Guinness Alternative Energy Fund

A high conviction pureplay equity fund managed by Edward Guinness investing in quoted companies in the alternative energy sector.

INVESTMENT COMMENTARY – review of the second quarter 2018

Manager	**Edward Guinness** (from launch in December 2007)
Fund size	**$13.9m**
AUM under strategy	**$24.4m**

Aim

Guinness Alternative Energy Fund gives investors pureplay exposure to global alternative energy markets.

The Fund is managed for capital growth and invests in companies in the solar, wind, hydro, geothermal, biofuels, biomass and energy efficiency sectors.

Investment case

We believe that over the next twenty years the alternative energy sector will benefit from the combined effects of:

- Higher energy prices driven by population growth, developing world industrialisation and diminishing fossil fuel supplies
- Falling costs of alternative energy assets as the technology improves
- Energy security concerns
- Climate change and environmental issues

The Guinness Alternative Energy team has been managing alternative energy portfolios since 2007.

The Fund is a long-only equity portfolio of around 30 equally-weighted positions.

Normally the Fund is invested in companies with a market capitalisation over $100 million.

Quarterly commentary

The Guinness Alternative Energy Fund was down 4.31% (in USD, 1.24% OCF) in the second quarter of 2018. This compared to a rise in the Wilderhill Clean Energy Index of 0.2%, a decrease in the Wilderhill New Energy Global Innovation Index of 6.67% and an increase in the MSCI World Index of 1.89%. Year-to-date the fund is down 4.43%, which is ahead of the Wilderhill New Energy Index (down 9.60%) and behind the Wilderhill Clean Energy Index (down 1.30%). While some of the fund's Chinese renewable utilities and efficiency stocks have performed well over the quarter, the fund has been held back by the performance of the solar stocks following changes to China's solar subsidy regime.

The following factors supported alternative energy stocks over the quarter:

- Growing public and government recognition of renewables' competitiveness versus fossil fuels
- Robust growth in global electric vehicle demand, particularly in China and Norway
- Higher oil prices

The following factors weighed down on alternative energy stocks:

- China's change in solar support mechanism
- Concerns about global trade
- US tax reform concerns
- Slow payment of subsidies to generators in China
- Concerns about low pricing for renewable electricity generated from the increased prevalence of auctions

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GUINNESS ASSET MANAGEMENT LTD

Guinness Asset Management Ltd is authorised and regulated by the Financial Conduct Authority

Performance contribution

Top 5 performing stocks	Q1 2018
TPI Composites Inc	30.24%
China Datang Corp Renewable Power Co Ltd	26.46%
Good Energy Group PLC	19.93%
Kingspan Group PLC	18.34%
Nibe Industrier AB	13.90%

Bottom 5 performing stocks	Q1 2018
Good Energy Group	-27.40%
JinkoSolar Holding	-26.90%
China Singyes Solar Technologies Holdings	-26.79%
Ormat Technologies	-25.81%
Johnson Controls International	-24.77%

Source: Bloomberg

Solar

The solar manufacturing stocks had a disappointing quarter, mainly due to China's decision to grant no more building permissions for solar installations under the 2018 tariffs. This has reduced analysts' global solar demand forecasts for 2018 by up to 20%. The supply-demand imbalance created means that module prices are forecast to reach prices of 23-26 US cents per W by the end of 2018. While this creates a short-term headwind for the solar industry, over the next three years we expect global solar demand to increase substantially as a result of the low module prices. Higher volumes and managed costs should increase earnings for the biggest, strongest solar manufacturers.

All solar holdings were weak over the quarter, but we believe the portfolio is positioned to hold the companies in the sector that are best placed to recover as prices stabilise and volumes increase. Xinyi Solar and China Singyes both have large development arms in China and should be well positioned to benefit from the potential for unsubsidised solar in China. The Chinese solar module manufacturers (Jinkosolar and Canadian Solar) are amongst the lowest-cost manufacturers in the industry, with relatively strong balance sheets and meaningful sales channels outside of China. Sunpower and First Solar were also hit by the changes on expectations of lower module pricing. Both have a highly differentiated offerings which should enable them to protect margins better than the more commoditised manufacturers.

Wind

TPI Composites, a contract wind blade manufacturer, had a strong quarter and exceeded analyst expectations for sales and earnings. The company attributed its increased productivity to decreased manufacturing cycle times and effective cost reduction efforts.

Despite increased competition in both the onshore and offshore wind sector, Vestas, as the market leader, is well placed to protect its margins and benefits from a strong balance sheet and large order book and was flat over the quarter.

The wind plant owners and operators in China had a mixed quarter. Weakness in Asian markets was reflected in a pullback in stock prices. On a positive note, curtailment continues to abate and the changes to the subsidy regime in China indicate a commitment to catching up on historic payments that are outstanding to renewable generators in China which should allow for more growth expenditure.

Our holding in Mytrah Energy Ltd contributed over 1% of performance due to management taking the company private.

Efficiency

Building efficiency companies Kingspan (insulation) and Nibe Industrier (heatpumps) had a positive quarter. Kingspan posted reassuring results showing growth in its insulation panels division, while Nibe had a strong start to the year with sales and profit rising more than 11%. Johnson Controls International continued to disappoint while going through a restructuring year following a spin-off and a merger.

Prysmian, an Italian-based global cables manufacturer and installer, is absorbing the acquisition of its rival General Cable and has reduced its fiscal year guidance due to potential delays in cable projects and in achieving synergies from the merger, with analysts worrying about short-term earnings visibility.

LG Chem's results for the first quarter undershot expectations mainly due to increased raw materials costs and to foreign exchange rates. Nevertheless, LG Chem's battery division achieved a small profit, fulfilling the company's prediction that the division would break even or be profitable by end-2018.

Schneider Electric remained flat over the quarter due to its Infrastructure Division announcing a net loss. The company is still well positioned to benefit from increasing use of power automation and 'smart' systems. Boer Power continues to suffer from restructuring and now liquidity issues and is not being rebalanced in the portfolio.

Hydro

Our only hydro holding, Iniziative Bresciane, had a positive run with new commissioned plants producing electricity. LG Chem, a Korean petrochemical company and a leading lithium-ion battery manufacturer for electric vehicles, was down slightly due to worries in the Korean market and after a small miss versus consensus revenue estimates for FY 2017.

Geothermal

Ormat, a developer and owner of geothermal plants, has suffered some setbacks. On May 3, the Kiluaea volcano in Hawaii erupted close to Ormat's Puna facilities. The impact of the eruption is ongoing although the Puna facility only accounts for a small percentage of Ormat's overall business. Ormat recently acquired US Geothermal, a geothermal power plant owner and operator. The company has a history of executing and managing growth well, giving us confidence in their performance going forward.

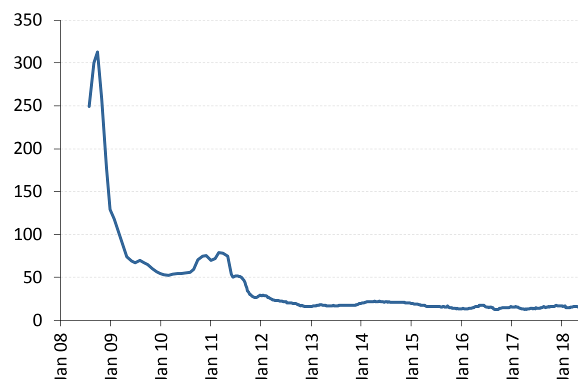
Biofuel

The fund's only holding in the biofuels sector, Cosan, is a Brazilian biofuel distributor. The company share price closely followed that of the Brazilian stock market index over the quarter. Brazil is suffering from political upheaval and a stagnating economy, impacting companies' earnings and sentiment. Cosan was further hit by a truckers' strike in Brazil that temporarily lowered demand.

Outlook

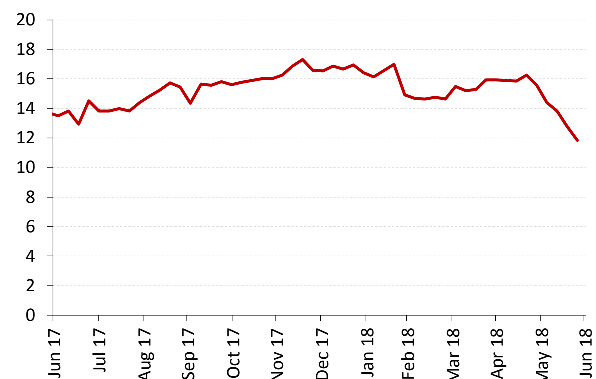
Solar

Long-term Silicon price ($/kg)



Source: Bloomberg

TTM Silicon price ($/kg)



Source: Bloomberg

Past performance should not be taken as an indicator of future performance. The value of investments and any income arising from them can fall as well as rise.

Following China's change in its solar subsidy regime and the resultant fall in solar module prices, the demand for solar installations is likely to continue to increase year-on-year. The short-term shock of reduced Chinese demand means that companies will accelerate the learning curve to be able to profit with module prices between 23 and 26 US cents per W. This is less than half the price for which modules were selling in 2015. The solar market has, once again, fast-forwarded two or three years in terms of forecast pricing. At such cheap equipment prices, the number of countries is dwindling in which solar is not economically attractive compared to wholesale power prices, let alone retail power prices. We believe we are now at the point where demand will be mainly driven by installations in unsubsidised countries (or even countries that tax solar installations with import tariffs like the US). Regulatory change which lowers module prices further is less likely with so few countries relying on subsidies and this should lead to a more sustainable economic environment and better visibility for solar company earnings.

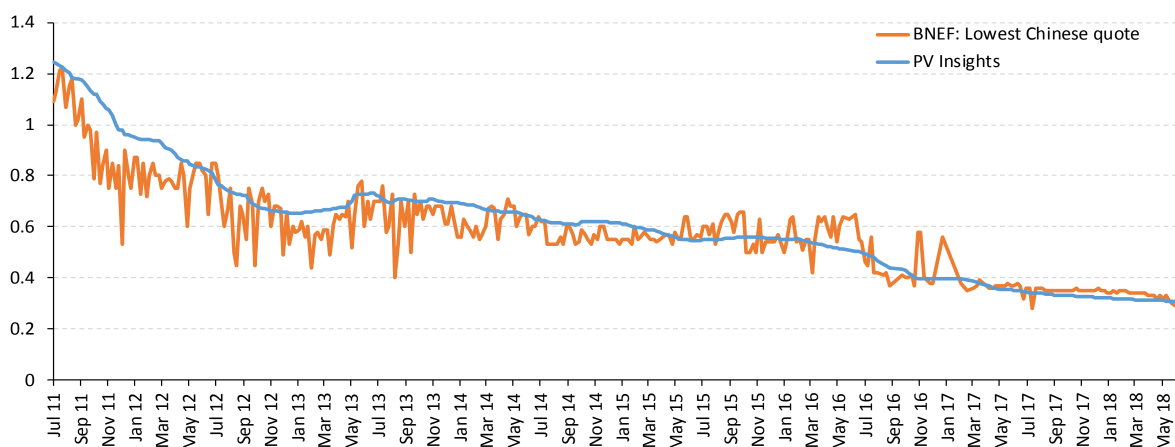
In the short term, we expect the module and silicon prices to decrease rapidly. Silicon prices will fall but will be constrained by the marginal cost of production which we think is at about $11 per kg. Many higher-cost silicon plants are no longer operating at current low prices and there is limited new capacity under construction.

Module prices decreased significantly in the second quarter of 2018 as the news from China impacted the market. We expect the module price to stabilise as volume picks up over the next two years.

Solar Installations, GW	2014	2015	2016	2017	2018e	2019e	2020e
World	46	56	75	98	94	120	134
Asia	26	35	48	73	59	66	70
North America & Caribbean	7	8	15	11	11	18	20
EU Europe	7	8	6	5	7	14	12
Central & South America	1	1	2	3	4	4	6
Oceania	1	1	1	2	4	4	6
Middle East & North Africa	1	1	2	2	4	4	5
Non-EU Europe	1	1	1	1	3	8	11
Africa (excl. North Africa)	1	0	1	0	1	3	4

Source: Bloomberg. Note: Sorted by 2018 forecast installations

Module Price ($/W)



Source: Bloomberg

Global solar demand forecasts have been revised downwards by analysts in the short term in response to demand from China decreasing in 2018. China's long-term appetite for new solar plants shows no sign of abating. China's air pollution levels remain high on the political agenda and GDP growth is driving an ever-increasing demand for energy. Most Chinese installations to date have been large, utility-scale

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projects; policy support is now increasing for the rooftop solar market, which provides a large additional unaddressed market to support continued growth. With these cheaper module prices, we expect an increased number of unsubsidised solar plants – both on rooftops and utility-scale projects.

The second-largest market for solar is the United States. Following the decision of the US International Trade commission to place tariffs on imported solar goods, the solar market is set to decline slightly in 2018. However, with the unexpected decrease in solar pricing, projects that were previously shelved for the future may be built and bolster short to medium-term global demand. It is worth noting that the US solar market is much smaller than the Chinese solar market. We continue to view the US solar sector as a sentiment driver for many solar-related stocks. The import tariffs create a market where any reduction in those tariffs will accelerate demand growth significantly. Demand growth is likely to exceed expectations as the fall in module prices has negated the impact of Trump's import tariffs.

India is now the third-largest solar market. India had set an ambitious goal of 100GW of total solar capacity by 2022, with 60GW coming from utility-scale plants and 40GW from rooftop installations. The likelihood of the goal being reached may be low, but the ambition is there. The country installed 4.4GW in 2016 and is expected to have installed almost double that in 2017 (c.8GW). The country has abundant sunshine, steadily growing electricity demand, high electricity prices, a weak grid and capable developers offering solar bids at or below coal power generation costs. The stalemate between importers of solar goods and trade officials has been partially resolved, with modules no longer classified as 'electrical motors and generators', a classification which draws a 7.5% tax. Again, with the cheaper-than-expected modules the incremental 7.5% will hardly be felt.

The rest of the world continues to see solar demand growth. In Europe, where several countries went through boom and bust cycles in the early 2000s as subsidies were introduced and then removed when too successful, solar demand is returning to growth. This is in part due to the 2020 renewable energy goals set for each country within the European Union, but mainly due to the competitiveness of unsubsidised solar – both rooftop and ground-mounted. Unsubsidised projects have been announced in most of the Mediterranean countries and are spreading to northern Europe.

Southeast Asian countries are considering low-cost policy structures, i.e. auctions or feed-in tariffs capped at local generation costs. These will support high volume growth. We view this region as having a lot of potential for solar installations.

The Middle East has disappointed many in the solar sector by announcing tenders and projects which ultimately did not result in as much installation as anticipated. However, projects are now starting to move from the drawing board to rooftops (or the desert floor) and the abundant insolation cannot be ignored as a natural resource advantage for the region.

Solar LCOE developments

The records set in Q4 2017 continue to stand: Enel's Chilean subsidiary dominated the most recent power auction, with one solar bid as low as $21.5/MWh, the second lowest ever recorded in Latin America. The lowest recorded in Latin America was in Mexico's most recent auction, coming in at $19.2/MWh. The lowest worldwide was a bid in Saudi Arabia's first auction at $17.9/MWh, a bid by Masdar from the UAE and France's EDF. The projects in Mexico and Saudi Arabia are due to come online in 2019. The Chilean bid of $21.5/MWh is for a project that need not be commissioned until 2024. Falling module prices increase the likelihood that these projects will be delivered and we expect to see further records set over the coming 12 months, reflecting the new lower pricing potential for solar.

It is worth noting how far the industry has come in terms of competitiveness. In 2014 the tariff of $58.5/MWh in Dubai was the lowest cost tariff for a solar project. Many analysts believed this to be an

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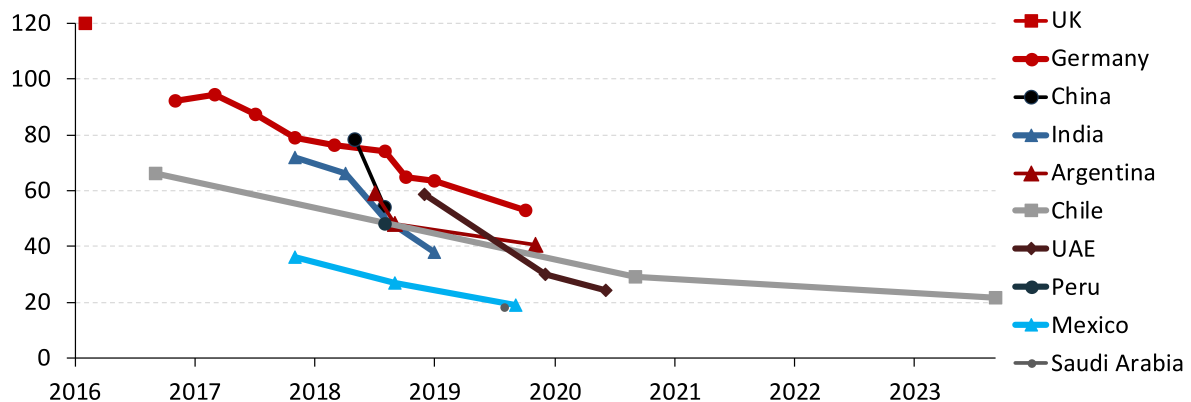
unviable tariff level that was awaiting some miraculous cost decline in equipment. Today such a tariff in a particularly sunny country such as the UAE would be ridiculed as too expensive.

PV bids by delivery date ($/MWh)



Source: Bloomberg, Cleantechnica, Guinness Asset Management

Wind

China is the largest source of wind power demand and its annual level of installations has reached around 20GW each year, which forms the majority of Asian demand (although analysts are forecasting a move upwards in Asian demand to 33GW in 2019). Europe is 20% of the global wind market, with demand between 9 and 12GW per year. North America comprises a similarly sized market, with good demand visibility through to 2020 as Production Tax Credits provide continuing albeit falling support. Although some projects in the United States may have been delayed as developers waited to see which version of the tax reform would be passed, there has not been meaningful demand destruction. Whether the tax reform will decrease appetite for tax credits from wind projects is yet to be seen, but they are just one way to finance a renewables project.

India has an ambitious target of 60GW of wind installations by 2022, but there is a lack of clarity as to how this target would be reached. India has seen several auctions and record-low wind prices this year, which should be good for overall demand. Latin America, like India, has been particularly encouraging, showing the world how low wind power pricing can go, and is a meaningful extra source of c.4GW of demand per annum. As the economic competitiveness of wind convinces more governments to put accommodating policies in place, this will complement increasing levels of unsubsidised wind in developed markets.

Wind installations, GW	2014	2015	2016	2017	2018e	2019e	2020e
World (onshore)	48	59	53	47	54	66	63
Asia	24	32	26	22	26	33	32
North America & Caribbean	8	10	10	8	11	14	14
EU Europe	10	10	11	12	10	10	11
Central & South America	4	3	3	3	4	4	2
Non-EU Europe	1	1	1	1	2	2	2
Middle East & North Africa	0	0	0	0	1	1	1
Oceania	1	0	0	1	1	1	1
Africa (excl. North Africa)	1	1	0	1	0	0	1
Offshore	1	4	1	5	4	6	7

Source: Bloomberg. Note: Sorted by 2018 forecast installations.

Offshore wind updates

In the Netherlands, Vattenfall won the country's offshore wind tender based on project design and developer experience, amongst other non-financial criteria. The tender was the first of its kind where there would be no direct subsidy per unit of energy. The project, should it be finished on time in 2023, will be the first zero-subsidy offshore wind farm to be constructed. Indirect subsidies include the

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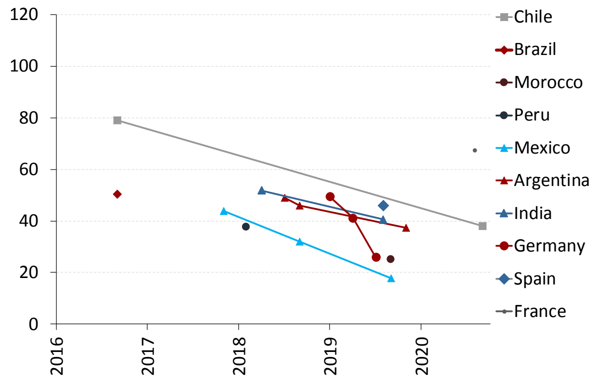
provision of the grid connection by the electricity grid operator, Tennet. The project is in shallow waters and close to the shore, making it less expensive. However, cost of capital will be higher than for subsidised projects, since the revenue streams of this plant are currently uncertain. Vattenfall could sign an offtaker agreement with corporates or sell its electricity to other utilities. It is encouraging that offshore wind projects continue to be built on a merchant basis.

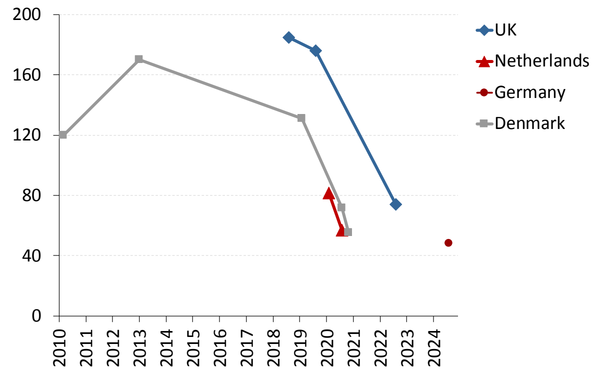
Wind LCOE developments

Onshore wind bids by delivery date ($/MWh)



Source: Bloomberg, Guinness Asset Management

Offshore wind bids by delivery date ($/MWh)



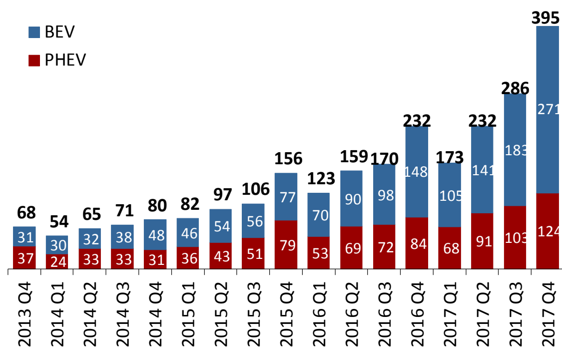
Source: UK government, Government of the Netherlands, Windpower Monthly, Vattenfall, Guinness Asset Management

Note: Projects have not been standardised for plant lifetime or financing cost and so values may not necessarily be directly comparable.

Developers are reaping the benefits of increased competition in the manufacturing space by getting more power out of the newer turbines for less capex. However, the power auctions sweeping the globe are also putting pressure on investor and developer returns. Nevertheless, the low $/MWh power prices wind is able to deliver, coupled with its ability to generate power overnight and not just during the day, as solar does, show that there is a long-term opportunity for the wind power sector. In most auctions held, a new record for that country or region was achieved.

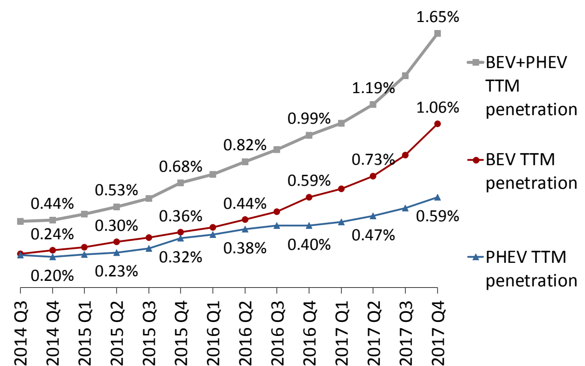
Electric Vehicles

Quarterly plug-in vehicle sales in selected countries (thousands)



Source: Bloomberg, Cleantechnica

Trailing 12-month plug-in vehicle penetration of new car sales in selected countries (%)



Source: Bloomberg. Note: TTM = trailing twelve months. Total EV sales across selected countries divided by total car sales in these countries show the penetration above.

Note: Selected countries include Austria, Belgium, Canada, China, Denmark, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, UK and USA. These countries were chosen for data availability and represent three-quarters of all car sales globally.

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Plug-in electric vehicle (EV) sales continue to increase year-on-year. We expect Q2 2018 to be another record quarter for plug-in electric vehicle sales given seasonal trends (our data sources lags by one quarter). The CAGR since Q1 2014 until Q1 2018 is 52.7% and the compound quarterly growth rate for the same period stands at 11.2%.

The trailing 12 months market share of plug-in electric vehicles has passed 1% in most developed markets and in China, closing in on the 2% mark. The growth rate of fully-electric vehicles, i.e. battery electric vehicles (BEVs), has been greater than that of plug-in hybrid electric vehicles (PHEVs), which have smaller batteries with a shorter range and still have a combustion engine for when the battery is depleted. More BEVs than PHEVs are being sold today, due to China favouring BEVs. Germany is on par with Norway, meaning the largest European country might soon be the third largest EV market after China and the US.

Car manufacturers have introduced more fully electric models to market in 2017 than any year before and all the main vehicle manufacturers are now developing electric vehicle ranges to complement or even replace their existing range of internal combustion engine vehicles. Tesla's Model 3 continues to be rolled out at a slower rate than hoped, but this has not stopped other car manufacturers from bringing out new versions of older models, like the new Nissan Leaf and Renault Zoe with longer electric range.

Portfolio changes

There were no active changes to the portfolio. One holding, Mytrah Energy, was bought out by its chairman in Q2 2018. The offered price was at a 64% premium to the closing price at the time of announcement. We have yet to replace the holding.

Edward Guinness
Guinness Alternative Energy Fund

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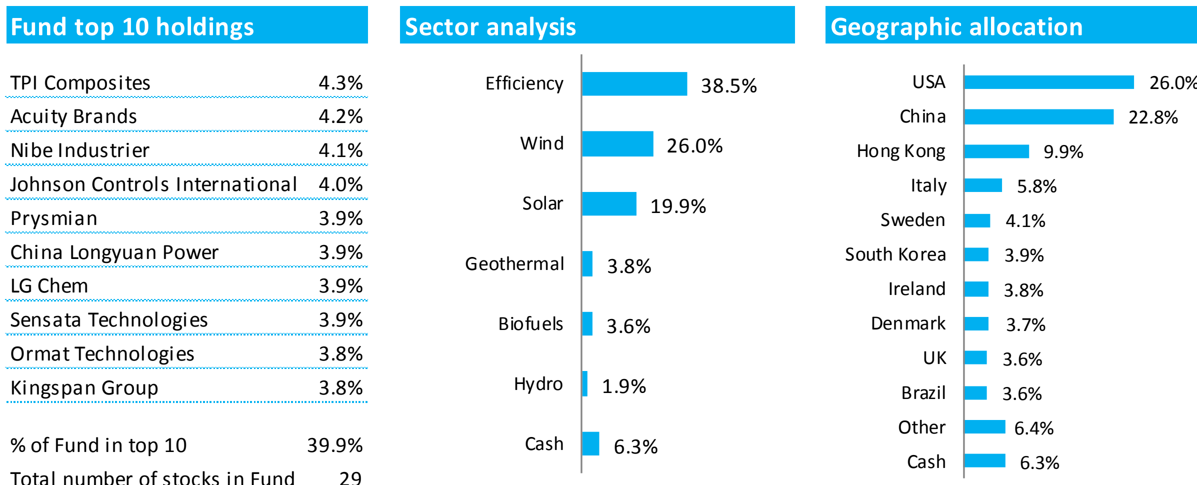
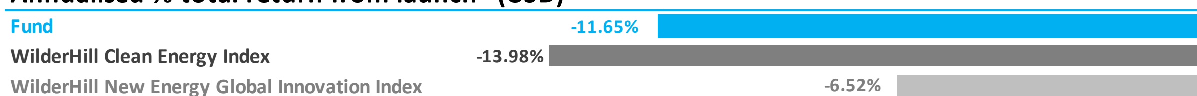
Guinness Alternative Energy Fund

PORTFOLIO **30/06/2018**



PERFORMANCE **30/06/2018**

Annualised % total return from launch* (USD)



Discrete years % total return (USD)	Jun '14	Jun '15	Jun '16	Jun '17	Jun '18
Fund	45.8	-20.2	-22.4	5.5	5.1
WilderHill Clean Energy Index	29.3	-21.2	-29.3	14.0	16.7
WilderHill New Energy Global Innovation Index	44.9	-7.0	-14.8	15.0	1.9

Cumulative % total return (USD)	3 months	Year-to-date	1 year	3 years	5 years	From launch*
Fund	-4.3	-4.4	5.1	-13.9	0.1	-74.0
WilderHill Clean Energy Index	0.2	-1.3	16.7	-6.0	-4.2	-79.6
WilderHill New Energy Global Innovation Index	-6.7	-9.6	1.9	-0.2	34.5	-50.8

RISK ANALYSIS **30/06/2018**

Annualised, three years, in USD	Wilderhill Clean Energy Index	Fund
Alpha	0	-0.53
Beta	1	0.71
Correlation	1	0.81
R squared	1	0.66
Volatility	14.37	13.66

*Fund launch date: 19/12/2007.

Performance data based on the Fund's 'E' share class (OCF: 1.24%), except periods starting prior to 02/09/2008, which are based on a composite of the Fund's 'A' share class (OCF: 1.49%) from Fund launch (19/12/2007) until the launch of the Fund's E class (02/09/2008).

Source: Bloomberg and Financial Express, bid to bid, (inclusive of all annual management fees but excluding any initial charge or redemption fee), gross income reinvested. Performance would be lower if initial charge and/or redemption fee were included.

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All returns stated here are in US dollars; which is the Fund's base currency. Returns in different currencies may be higher or lower as a result of currency fluctuations.

Important information and risk factors

Issued by Guinness Asset Management Limited, authorised and regulated by the Financial Conduct Authority.

This report is primarily designed to inform you about Guinness Alternative Energy Fund. It may provide information about the Fund's portfolio, including recent activity and performance. It contains facts relating to the equity markets and our own interpretation. Any investment decision should take account of the subjectivity of the comments contained in the report.

This document is provided for information only and all the information contained in it is believed to be reliable but may be inaccurate or incomplete; any opinions stated are honestly held at the time of writing, but are not guaranteed. The contents of the document should not therefore be relied upon. It should not be taken as a recommendation to make an investment in the Fund or to buy or sell individual securities, nor does it constitute an offer for sale.

Risk

The Guinness Alternative Energy Fund is an equity fund. Investors should be willing and able to assume the risks of equity investing. The value of an investment and the income from it can fall as well as rise as a result of market and currency movement, and you may not get back the amount originally invested. Details on the risk factors are included in the Fund's documentation, available on our website. Shareholders should note that all or part of the fees and expenses will be charged to the capital of the Fund. This will have the effect of lowering the capital value of your investment.

Documentation

The documentation needed to make an investment, including the Prospectus, the Key Investor Information Document (KIID) and the Application Form, is available from the website www.guinnessfunds.com , or free of charge from:-

- the Manager Link Fund Manager Solutions (Ireland) Ltd, 2 Grand Canal Square, Grand Canal Harbour, Dublin 2, Ireland; or,
- the Promoter and Investment Manager: Guinness Asset Management Ltd, 14 Queen Anne's Gate, London SW1H 9AA.

Residency

In countries where the Fund is not registered for sale or in any other circumstances where its distribution is not authorised or is unlawful, the Fund should not be distributed to resident Retail Clients.

NOTE: THIS INVESTMENT IS NOT FOR SALE TO U.S. PERSONS.

Structure & regulation

The Fund is a sub-fund of Guinness Asset Management Funds PLC (the "Company"), an open-ended umbrella-type investment company, incorporated in Ireland and authorised and supervised by the Central Bank of Ireland, which operates under EU legislation. If you are in any doubt about the suitability of investing in this Fund, please consult your investment or other professional adviser.

Switzerland

The prospectus and KIID for Switzerland, the articles of association, and the annual and semi-annual reports can be obtained free of charge from the representative in Switzerland, Carnegie Fund Services S.A., 11, rue du Général-Dufour, 1204 Geneva, Switzerland, Tel. +41 22 705 11 77, www.carnegie-fund-services.ch. The paying agent is Banque Cantonale de Genève, 17 Quai de l'Ile, 1204 Geneva, Switzerland.

Singapore

The Fund is not authorised or recognised by the Monetary Authority of Singapore ("MAS") and shares are not allowed to be offered to the retail public. The Fund is registered with the MAS as a Restricted Foreign Scheme. Shares of the Fund may only be offered to institutional and accredited investors (as defined in the Securities and Futures Act (Cap.289)) ('SFA') and this material is limited to the investors in those categories

Telephone calls will be recorded and monitored.