

Public Newsletter for the period ended
31 December 2018

1. Foreword
2. Market Commentary
3. Portfolio Review
4. A Salt and Battery

1. Foreword

Fellow Investors,

Welcome to the Lighthouse Advisors newsletter for December 2018.

This newsletter follows the same format as previous issues. The special topic for this issue is **A Salt and Battery**.

2. Market Commentary

2018 was a poor year for major stock markets as the US-China trade war weighed on investor sentiment. News indicating a slowdown in China's growth also dented hopes that China would keep the world economy humming. Many investors chose to sell out and wait on the sidelines, and their collective selling dragged markets south.

Market (Index)	Change
US (S&P 500)	-6.2%
UK (FTSE 100)	-12.5%
Japan (Nikkei 225)	-12.1%
China (Shanghai Composite)	-24.6%

China was hit especially hard in 2018 because the trade war coincided with a drive to reform many industries. Electric vehicles have been a key focus for China as it tries to lead the next automotive revolution, but subsidy reforms have hurt leading players who depend on subsidies for profits¹.

¹ *China Weighs Further Cuts in Electric-Car Subsidies*, **Bloomberg News**, 6 July 2018.

Likewise, reforms in Chinese healthcare have also brought pain. Supply chains were simplified with the "two invoice system" but this hurt many smaller players. A pilot program to change the drug procurement system from direct negotiations to open tenders has cut prices dramatically, resulting in large savings for the government, but correspondingly thinner margins for suppliers².

Given that the changes are positive for China as a whole, the momentum is clear. However, the impact is largely negative for corporations, so it seems prudent to stay cautious on healthcare for now.

Europe is still in the doldrums as politicians remain preoccupied with the what-ifs of Brexit. Companies have meanwhile made their preparations: European banks are relocating³, while Nissan has cancelled plans to build SUVs in the UK⁴.

Little more needs to be said about the bear market: hang on tight and stocks should recover, eventually. Indeed, January saw a meaningful bounce, suggesting that markets may be at or near a bottom. The next newsletter will cover the quarter ended 31 March 2019.

Benjamin Koh
Chief Investment Officer
Lighthouse Advisors
20 February 2019

² *China's push for bulk medicine purchases a big no-no for pharmaceutical firms*, **Healthcare Asia**, 12 December 2018.

³ *London to lose €800bn to Frankfurt as banks prepare for Brexit*, **The Guardian**, 29 November 2018.

⁴ *Nissan scraps plan to make X-Trail SUV in UK*, **Nikkei Asian Review**, 3 February 2019.

LIGHTHOUSE ADVISORS

Keeping Your Capital Safe

3. Portfolio Review

As at 31 2018, the Net Asset Value (NAV) of the Fund was USD 86.66. Net of all fees, the return for the fourth quarter was -8.1%, and for the full year it was -20.8%.

For reference, below are the changes in the Fund's key markets:

Market (Index)	1Q18	2Q18	3Q18	4Q18	2018
Singapore (STI)	+0.7%	-4.6%	-0.03%	-5.8%	-9.8%
Hong Kong (HSI)	+0.6%	-3.8%	-4.0%	-7.0%	-13.6%
Shanghai (SSE)	-4.2%	-10.1%	-0.1%	-11.6%	-24.6%
Fund	-0.4%	-4.3%	-9.7%	-8.1%	-20.8%

20 securities made up 82% of the Fund's holdings, with the balance in cash. NAV values are tabled in Annex I.

To protect the interest of clients, detailed discussion is confined to the client-only version of this newsletter. Client newsletters are embargoed for one year, after which they are made available online.

4. A Salt And Battery

Every so often, the mainstream media reports a shortage of some commodity and looming economic Armageddon. Depending on the era, this commodity might be whale oil, oil and gas, copper, uranium, rare earths etc.

“The best cure for high prices is high prices.”
- source unknown

Shortages lead to price increases, which catalyze the development and use of alternatives: in the 1860s whale oil used in lighting was replaced by petroleum-based fuel⁵, while during the 1960s and 1970s in

⁵ *Why Aren't You Worried about A Shortage of Whale Oil?* excerpted from **The Doomsday Myth: 10,000 Years of Economic Crises**, 1 June 1984.

North America, copper was costly and replaced by aluminum for wiring in homes⁶.

Today we discuss the electric vehicle (EV) and its key component, the battery. EVs are not new: the first EV was created in 1828, though lead-acid batteries were only invented in 1859. Electric taxis roamed London in 1897. But EVs based on modern lithium-ion batteries only became a commercial reality in 2005, in the form of Tesla's Roadster.

Mass-produced EVs are now available, not just from **Tesla** (Model S, Model X, Model 3) but also from the likes of **General Motors** (Bolt), **Nissan** (Leaf) and **BYD** (e6).

Given the rapid rate of technology improvement and cost reduction, industry observers expect EV demand to continue rising and eventually dominate global sales and production. The International Energy Agency estimates global sales will reach 4m by 2020 and 21.5m by 2030, with the global stock at 13m and 130m respectively, excluding two- and three-wheeled vehicles⁷.

However, current mass-market EVs are expensive compared to traditional internal combustion engine vehicles, mainly due to the cost of batteries. EV batteries today mostly use lithium nickel manganese cobalt oxide (NMC) technology. Nickel and manganese are currently cheap and abundant, which means the limiting elements are lithium and cobalt.

Any reasonable EV forecast requires that current production rates of lithium and cobalt be massively expanded to meet demand. However, to date, production increases have *not* kept pace, resulting in large and rapid price increases for lithium and cobalt. For brevity, we discuss only lithium here.

⁶ *The True Story Behind Aluminum Wiring - Part One*, **Carson Dunlop Home Inspection Training**, 21 March 2015.

⁷ *Global EV Outlook 2018*, **International Energy Agency**, 30 May 2018.

LIGHTHOUSE ADVISORS

Keeping Your Capital Safe

The rapid price increase in lithium has encouraged many speculative ventures, some small, some large. Among the latter is Bolivia's Salar de Uyuni, the world's largest salt flat. The salt crust covers a pool of lithium-rich brine estimated to contain 9m tons of lithium, or about 17% of the total current known global resources⁸.

Bolivia's current president Evo Morales is determined that Bolivia will not merely engage in lithium extraction, but also participate in downstream processing and manufacturing. But Bolivia lacks the required technical expertise. Past agreements signed with companies from Japan, South Korea and France never materialized. Yacimientos de Lito Bolivianos (YLB), the state-owned mining company, currently has an agreement with ACI, a German company, to build a US\$250m plant, with YLB owning 51% and ACI 49%. ACI has no prior mining experience, and no financing has been secured for the plant so far. It also plans to use untested technology from another German company, K-UTEC AG Salt Technologies.

YLB has a stated goal of producing 150,000 tons of lithium carbonate annually within 5 years, giving Bolivia a 20% share of world lithium output by 2022⁹. Most observers deem the project extremely ambitious, given ACI's lack of track record and Bolivia's disadvantages compared to its neighbour Chile¹⁰.

Chile has an ideal climate for brine extraction: intense sunlight and constant hot winds speed brine evaporation, and its coastal location and existing infrastructure make transport to ports for export relatively straightforward.

⁸ *Mineral Commodity Summaries, U.S. Geological Survey*, January 2018.

⁹ *Bolivia's Almost Impossible Lithium Dream, Bloomberg*, 3 December 2018.

¹⁰ *Bolivia: Where revolutionaries and lithium miners go to die, Richard Mills, Mining.com*, 26 December 2018.

Bolivia is landlocked and has to go through Argentina or Chile to get to a port. Its long rainy season slows evaporation, and its brine has more impurities (specifically magnesium) which raises processing costs. These differences mean that while Chile has already become an important lithium producer, Bolivia's dream remains just that¹¹. Chile's lithium output in 2017 was 14,100 tons, nearly one-third of the world total. Bolivia's total output in 2018: under 250 tons.

But the point about Bolivia's lithium project is not whether it will succeed, but that people tend to extrapolate recent prices into the distant future, making risky bets that rely on high prices persisting for an extended period. As for the likely outcome, recent history in the rare earths space may give lithium investors some pause.

"Rare Earths" is the term used for a group of 17 metallic elements. They are not in fact truly rare, simply difficult to refine. China accounts for some 90% of world output. These rare earths have properties which make them useful as permanent magnets in electric motors. EVs use large electric motors, so EV demand affects rare earth demand.

Officially, in order to conserve its own reserves, China cut export quotas sharply in 2010. This had the convenient side-effect of reducing rare earth prices for domestic EV companies.

However, prices outside China soared. **Molycorp** reopened its old Mountain Pass mine in California, **Lynas Corporation** built a new refinery in Malaysia, and Chinese smugglers exploited the price arbitrage.

Meanwhile, major end-users of rare earths, such as automotive companies, developed motors which used less rare earths¹², cheaper

¹¹ *Why Chile is leading South America in lithium production, CNNMoney*, 15 August 2018.

¹² *Toyota Develops New Magnet for Electric Motors Aiming to Reduce Use of Critical Rare-Earth Element*

LIGHTHOUSE ADVISORS

Keeping Your Capital Safe

rare earths¹³ (since they were not all priced the same) or even no rare earths at all¹⁴.

The investments by other producers and development counter-measures from end-users were so successful that in 2015, following a challenge at the World Trade Organization brought by the US, EU and Japan, China dropped its export restrictions. Prices have since fallen to 2010 levels or below, and today rare earth-related news is, well, rare.

For the record, Molycorp filed for bankruptcy in June 2015, apparently due to low rare earth prices. Lynas has survived due to a fortuitous

combination of a miracle-worker CEO, support from Japanese buyers, a Chinese crackdown on rogue suppliers, and growing demand from EVs and wind turbines¹⁵.

While it is not possible to predict how or when the prices of lithium or cobalt will decline, history suggests it is unwise to expect high commodity prices to persist. Someone, somewhere, will uncover a new deposit, improve technology to exploit marginal deposits, or simply find a way to reduce or eliminate the use of said commodity altogether.

❧ End ❧

by up to 50%, **Toyota Motor Corporation**, 20 February 2018.

¹³ *Honda develops hybrid motor without key rare earth metals*, **Automotive News**, 12 July 2016.

¹⁴ *LG Innotek Develops World's First "Rare Earth Free" Automotive DCT Motor*, **LG Innotek**, 28 August 2014.

¹⁵ *Rare earths supplier Lynas finally out of the woods*, **Australian Financial Review**, 4 July 2017.

LIGHTHOUSE ADVISORS

Keeping Your Capital Safe

Annex I

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2008										34.16	33.49	35.62	+4.3%
2009	34.57	33.52	33.37	36.69	46.20	46.00	50.06	49.68	52.66	54.17	56.68	59.94	+68.3%
2010	59.05	61.09	65.17	68.27	64.14	65.69	70.65	72.24	81.06	83.56	85.10	90.30	+50.6%
2011	87.21	86.29	88.13	92.81	90.85	91.35	91.17	83.69	69.04	78.23	73.00	72.88	-19.3%
2012	77.40	82.90	82.52	83.32	76.36	77.25	77.27	77.91	80.57	79.44	82.70	84.92	+16.5%
2013	91.43	97.36	99.96	100.24	99.14	95.09	98.50	100.00	100.86	102.24	102.63	102.93	+21.2%
2014	99.15	101.78	99.80	101.84	105.45	106.57	109.05	108.58	103.60	103.91	101.87	99.94	-2.9%
2015	97.97	98.16	97.74	103.80	103.69	100.99	96.17	85.91	84.17	88.91	86.20	86.35	-13.6%
2016	81.56	83.81	88.82	92.18	91.50	91.52	94.48	94.86	94.87	93.34	91.92	90.20	+4.5%
2017	93.18	97.08	101.10	101.39	105.74	107.11	109.67	108.57	109.35	112.57	108.28	109.41	+21.3%
2018	113.04	109.56	109.03	105.39	109.62	104.37	101.26	93.71	94.25	85.19	86.83	86.66	-20.8%

Note: The Net Asset Value of the Fund has been linked to the rebased NAV of the Reference Account, which had the same investment style. Until the launch of the Fund, the Reference Account served as the model portfolio for all the separately-managed client accounts. Its trading records were distributed to clients as proof that the Manager's interests were fully aligned with those of the clients. The Reference Account was started at the end of 2008 and became inactive following the launch of the fund on 1 September 2013.