuan Power, Kingspan.

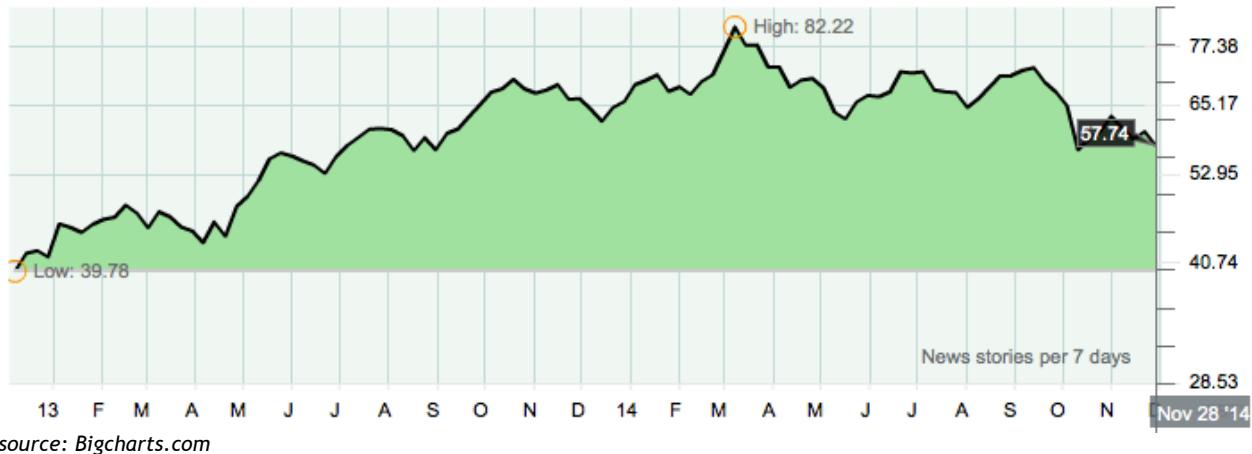
Look next at the past *Two years* for NEX: that looks much more positive:



source: Bigcharts.com

As does ECO past 2 Years; for past 2 years to end of November 2014.

 ECO  News Stories



However that past 2 years period comes up off recent bottoms for both ECO and NEX.

So there's a coincidence of low bottoms and starting period for a notably 'optimistic Chart'.

Here then are 2 Charts, one for past 4 years of NEX through end of November 2014:



And now a Chart for 10 years of ECO Index from August 2004 to end November 2014:



Looking above there were big gains of 2004 - 2007, then tremendous declines in 2008 - 2012, followed by an increase in the past 2 years coming off that thus-far-nadir of 2012.

And as always, what the future may bring is yet unknown...

Next consider a very different theme: WilderHill Progressive Energy Index® (WHPRO) for companies serving as an energy bridge for improving the near-term use of fossil fuels, better efficiency, and reducing CO₂ and pollution in dominant energy today. Unlike green ECO and NEX centered on clean energy innovation, WHPRO instead captures innovative technologies that can do better in dominant energy today such as natural gas, oil, and nuclear.

Here then are the leading decliners there in Progressive Energy Index (WHPRO) as expressed by their % Declines from their Past 52-week Highs to late Nov. 2014 (*omitting components <\$400M in market cap at Q4 rebalance because those were banded @0.5% only in this theme so had less impact*):

WPRT **-82.13%** Westport: vehicle use of gaseous fuels.
 GTI **-68.49%** Graftech: Graphite, in electrodes etc.
 GTLS **-63.17%** Chart Industries: Natural gas, LNG.
 MDR **-62.71%** McDermott: Infrastructure: reduces emissions.
 ABGB **-61.48%** Abengoa: Energy engineering & infrastructure.
 RTK **-54.26%** Rentech: Syngas; Gas to Liquids.

And here too for Progressive Energy it's probably useful to look at this theme too another way - from a view of its greatest Gainers. Look at WHPRO: its largest **Gainers** among components from 52-week lows up to late November were,

KNDI **+97.28%** Kandi Technologies: small urban EVs.
 TTM **+73.20%** Tata: small and nano-vehicles.
 GPRE **+70.25%** Green Plains: biofuels, ethanol.
 APOG **+60.71%** Apogee: advanced glass for better efficiency.
 ABGB **+53.70%** Abengoa: Energy engineering & infrastructure.

One item to note above is that 2 micro-car manufacturers in more efficient vehicles were in two top spots. Also a biofuels producer was up some 70% (in a period when many in that space did Not do well), and note ABGB would be both among the biggest losers down by over half in the past 52 weeks, and it was among the greatest gainers here up some 50%.

So like ECO and NEX Indexes, and many others in energy in Q4, there was a sharp downturn September to December 2014 with oil's plummet worldwide. Looking back much further to inception of that Index, here last is Progressive Energy WHPRO for the past 8 years going from October 2006 through end of November 2014:



A Look Back over 10 years for Clean Energy: ‘An Emerging Sector Just Growing Up’.

ECO Index® that was born August 2004 has now been calculating live for more than a decade. As the first Index to capture the clean energy theme it also provides the most robust data. With ECO having passed 10 years capturing & tracking clean energy and usefully being a leading Sector Benchmark, it might be interesting to look back a bit at what things were like in the early 2000s, how they’ve since changed and what might possibly be ahead.

First looking back it was arguably a few preceding years in the late 1990s that were important in giving rise to a need for creating the ECO Index in the first place. On the one hand it’s easy to remember still that the publicly-traded, pure play clean energy equities were sparse then; only a few highly-speculative, say solar firms were available, none robustly profitable. Clean energy was simply rare as an investment thesis. Similarly wind names were mainly unavailable, the same with electric vehicles, LEDs (none yet), Li-Ion batteries (no), geothermal, even energy efficiency options were few & far between to equity investors.

So the universe of possibilities was still small (compared for instance to ‘today’ and probably more so in comparison to ‘tomorrow’). But that didn’t mean it was without risk. In fact there was a significant risk of going to zero among the individual equities. Among the few clean energy companies available, it was impossible to know which say in solar might survive - and which not. Take e.g. Astropower - vs Evergreen within solar: each had some strengths but choosing which might survive, let alone do well was unknowable.

That was just one reason creating a basket for this theme could make sense; to help mitigate risk and address return as a function of risk. It couldn’t show skyrocketing values of one stellar stock - but can do better than go to zero - which both those solar names did do. Another was sizable non-correlation to major Benchmarks shown by this emerging sector.

But there were also as mentioned some key preceding years that gave rise to this need. Paraphrasing early text on a predecessor late-1990s site, ‘Clean Energy stocks are we believe a fascinating new sector in its own right and one here to stay. In the past this sector was a money-loser and largely ignored by Wall Street. Since Clean Energy technology and thus stocks failed to deliver on their promise for so many decades, there was some measure of institutionalized contempt for the idea they could make money for investors, or prove a non-correlating asset class that differed from the major markets. Thus when ... [a few early clean energy] stocks for instance really started to show great volatility in 1999 amidst much hype, there was no Index in place to measure or bring attention to that activity at first upwards and then importantly robustly downwards too. One goal is ... to calmly reveal old days are gone.’

With a new millennium to start in 2001, a twinkling of exciting & innovative ideas appeared: new Li-ion batteries seemed they *might* give rise to viable electric cars - far more so than did lead-acid / Nickel Metal Hydride; Blue LEDs and growing GaN LEDs could improve lighting; more efficient Solar PV panels might begin to significantly lower costs; Wind was dropping rapidly in cost while turbines were growing in size and output; at the same time better Energy Efficiency was increasingly considered to be a sensible idea. In the first few years of 2001, 2002 and 2003, a new world had just opened up that was much more substantial.

In 2003, yes costs of renewables were still too high, in some cases by an order of magnitude. And yet ...yet ... clean energy **costs** trends all headed in a right direction: down fast!

Oil & coal were still formidable, ‘magical’ for low-costs (ignoring externalities) and their high energy & power density - but they didn’t feel like a high water mark in innovation for humankind. Natural gas seemed something of a transition fuel but it like nuclear, should yield to safer, greener, more attractive economic & other benefits of clean energy in time.

Importantly too it began to be understood that unlike dirty oil & coal still firing cars/trucks and power plants, newer clean energy should also give rise to *much better* goods / services. Electric Cars would be much faster given their greater torque - while solar, wind, geothermal etc might in theory one day also make nations stronger and improve GDP. Energy-storage farther out means solar powered homes & faster cars without any need for grid or gasoline.

Available technologies were still ‘not there’ yet, but this future all seemed so close, and so compelling one could taste it. Like the computer hardware that quickly got faster, able to hold much more data in turn allowing better and more productive software - the long-term thesis for clean energy given declining prices seemed to be of considerable interest.

While no Index or Benchmark to track clean energy had yet existed before ECO - a rationale for its creation to passively capture and track this theme over the long-term was fairly clear. Certainly as an emerging sector it is always emphasized a volatile story that can surely will ‘drop like a rock’ at times. As a passive Index the goal is to track movements of the theme.

And by 2004, there were enough candidates to populate a clean energy basket and ECO launched. Here one can see early sample components in ECO in 2005 shortly after its launch:

***Renewable Energy Harvesting* - 21% sector weight (7 stocks @3.0% each)**

Distributed Energy, DESC. Part solar, wind; also in DG, H2, an integrator.

Emcore, EMKR. Solar, 27.5% ultra-efficient PV cells, also LED products.

Evergreen, ESLR. Solar, string ribbon PV maker with efficient silicon-use.

Kyocera, KYO. Solar, integrated manufacturer that’s doubling PV production.

Ormat, ORA. Geothermal, works as well in recovered energy, biofuels.

SunPower / Cypress, CY. Solar, 18.3% highly-efficient, rear-contact PV cells.

Zoltek, ZOLT. Wind, makes carbon fiber for wind blades, and product ‘lightening’.

***Energy Storage* - 18% sector weight (6 stocks @3.0% each)**

Active Power, ACPW. Flywheels, makes firm power systems.

Energy Conversion Devices, ENER. Metal-hydride batteries, also in solar PV, H2 FCs.

Impco, IMCO. Gaseous fuels, manufacturer and integrator for cleaner vehicles. *Maxwell*, MXWL. Ultracapacitors, battery alternatives as in hybrid vehicles.

Quantum Fuel, QTWW. Hydrogen gas storage systems for cleaner vehicles.

Ultralife Batteries, ULBI. Batteries, advanced lithium ion, polymer rechargeable.

***Power Delivery and Conservation* - 29% sector weight (10 stocks @2.9% each)**

American Superconductor, AMSC. Superconductors, low-resistance 2G HTS wire. *American Power Conversion*, APCC. UPS, makes firm-power systems.

Cree, CREE. LEDs, makes efficient lights, power-saving electronics.

Echelon, ELON. Networking, for whole energy systems.

International Rectifier, IRF. Efficiency-enabling electronics producer.

Itron, ITRI. Monitoring, designs energy measurement and management.

Magnetek, MAG. Solar inverters, makes wind power converters, power controllers. *Power*

Integration, POWI. Energy savings, enables power conservation in IC chips. *SuperPower / Intermagnetics*, IMGC. Superconductors, and power transmission.

UQM Technologies, UQM. Hybrid vehicles, and electrics; motor & power systems.

Energy Conversion - 19% sector weight (7 stocks @2.7% each)

Ballard Power, BLDP. Mid-size fuel cells, makes mainly PEM FCs.

Capstone Turbines, CPST. Micro-turbines 30-60 kW, may be flexible-fueled.

FuelCell Energy, FCEL. Large fuel cells, stationary high-temp, flex-fuel MCFCs.

Hydrogenics, HYGS. Fuel cells and testing gear, H₂ electrolysis, regenerative FCs. *Medis*,

MDTL. Micro fuel cells, design with liquid-fuels and unique electrolyte. *Mechanical*

Technology, MKTY. Small fuel cells, helps supplant Li-Ion batteries.

Plug Power, PLUG. Mid-sized fuel cells for distributed generation, home power.

Cleaner Fuels - 9% sector weight (4 stocks @2.25% each)

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

BOC Group, BOX. Hydrogen, supplier of industrial gases.

MGP, MGPI. Biofuels, ethanol and fuel alcohol.

Praxair, PX. Hydrogen, supplier of industrial gases.

Greener Utilities - 4% sector weight (2 stocks @2.0% each)

Idacorp, IDA. Hydroelectric, Utility, mainly hydro; also some fuel cell research.

PPM Energy / Scottish Power, SPI. Wind, Utility, PPM is growing wind power.

To be sure, what might lie ahead the first 10 years of 2005 to 2015 for this emerging clean energy sector were then unknown and unknowable - just as is today for what the next 10 years may bring. Yet a few possibilities back then did appear to be arguably fairly strong. One was solar can and would drop in costs and grow in importance, perhaps dramatically so. There were just 4 available solar plays at that time (U.S. listed equities), and they were:

Emcore, EMKR, Solar, 27.5% ultra-efficient PV cells, also LED products.

Evergreen, ESLR. Solar, string ribbon PV maker with efficient silicon-use.

Kyocera, KYO. Solar, integrated manufacturer that's doubling PV production.

SunPower / Cypress, CY. Solar, 18.3% highly-efficient, rear-contact PV cells.

There have been many changes in the complexion of clean energy, as the above list attests. Interestingly for instance this solar sector of ECO that now in 2015 includes many China-based firms (on U.S. exchanges) looked very different in 2005. China's growth in solar was not anticipated, nor was a fall of valuations of U.S., European & Japanese PV firms when low cost China entered solar in a very big way (helpfully driving down PV prices dramatically).

In wind power too China has come to have much greater role in the first 10 years. That both drove down costs/prices for wind and reshaped that industry, though its creaky grid hasn't so far allowed great penetration of wind power into its own territory. Meanwhile ideas like flywheels, ultracapacitors, hydrogen & older battery chemistries made little advance.

Back then it seemed electric cars with the new Lithium cobalt battery chemistries were nearly inevitable ahead. They could, put into a premium high performance car give workable 200-mile range and perform better than typical gasoline cars. Farther out, cars & SUVs etc could become powered by solar and with PV past payback, 'fuel' would be free to boot.

Back then that seemed to be just on the horizon - some innovation is already starting. Now in 2015, a significant amount of action might be expected ahead such as in e.g. *energy storage*. This is for several reasons. One is that as electric cars and SUVs, trucks etc grow in number, getting battery costs down and performance up is critical. The first roadster from a very respected high-end EV maker had cobalt oxide cathode chemistry & ~6,700 commodity cells: it was wonderful as proof of concept, a start, and proved a real ability to combine new EVs with solar power too, see http://www.wildershares.com/pdf/solarsense_v1.2.pdf

Given limited useful cycles, cells had to be scaled up greatly in number (~6,700, type 18650) - since mindful of only 20% useful life the car should reach 200 miles range per charge. It also needed liquid coolant to prevent 'thermal runaway' where one cell may short-circuit and possibly lead to fire that cascades through a pack. So what became very artful & safe design of that car's LiNiCoAlO₂ energy storage system alone was a tremendous accomplishment.

But the important point is that it could be possible - and far better in time than any ICE. Today look ahead and LiCoO₂ has given way to batteries of nickel cobalt aluminum oxide at cathode - or titanate at anode for energy/power density, and higher operating temps (less concern over thermal runaway). Importantly more cycles without the electrode degrading means long-lasting packs and better range too. Other types of vehicles or uses can trade some energy density for simpler-battery management, or for lower costs, say iron phosphate. For sure costs will be dropping ahead as wonderful new giga-factories come online with far higher production capacities. Rather than costing close to \$350+ per kilowatt hour, future batteries might well drop to \$200 kWh or even cheaper... and that would be huge.

That will open up tremendous opportunities in turn for so-called '2nd life' batteries. Consider that once storage goes much below just 80% capacity from use, that innovative battery is considered no longer useful for pushing a car, SUV or big Class 8 truck. But since it still is good, with ~80% original capacity left, it can be great in many ways where top performance no longer key. For example think about the intermittency of renewable power.

Solar and wind are wonderfully clean, no fuel costs and are getting less costly themselves all the time. But they are not *firm*. This means they are not always 'on'. In the past that was considered a fault - since they could not immediately be ready or spin up in the same way as say a natural gas peaker plant, or possess the always-on features of coal or nuclear.

But if in the future, once potent AND cheap energy storage is injected in the equation, to be always-on is not so wonderful when demand is low like at night. Extra capacity for the very highest brief demand peak, is still being forced to lie idle the rest of the time. So instead, if solar follows the load fairly well but it can be available anytime such as by storage, and if wind's gigawatts could be stored at night when most potent, a new concept emerges.

Here other types of storage can become notable, especially if weight is not a limit. Ideas like the (vanadium) flow batteries being tested by the military aren't limited by cycle life, there energy is stored in a flowing electrolyte (not electrode) without degradation. Or one could envision, say, future manganese oxide batteries that need little battery management.

It's conceivable to see industry rather quickly get battery costs down on greater production, getting cycle numbers and operating temps up with refined or new chemistries, and even to grow linkages between intermittent clean renewables - and transportation demand in vehicles of all kinds: electric bikes, cars, SUVs, up to Class 8 trucks - even planes in future.

In sum as storage such as batteries improves both in energy+power density - and abundant 2nd life batteries from EVs soon grow available seeking fresh uses - its likely many great options will arise. With innovations ahead in renewables, efficiency, demand response, lighting, EVs, the grid, charging, and other technologies, along with new financing & policy too - the long-term-future for clean energy should be exciting indeed.

Conclusion:

4th Quarter began with the Clean Energy Index® ([ECO](#)) at 66 and it closed well down at 55 for a big loss in Q4 of -16.3%. For the whole year too ECO was down quite solidly -17.2%. Yet the theme didn't start 2014 by going down: Q1 was actually sharply up; it would fall negative YTD with drops to come in Q2, Q3 & Q4. In sum clean energy's theme and hence ECO first rose +20% to March, it after submerged to red for YTD by May, again in August, and finally in October after which it would not re-emerge in green the rest the year.

To sum up 4th Quarter ECO showed some strong declines like Q2 & Q3. NEX's theme did relatively much 'better' than ECO or WHPRO in Q4. Meanwhile Progressive Energy WHPRO was down substantially Q4 and went firmly negative YTD earlier than did ECO.

There were 3 Additions to ECO to start Q1 2015: Sky Solar ([SKYS](#)), TerraForm ([TERP](#)), and Vivent Solar ([VSLR](#)). 4 Deletions were: [AMSC](#), ([GTAT](#), intra-Quarter), [RGSE](#), [UQM](#).

At differing WilderHill Progressive (WHPRO) there was 1 Addition of Abengoa Yield ([ABY](#)) - and Deletions of [BBLU](#), [CPST](#), [DNN](#), ([FWLT](#) delisted intra-Quarter), [RVLT](#) to start Q1.

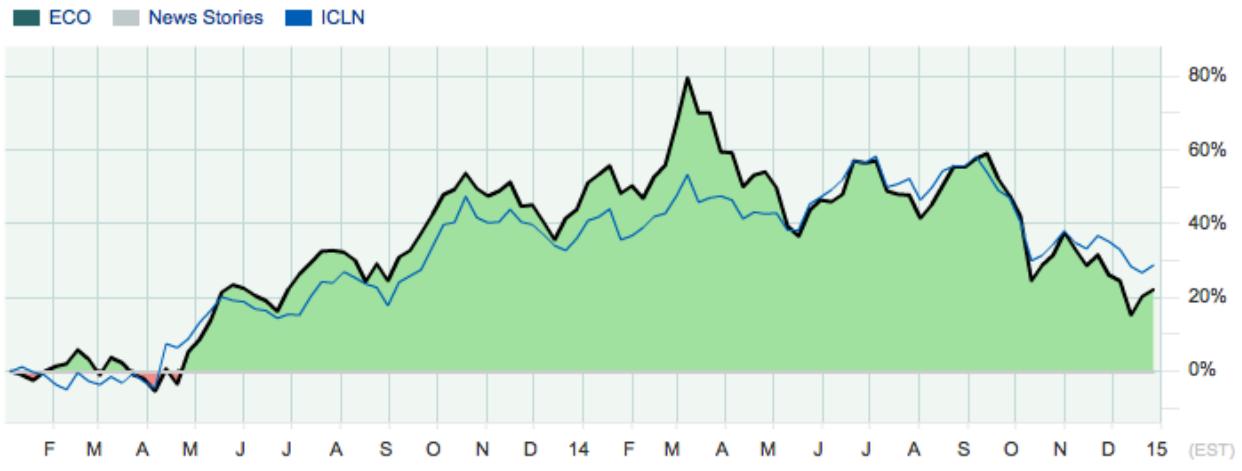
As always we welcome your thoughts and suggestions.
Sincerely,

Robert Wilder

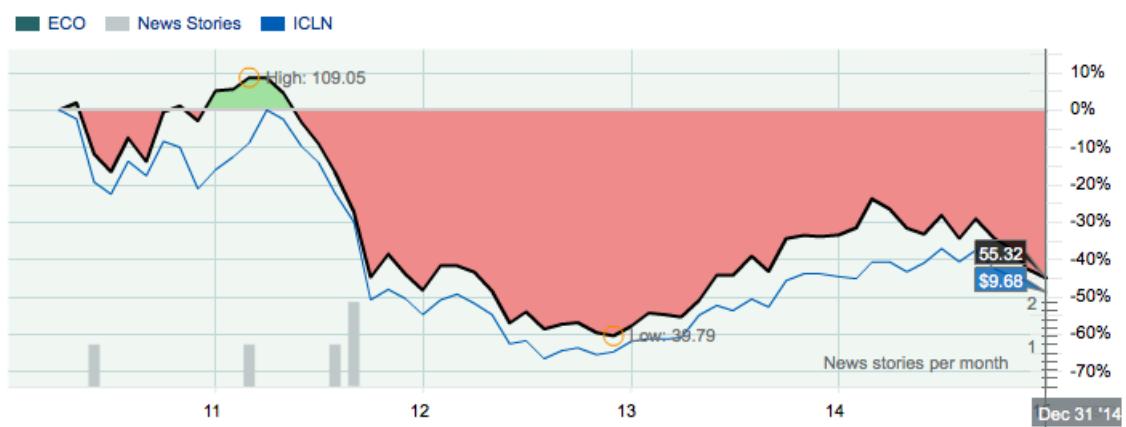
Dr. Rob Wilder
rwilder@wildershares.com

Disclaimer: The following is a reminder from the friendly folks at Clean Energy Index® who worry about liability. Performance figures quoted represent past performance only, and are no guarantee of future results. Views expressed are those of just one of the managers of this WilderHill® Index. Views are not meant as investment advice and should not be considered as predictive in nature. Any descriptions of a holding, applies only as of December 31, 2014. Positions in the ECO Index® can and do change thereafter. Discussions of historical performance do not guarantee and are not indicative of future performance. The Index covers a highly volatile sector & is highly volatile too, always subject to well above-average changes in its valuation. WilderHill Clean Energy Index® (ECO) is published and owned by WilderShares® LLC. No financial instruments or products based on this Index are sponsored or sold by WilderShares LLC, and Wildershare® LLC makes no representation regarding advisability of investing in such product(s). Marks to WilderHill®, to Clean Energy Index®, to ECO Index®, to WilderShares®, to Progressive Energy Index®, to Energy Efficient Transport Index® and to HAUL Index® are all registered and each is exclusive property; all rights reserved.

Past 2 years for ECO Index (**bold**) vs. a Global Clean Energy Index (in blue; not ours):



Past nearly 5 years for ECO Index (**bold**) vs. that Global Clean Energy Index (blue; not ours):



Adding as well a sample tracker for the Solar-only sector (in red; not ours) still Past 5 years:



Appendix I:

**ECO Index (via tracker PBW) Descending Weights & Components in late Q4 on
12/14/2014, or about 2 weeks before rebalance to start Q1 2015. 54 stocks:**

Name	Ticker	Weight
Polypore International Inc	PPO	3.258
Advanced Energy Industries Inc	AEIS	3.187
ITC Holdings Corp	ITC	3.082
Air Products & Chemicals Inc	APD	3.042
Maxwell Technologies Inc	MXWL	2.991
OM Group Inc	OMG	2.889
Ormat Technologies Inc	ORA	2.86
PowerSecure International Inc	POWR	2.801
Ameresco Inc	AMRC	2.702
Itron Inc	ITRI	2.685
Cytec Industries Inc	CYT	2.677
Calpine Corp	CPN	2.676
JA Solar Holdings Co Ltd ADR	JASO	2.653
Renewable Energy Group Inc	REGI	2.568
SunEdison Inc	SUNE	2.551
Silver Spring Networks Inc	SSNI	2.479
Sociedad Quimica y Minera SA ADR	SQM	2.447
Tesla Motors Inc	TSLA	2.416
SolarCity Corp	SCTY	2.388
AIXTRON SE ADR	AIXG	2.339
Pattern Energy Group Inc	PEGI	2.257
OPOWER Inc	OPWR	2.163
EnerNOC Inc	ENOC	2.122
Enphase Energy Inc	ENPH	2.098
Universal Display Corp	OLED	2.095
Gentherm Inc	THRM	2.092
China Ming Yang Wind Power ADR	MY	1.98
Quanta Services Inc	PWR	1.969
Trina Solar Ltd ADR	TSL	1.925
SunPower Corp	SPWR	1.923
Yingli Green Energy Holding ADR	YGE	1.918
FuelCell Energy Inc	FCEL	1.908
Cree Inc	CREE	1.884
First Solar Inc	FSLR	1.83
Canadian Solar Inc	CSIQ	1.803
Plug Power Inc	PLUG	1.763
Daqo New Energy Corp ADR	DQ	1.758
Amyris Inc	AMRS	1.729
Hanwha SolarOne Co Ltd ADR	HSOL	1.636
Ballard Power Systems Inc	BLDP	1.588
ReneSola Ltd ADR	SOL	1.134
Solazyme Inc	SZYM	0.841
Fuel Systems Solutions Inc	FSYS	0.673
Rubicon Technology Inc	RBCN	0.602

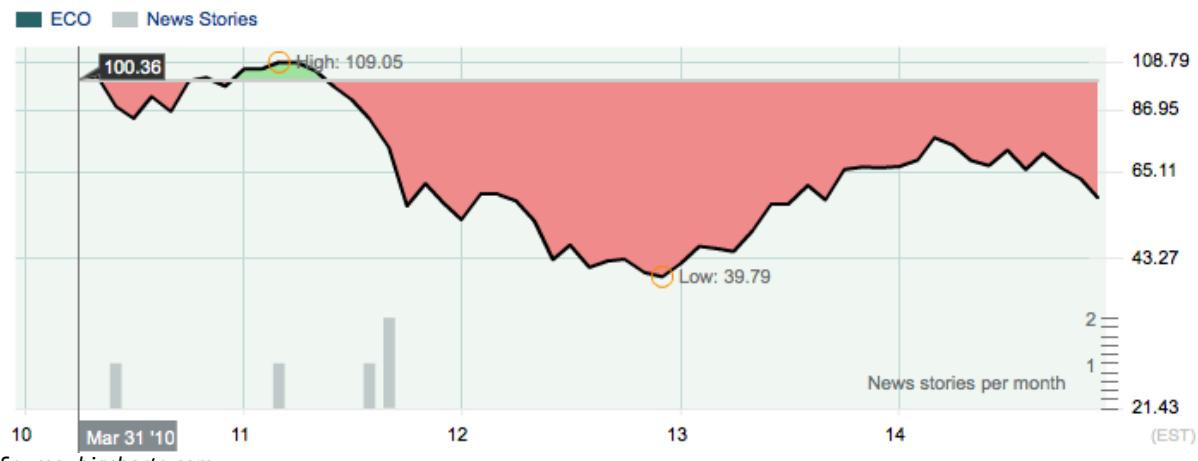
Orion Energy Systems Inc	OESX	0.51
Echelon Corp	ELON	0.468
Amtech Systems Inc	ASYS	0.461
Broadwind Energy Inc	BWEN	0.424
UQM Technologies Inc	UQM	0.421
Hydrogenics Corp	HYGS	0.411
American Superconductor Corp	AMSC	0.35
Quantum Fuel Systems Technologies Inc	QTWW	0.313
Real Goods Solar Inc	RGSE	0.259

ECO Index past 2 years from mid-December 2012 - to mid-Dec. 2014: clean energy rose much of this time (mainly green) because coincidentally it happens to begin near a steep low in late 2012 - whether it goes on falling since Spring 2014 is of course unknown:



Source: bigcharts.com

Or for much different perspective with greatly pronounced red so declines and big losses going from 100 in 2010 - well down to under 40 in 2012, and to just 50 in late 2014, here's past 5 years to mid-December 2014. This displays that huge volatility and how the clean energy sector and so ECO indeed certainly can and will at times 'drop like a rock':



Source: bigcharts.com

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

INDEX (ECO) SECTOR & STOCK WEIGHTS FOR START OF Q1 2015. 53 STOCKS.

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

*Stocks below \$200 million in size at rebalance are *banded with a 0.5% weight.

Renewable Energy Harvesting - 22% sector weight (9 stocks @2.33 each; +2 banded)

**Broadwind Energy*, BWEN. Wind power, producer of towers, gearing, services.

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

China Ming Yang Wind, MY. Wind, large turbine manufacturer is a pure play.

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

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

**Hanwha SolarOne*, HSOL. Solar PV, integrated from poly through modules.

JA Solar, JASO. Solar, China-based sells PV modules in Asia, Europe, U.S.

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

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

Trina Solar, TSL. Solar, produces ingots, wafers, modules; China-based.

Yingli Green Energy, YGE. Solar, large vertically integrated manufacturer.

Power Delivery & Conservation - 19% sector weight (8 stocks @2.25%; +2 *banded)

Aixtron Aktiengesellschaft, AIXG. Deposition tools, efficient O/LED, displays.

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

Cytec, CYT. Carbon fiber, used eg in wind; tidal power; vehicle lightening.

**Echelon*, ELON. Networking, better management of whole energy systems.

EnerNoc, ENOC. Demand response for better energy management, smart grid.

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

**Orion Energy Systems*, OESX. Efficiency, LED light retrofits, energy services.

PowerSecure, POWR. Smart grid, demand response, distributed generation.

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

SunEdison, SUNE. Producer of polysilicon; also growing solar energy services.

Energy Conversion - 20% sector weight (8 stocks @2.31% each; +3 *banded stocks)

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

**Amtech Systems*, ASYS. Solar wafer equipment, U.S. based turnkey supplier.

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

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

Enphase, ENPH. Microinverters, PV panel DC becomes grid compliant AC.

FuelCell Energy, FCEL. Large fuel cells, stationary high-temp flex-fuel MCFCs.

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

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

**ReneSola*, SOL. Wafers, for silicon PV, mono & multicrystalline, China-based.

**Rubicon*, RBCN. Substrates, are used in the production of LEDs for lighting.

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

Greener Utilities - 19% sector weight (9 stocks @2.11% each)

Calpine, CPN. Geothermal, major North American producer, low-carbon assets.

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

ITC Holdings, ITC. Grid transmission, better integration for wind/renewables.

Opower, OPWR. Utility software, cloud based for reducing energy demand.

Silver Spring Networks, SSNI. Smart grid, two-way communications aids Utilities.

Sky Solar, SKYS. Solar farms, creating & operating utility projects; becoming IPP.
SolarCity, SCTY. Downstream PV leases, solar for homes for no-upfront costs.
TerraForm Power, TERP. Solar, owner & operator of solar assets, a yieldco.
Vivent Solar, VSLR. Downstream solar, PV leasing on long-term contracts.

Energy Storage - 13% sector weight (6 stocks @2.16% each)

Fuel Systems Solutions, FSYS. Gaseous fuels; in cleaner-but-still ICE vehicles.
Maxwell, MXWL. Ultracapacitors, an alternative assisting batteries, in hybrids.
OM Group, OMG. Battery materials from cobalt; also magnetics, cell etching.
Polypore Intl., PPO. Separators, membranes used in Li-ion, other battery cells.
Sociedad de Chile, SQM. Lithium, major Li supplier in batteries; energy storage.
Tesla Motors, TSLA. Electric vehicles, pure-play in EVs and energy storage.

Cleaner Fuels - 7% sector weight (3 stocks @1.83% each; +3 *banded stocks)

Air Products & Chemicals, APD. Hydrogen, is a supplier of industrial gases.
***Amyris**, AMRS. Biotech, speculative R&D in renewable fuels for transportation.
***Hydrogenics**, HYGS. Hydrogen, electrolysis generation & fuel cells, H2 storage.
***Quantum Fuel Systems**, QTWW. Compressed gas, in alternative fuel vehicles.
Renewable Energy Group, REGI. Biodiesel, natural fats, oils, greases to biofuels.
Solazyme, SZYM. Biofuels, microalgae grown w/o sun, drop-in diesel substitute.

ECO & some other ‘tough times’ themes from 2010 to start of December 2014:



Source: Bigcharts.com

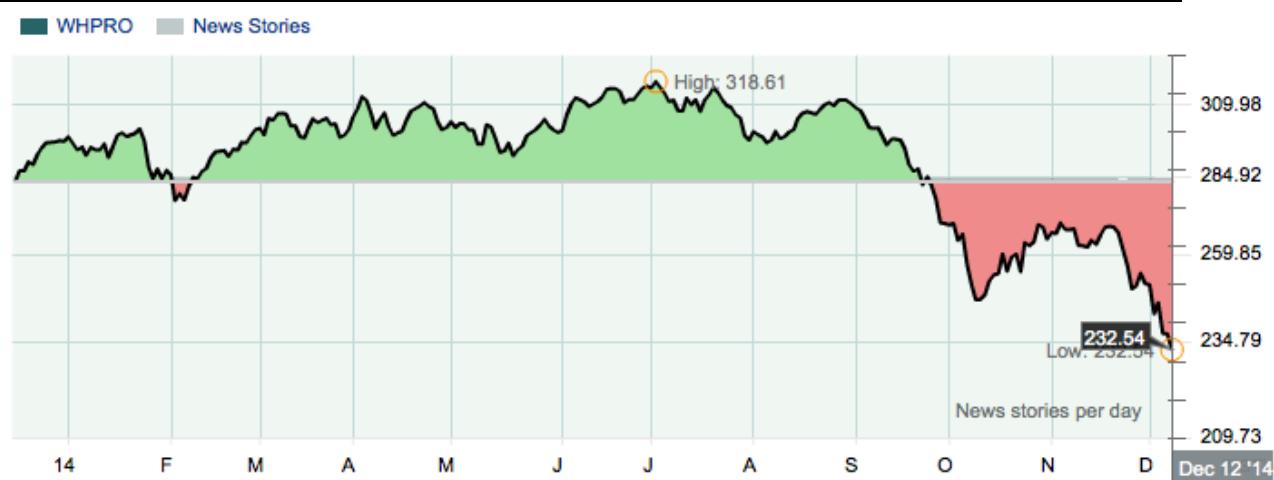
As seen by ECO (in bold) and others above, last few years have been **very rough** for much in both clean & alternative energy. For example despite ECO falling tremendously, ending this period to late Nov. 2014 down a lot, it's still 'above' another sample **Index/ETF** (not ours) for Global alternative energy (orange), a tracker for **Solar-only Index/ETF** (blue), and a **Natural Gas Index/ETF** (brown). These were remarkably tough years for several themes! Yet note too in **light green** at far top ironically the 'brown' WilderHill **Progressive Energy** Index (WHPRO) that sits well above this period, up some +15% with its tracker (PUW) touching its nadir on relatively less downturn (yet it did quite 'badly' in late 2014 as oil plummeted). Hence the clean energy - as well as natural gas (alone) themes - moved differently from WHPRO. Like solar, ECO was volatile this period, fell far from its highs - and had touched strong new lows in 2012.

Appendix III: WHPRO Index (via tracker PUW) Descending Component weights in late Q4 2014 on 12/14/2014, or about 2 weeks before the rebalance to start Q1 2015. 59 Stocks:

Name	Ticker	Weight
WABCO Holdings Inc	WBC	2.66
Covanta Holding Corp	CVA	2.626
AO Smith Corp	AOS	2.409
Apogee Enterprises Inc	APOG	2.357
Veeco Instruments Inc	VECO	2.33
EnerSys	ENS	2.314
Acuity Brands Inc	AYI	2.313
Johnson Controls Inc	JCI	2.292
Regal-Beloit Corp	RBC	2.28
Owens Corning	OC	2.265
Hexcel Corp	HXL	2.262
Eaton Corp PLC	ETN	2.236
Altra Industrial Motion Corp	AIMC	2.233
Corning Inc	GLW	2.204
ESCO Technologies Inc	ESE	2.178
Advanced Emissions Solutions Inc	ADES	2.177
Woodward Inc	WWD	2.16
Cameco Corp	CCJ	2.133
Rockwood Holdings Inc	ROC	2.125
Emerson Electric Co	EMR	2.064
Andersons Inc/The	ANDE	2.035
Tata Motors Ltd ADR	TTM	2.034
Southwestern Energy Co	SWN	2.009
Denison Mines Corp	DNN	2.005
Tenneco Inc	TEN	1.986
Koninklijke Philips NV	PHG	1.978
NRG Yield Inc	NYLD	1.964
Remy International Inc	REMY	1.96
Kandi Technologies Group Inc	KNDI	1.919
Luxfer Holdings PLC ADR	LXFR	1.91
Range Resources Corp	RRC	1.898
GrafTech International Ltd	GTI	1.788
LSB Industries Inc	LXU	1.788
Cia Energetica de Minas Gerais ADR	CIG	1.77
Chesapeake Energy Corp	CHK	1.725
General Cable Corp	BGC	1.719
Rentech Inc	RTK	1.697
Methanex Corp	MEOH	1.642
Chicago Bridge & Iron Co NV	CBI	1.617
MasTec Inc	MTZ	1.534
Cosan Ltd	CZZ	1.52
Centrais Eletricas Brasileiras SA ADR	EBR	1.46
Green Plains Inc	GPRE	1.444
Power Solutions International Inc	PSIX	1.336
Chart Industries Inc	GTLS	1.312

Sasol Ltd ADR	SSL	1.278
Clean Energy Fuels Corp	CLNE	1.277
Golar LNG Ltd	GLNG	1.243
Abengoa SA ADR	ABGB	1.012
McDermott International Inc	MDR	0.905
Nuverra Environmental Solutions Inc	NES	0.894
Westport Innovations Inc	WPRT	0.787
Energy Recovery Inc	ERII	0.759
Hannon Armstrong Sustainable Infra.	HASI	0.633
Global Power Equipment Group Inc	GLPW	0.554
Revolution Lighting Technologies Inc	RVLT	0.45
Capstone Turbine Corp	CPST	0.394
Blue Earth Inc	BBLU	0.145

First, just Progressive Energy Index (WHPRO) over the past 1 year to mid-December 2014:



Progressive (**bold**) with Clean Energy (tracker PBW, [blue](#)), Global Clean Energy (tracker PBD, [red](#)):



Appendix IV: WHPRO Index for start of New Quarter.

Sectors & Stock Weightings: WilderHill Progressive Energy Index (WHPRO) for start of Q1 2015. 55 stocks.

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

Alternative Fuel - 18% Sector Weight (8 stocks @2.18% each; +1 *banded)

Andersons, ANDE. Ethanol producer, corn-based; rail group is in fuel transport.
Cameco, CCJ. Uranium fuel, one of largest producers; also does fuel processing.
Chesapeake Energy, CHK. Natural gas, one of larger U.S. independent producers.
Cosan, CZZ. Biofuels, Brazil-based using sugarcane feedstock, ethanol exporter.
Green Plains Renewable Energy, GPRE. Biofuel, ethanol; domestic corn feedstock.
Methanex, MEOH. Methanol, liquid fuel can be derived from fossil fuels or organics.
Range Resources, RRC. Natural gas, produces in Appalachian & Gulf Coast regions.
**Rentech*, RTK. Syngas & fuels from biomass and waste materials; Gas to Liquids.
Southwestern Energy, SWN. Natural gas, U.S. producer, also midstream services.

Conversion & Storage - 19% Sector weight (9 stocks @2.05% each; +1 *banded)

Altra Holdings, AIMC. Mechanical power transmission, electromechanical conversion.
Chart Industries, GTLS. Natural gas, LNG; liquefied gas storage/transport, efficiency.
Chicago Bridge & Iron, CBI. Nat. gas; also better containment for next-gen nuclear.
Clean Energy Fuels, CLNE. Natural gas fleet vehicles, integration and distribution.
Covanta Holding, CVA. Incineration, converts waste to energy (WtE); conglomerate.
EnerSys, ENS. Battery maker, for telecommunications, utilities, motive power.
Golar LNG, GLNG. LNG, major independent carrier, gas transport, regasification.
MasTec, MTZ. Engineering & construction: distribution of electricity, natural gas.
Wabco, WBC. Mechatronics, better vehicle mechanical/energy/braking controllers.
**Westport Innovations*, WPRT. Enables vehicles' use of natural gas, gaseous fuels.

Better Efficiency - 20% Sector Weight (10 stocks @2.00% each)

Acuity Brands, AYI. LED lights, OLEDs, and controls for indoor & outdoor lighting.
A.O. Smith, AOS. Energy efficiency innovations for water heating & monitoring.
Apogee, APOG. Advanced glass, for better efficiency, green building designs.
Emerson Electric, EMR. Broad work in energy efficiency, storage, lately biofuels.
Esco Technologies, ESE. Power grid, advances 2-way metering & communications.
General Cable, BGC. Power grid, high voltage transmission cable and wire products
Koninklijke Philips Electronics NV, PHG. Efficient LEDs, advanced industrial lighting.
LSB Industries, LXU. Greater energy efficiency in building end-use, heating, cooling.
Regal Beloit, RBC. Energy efficient motors, in commercial, industrial, homes etc.
Woodward, WWD. Energy controllers, optimization, industrial turbines in generation.

New Energy Activity - 17% Sector weight (8 stocks @2.00% each; +2 *banded)

Eaton, ETN. Hybrids, better electric and fluid power in truck & auto applications.
**Global Power Equipment*, GLPW. Designs, engineering for gas, hydro, nuclear.
GrafTech, GTI. Graphite, advanced electrodes for power generation, fuel cells.
**Hannon Armstrong*, HASI. Capital: Infrastructure & finance for energy efficiency.
Hexcel, HXL. Lighter composites, advanced structural reinforcement materials.
Johnson Controls, JCI. Building controls, also advanced hybrid vehicle systems.
Owens Corning, OC. Materials lightening, building insulation composite materials.

Remy International, REMY. Electric & hybrid motors, OEM for cars, trucks, trains.
Rockwood Holdings, ROC. Lithium battery recycling, lithium & cobalt supply.
Veeco Instruments, VECO. Design, manufactures equipment for LED production.

Emission Reduction - 17% Sector Weight (8 stocks @1.93% each +3 *banded)

ADA-ES, ADES. Coal emissions reduction, mercury, NOX, CO₂, noxious pollutants.
Corning, GLW. Diverse activity includes emissions reduction, filters, and catalysts.
**Energy Recovery*, ERII. Harvesting energy, from industrial fluid flows & pressure.
Kandi Technologies, KNDI. Developing small urban all-electric cars plus trucks.
**Luxfer Holdings PLC*, LXFR. Advanced materials: reduced emissions, gaseous storage.
McDermott, MDR. Infrastructure: reduces coal emissions, constructs WtE facilities.
**Nuverra*, NES. Natural gas: recycling water & spill prevention; used oil recycling.
Power Solutions, PSIX. Flex-fuel low-emission engines; nat. gas, biogas, hybrid etc.
Sasol Ltd, SSL. Syngas to synthetic fuel; potential CO₂ capture/sequestration (CCS).
Tata Motors, TTM. Smaller & 'nano' vehicles, India-based with worldwide sales.
Tenneco, TEN. Automotive end-of-pipe emissions controls, catalytic converters.

Utility - 9% Sector weight (5 stocks @1.80% each)

Abengoa SA, ABGB. Energy engineering & infrastructure, worldwide; sustainability.
Abengoa Yield, ABY. Yieldco, conventional power & transmission, some renewables.
Companhia Energetica de Minas Cemig, CIG. Brazilian Utility, large hydroelectric.
Centrais Electricas Brasileiras, EBR. Brazilian Utility, large hydro, also nuclear.
NRG Yield, NYLD. Contracted power generation and thermal, also some renewables.

Chart for the WHPRO Index since early 2010 vs an independent ECO tracker (PBW):



Source: Bigcharts.com

WHPRO Index from April 2010 at near 220 - to end-November 2014 near 250: it would fall hard in Dec. 2014. Unlike some themes its low, seen in 2011 (near 180) actually was relatively 'better' than lows put in by other various energy themes the past 5 years. Much different is ECO tracker in blue that dropped far in 2012; unlike ECO we see WHPRO these years generally less volatile but that changed in 2014 when WHPRO fell especially hard late part of that year.

Appendix V: WilderHill New Energy Global Innovation Index (NEX) late Q4 2014 via tracker (PBD) on 12/14/2014, about 2 weeks before Rebalance to start Q1 2015. 106 stocks:

Name	Ticker	Weight
Hanergy Thin Film Power Group Ltd	566	2.853
AO Smith Corp	AOS	2.019
China Longyuan Power Group Corp Ltd	916	1.967
Kingspan Group PLC	KSP	1.963
Acuity Brands Inc	AYI	1.94
Veeco Instruments Inc	VECO	1.922
Itron Inc	ITRI	1.893
Johnson Controls Inc	JCI	1.891
Nibe Industrier AB	NIBEB	1.886
Nordex SE	NDX1	1.848
Epistar Corp	2448	1.831
International Rectifier Corp	IRF	1.83
Huaneng Renewables Corp Ltd	958	1.788
OSRAM Licht AG	OSR	1.749
EDP Renovaveis SA	EDPR	1.734
Vestas Wind Systems A/S	VWS	1.733
Sino-American Silicon Products Inc	5483	1.675
AIXTRON SE	AIXA	1.642
Xinjiang Goldwind Science & Technology	2208	1.619
Gamesa Corp Tecnologica SA	GAM	1.605
Tesla Motors Inc	TSLA	1.5
Rockwool International A/S	ROCKB	1.469
Pattern Energy Group Inc	PEGI	1.469
Universal Display Corp	OLED	1.44
Meidensha Corp	6508	1.437
SunEdison Inc	SUNE	1.436
Mighty River Power Ltd	MRP	1.409
OPOWER Inc	OPWR	1.401
Covanta Holding Corp	CVA	1.305
China Everbright International Ltd	257	1.299
Cree Inc	CREE	1.298
China High Speed Transmission Equipment	658	1.292
Energy Development Corp	EDC	1.265
Energy Absolute PCL	EA-R	1.255
SolarCity Corp	SCTY	1.237
Innergex Renewable Energy Inc	INE	1.216
Seoul Semiconductor Co Ltd	46890	1.215
Contact Energy Ltd	CEN	1.208
Novozymes A/S	NZYMB	1.198
Neo Solar Power Corp	3576	1.19
China Singyes Solar Technologies Holdings	750	1.185
Ormat Technologies Inc	ORA	1.176
Verbund AG	VER	1.157
Fortum OYJ	FUM1V	1.143

Infinis Energy Plc	INFI	1.127
Shunfeng International Clean Energy Ltd	1165	1.119
Meyer Burger Technology AG	MBTN	1.075
Trina Solar Ltd ADR	TSL	1.023
SMA Solar Technology AG	S92	1.008
REC Silicon ASA	REC	1
SunPower Corp	SPWR	1
Enel Green Power SpA	EGPW	0.989
LSB Industries Inc	LXU	0.974
First Solar Inc	FSLR	0.963
GCL-Poly Energy Holdings Ltd	3800	0.946
Canadian Solar Inc	CSIQ	0.938
Sao Martinho SA	SMTO3	0.913
Cosan SA Industria e Comercio	CSAN3	0.852
Green Plains Inc	GPRE	0.7
Polypore International Inc	PPO	0.623
Abengoa SA	ABG/P	0.569
PowerSecure International Inc	POWR	0.553
Wasion Group Holdings Ltd	3393	0.538
Ameresco Inc	AMRC	0.535
Capital Stage AG	CAP	0.514
TransAlta Renewables Inc	RNW	0.502
China Datang Corp Renewable Power	1798	0.499
United Photovoltaics Group Ltd	686	0.497
Rubicon Technology Inc	RBCN	0.496
Renewables Infrastructure Group Ltd	TRIG	0.49
REC Solar ASA	RECSOL	0.472
Ricardo PLC	RCDO	0.461
Falck Renewables SpA	FKR	0.461
Aerovironment Inc	AVAV	0.46
Dialight PLC	DIA	0.457
CENTROTEC Sustainable AG	CEV	0.447
Silver Spring Networks Inc	SSNI	0.437
Blue Solutions	BLUE	0.425
FDG Electric Vehicles Ltd	729	0.423
EnerNOC Inc	ENOC	0.422
GS Yuasa Corp	6674	0.421
Plug Power Inc	PLUG	0.419
Byd Co Ltd	1211	0.418
Akenerji Elektrik Uretim AS	AKENR	0.407
SPCG PCL	SPCG-R	0.405
JA Solar Holdings Co Ltd ADR	JASO	0.395
Enphase Energy Inc	ENPH	0.373
Taewoong Co Ltd	44490	0.367
Takuma Co Ltd	6013	0.364
Solazyme Inc	SZYM	0.362
Motech Industries Inc	6244	0.354
West Holdings Corp	1407	0.315
Renewable Energy Group Inc	REGI	0.308

Yingli Green Energy Holding Co Ltd ADR	YGE	0.287
Albioma SA	ABIO	0.274
Fuel Systems Solutions Inc	FSYS	0.187
Maxwell Technologies Inc	MXWL	0.162
Saft Groupe SA	SAFT	0.144
FuelCell Energy Inc	FCEL	0.128
Hydrogenics Corp	HYGS	0.112
Capstone Turbine Corp	CPST	0.11
Ballard Power Systems Inc	BLD	0.104
Quantum Fuel Systems Technologies	QTWW	0.087

For current values, http://www.nex-index.com/Constituents_And_Weightings.php
or see also for more NEX data: http://www.nex-index.com/Constituents_And_Weightings.php

Here are links to quotes to NEX Index available on the web:

NEX Quotes & Data	Ticker	Bigcharts	Bloomberg	Marketwatch	Yahoo
USD Price Index	NEX	51599W10	NEX:IND	NEX	^NEX
EUR Price Index	NEXEU	26499Z42	NEXEU:IND	NEXEU	^NEXEU
GBP Price Index	EXBP	26499Z40	NEXBP:IND	NEXBP	^NEXBP
JPY Price Index	NEXJY	26499Z38	NEXJY:IND	NEXJY	^NEXJY
USD Total Return Index	NEXUST	26499Z43	NEXUST:IND	NEXUST	^NEXUST
EUR Total Return Index	NEXEUT	26499Z41	NEXEUT:IND	NEXEUT	^NEXEUT
GBP Total Return Index	NEXBPT	26499Z39	NEXBPT:IND	NEXBPT	^NEXBPT
JPY Total Return Index	NEXJYT	26499Z37	NEXJYT:IND	NEXJYT	^NEXJYT

Below is the NEX Index vs. NYSE Oil vs. Nasdaq vs. S&P500 vs. MSCI World for past 10+ years to early 2014. Note the **Global NEX** that was well up and indeed at the very top late 2007 near 450 – seen this period was by latter 2012 (2 years ago) around a bottom near 100 of a decade ago:



AMEX Oil, Nasdaq, S&P 500 rebased 30 Dec 2001 = 100 Source: Bloomberg New Energy Finance

*The global NEX Index only is a unique Partnership as between Bloomberg New Energy Finance; Josh Landess of First Energy Research, and Dr. Rob Wilder of WilderHill Indexes.