

Harbour Investment Horizon

At the cusp of technological transition

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Despite economic uncertainty, technological transitions are picking up pace

Last week saw the coming together of 1,600 delegates, companies, analysts and thought leaders in Hong Kong at the annual CLSA conference, where not only does east meet west, but companies also showcase leading technological developments.

We attended 26 sessions gaining an efficient download on macro-economic developments (especially in China); on industrial change; on new insights in big data and healthy living; and on the scary world of artificial intelligence and virtual reality. We also had a whole day focussing on contrasting views regarding electric vehicles, solar energy and battery technology.

It is impossible to share all these insights without overloading both the writer and the reader.

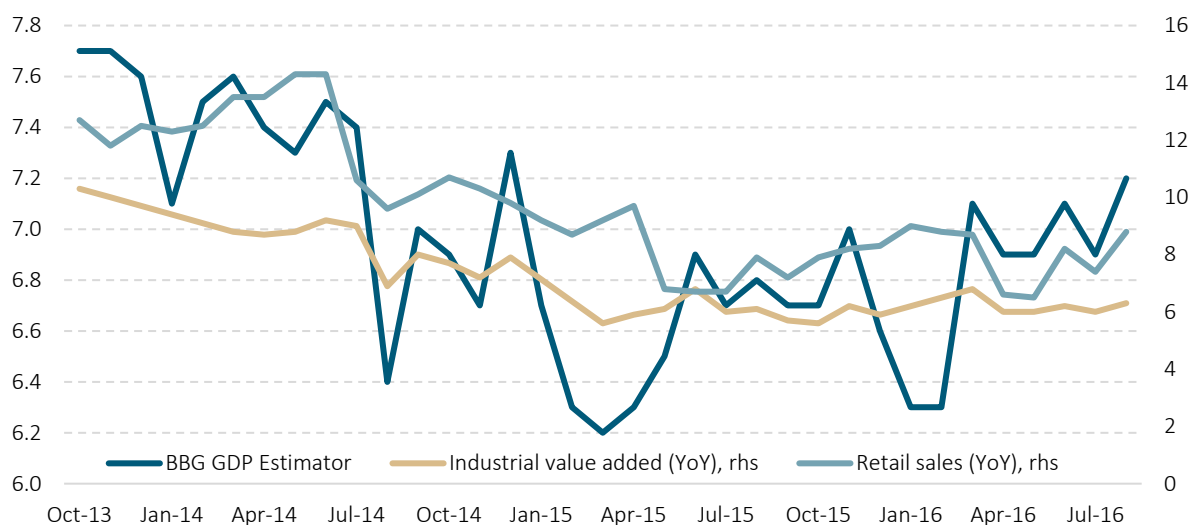
However, here are some immediate perspectives:

- Adoption of ESG (environmental, social and governance issues) and sustainable investment strategies is a strong investment theme, possibly surpassing the search for yield
- Despite all the uncertainty in the world, investors continue to be optimistic about growth prospects in Asia relative to the rest of the world
- Chinese growth in the near term may surprise on the upside, as may policy announcements, and this has implications for resources
- Chinese birth rates continue to increase as does the trend of both travel and migration
- The debate on income inequality is set to change the narrative on global economic policy
- Trump and Clinton agree on one thing - the US needs a lot more infrastructure spending
- Risk in the world economy is switching to the monitoring the current US growth pause, the forthcoming US election and the Italian referendum. Chinese financial risks persist, but seem to be off the radar as a global risk given the recent improvement in growth
- The confluence of energy transition, artificial intelligence, and big data creates questions for many industrial models, and even the structure of society
- Simple changes in lifestyle and medical practices could save communities billions in medical costs while also extending life expectancy for another decade; however current life expectancy trends are deteriorating in many socio-economic groups

Chinese growth in the near term may surprise positively

Several economists and commentators were more optimistic in the near term on Chinese economic activity. Chinese RMB devaluation risks have diminished, a stronger housing and infrastructure pipeline is supporting economic activity, and the global tendency for fiscal expansion may lift export growth. Some commentators were more optimistic on Chinese financial reform and the potential for land reform in rural areas as opportunities for 2017.

Chinese growth on a stronger footing



Source: Bloomberg, Harbour

Backing up on the stronger outlook for Chinese growth, many commentators also anticipated a basing in commodity prices, although no-one was particularly bullish on commodities. To put the growth outlook in context, most commentators were more confident in China actually recording a 6+% growth rate in 2017 than an acceleration in the growth rate. The implication was a better environment for Asia and Australia than currently expected.

The risks around this slightly more optimistic macro-economic outlook are centred on the valuation of assets (both bonds and equities) and politics - in the US and Italy. Beyond that time frame, many speakers talked about the politics of inequality, more so than any market oriented conference I have attended before.

As one adviser recently quipped:

“There is nothing obvious that makes us extremely nervous right now. But there are a number of policy trends we’re watching closely – especially with asset valuations elevated.”

- (NY-based Analyst, Strategas)

Digital transformation

Last week my colleague Kevin Bennett published his findings from a recent trip to a technology conference in the US¹. He observed the strong influence of mobile applications, big data and a number of evolving technologies.

Sometimes investment markets look forward a long way. That is why future trends in digital transformation and advances in energy and medical technology can impact equity valuations.

An overarching theme for markets today is that transforming technological change is being introduced in faster time frames. Mass consumer uptake of new technology has never been quicker, in part with mobile access leading the fast-paced adoption.

Societies are changing from humanist democracies - where every vote counts - to communities where "dataist" intelligence based on predictions from big data creates rules for personal and community decision making. Not only does this make life at work and in the home interesting as Mr Google has the answers to everything, but this transition **challenges both traditional profit models and the comfort we have with our political processes.**

Harbour's most recent thinking on artificial intelligence, the Internet of Things and virtual reality is largely covered off in Kevin Bennett's note; needless to say the future looks very different. For those of you who haven't watched the Microsoft HoloLens video clip I suggest a viewing.

<https://www.microsoft.com/microsoft-hololens/en-us>

But it is hard to imagine today the investment implications of augmented reality. In contrast **developments in energy technology** seem very real and may have an impact on the pricing of energy markets.

Energy in transformation



Source: Tesla

¹ A connected world: Tech observations from the US (Harbour Investment Horizon, 29 October 2016)

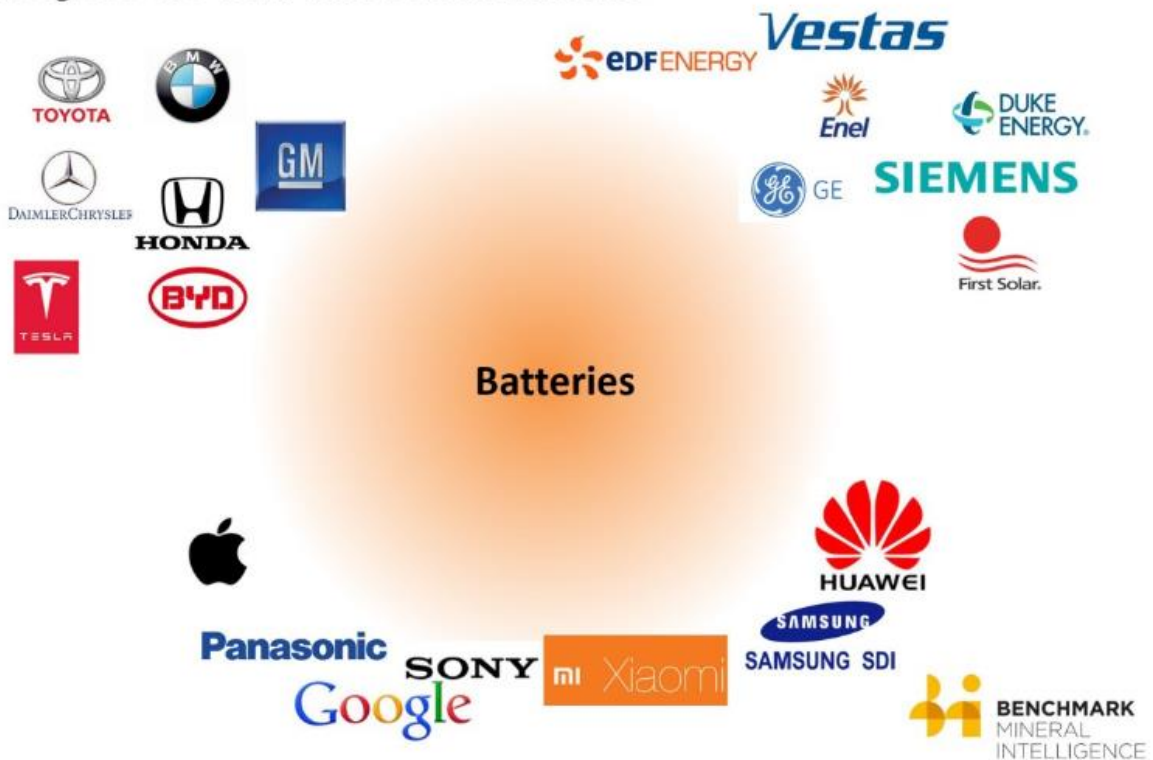
Energy impacts everyone, and investors are increasingly drawn into the conversation around Tesla, and especially Tesla's recent purchase of SolarCity.

For New Zealand investors this may seem a distant story, but it isn't; 19% of New Zealand's listed market sells either electricity or petrol. Last week when Apple purchased McLaren for \$1.5bn, for its electric vehicle (EV) and technical know-how, investors said that the hype over new vehicle and battery technology coming to the mass market will have real consequences. Earlier this year French oil energy giant Total purchased battery maker Saft for \$1.1bn, an almost 40% premium to its closing price. They said that Saft would "spearhead Total's ambition to accelerate its development of renewable know-how and expertise ... complementing the portfolio with energy storage solutions."

The most hotly debated issues in the energy debate seem to focus on the cost and efficiency of solar, and the cost of energy storage. Traditional energy utility executives (including America's largest utility Berkshire Hathaway Energy) and many Asian electricity utilities are now installing large scale integrated PV and battery storage within their ecosystems. Tesla and many other smaller disruptive energy providers tend to favour the cost efficiency and deployment of at-home, or small-scale integrated energy solutions.

So what's happening?

Convergence of 3 multi-billion dollar industries



Source: Benchmark Mineral Intelligence

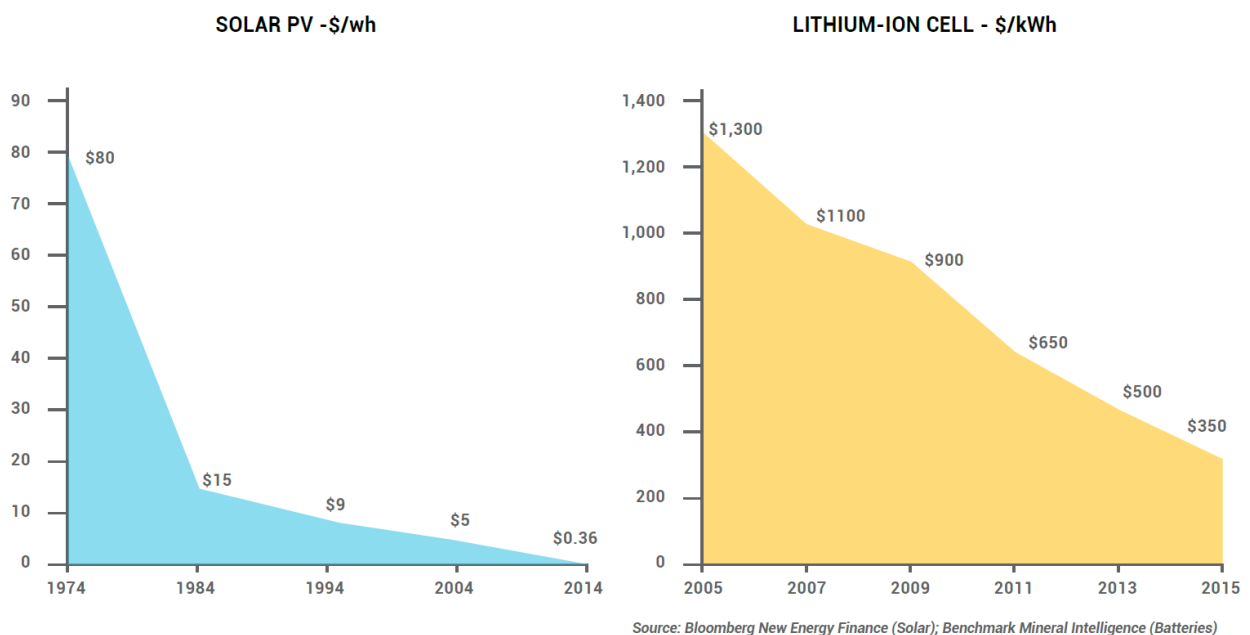
The story is well known. Three unrelated technologies are being integrated. First solar **photovoltaic** (PV) cell efficiency continues to rapidly improve. PV prices are falling bringing PV to the bottom end of the energy cost curve, excluding existing geothermal and hydro-electric

generators. Second **Li-on battery kW storage efficiency** has sharply improved and production costs are also falling. Third, **artificial intelligence**, the Internet of Things and big data are changing both the transport and energy industries. These three forces are seeing convergence and disruption in the world's three largest businesses: energy, transport and technology.

Consumers have now pre-ordered 400,000 Tesla 3 cars, and Tesla have brought forward delivery times to late 2017, ramping up production ahead of schedule. In 2018 Tesla will produce 500,000 EVs. The battery demand from Tesla alone is equivalent to an 80% increase in battery output. But that is only a fraction of the story. Three huge Giga factories are being constructed. They will each challenge to be the biggest buildings in the world. They will produce new Li-on batteries for cars, at home electricity storage units, PVs and EVs, and batteries for at home use and for the electricity grid.

The list of car manufacturers announcing production dates for EVs or PHEVs is growing. The world energy council now estimates the annual rate of global EV production will reach 7,500,000 in 2020. Estimates for Li-on production today are that we produce the equivalent of 60gW hours; that equals about 6 billion phone batteries. By 2025 this will most likely lift to a 500gW hours equivalent.

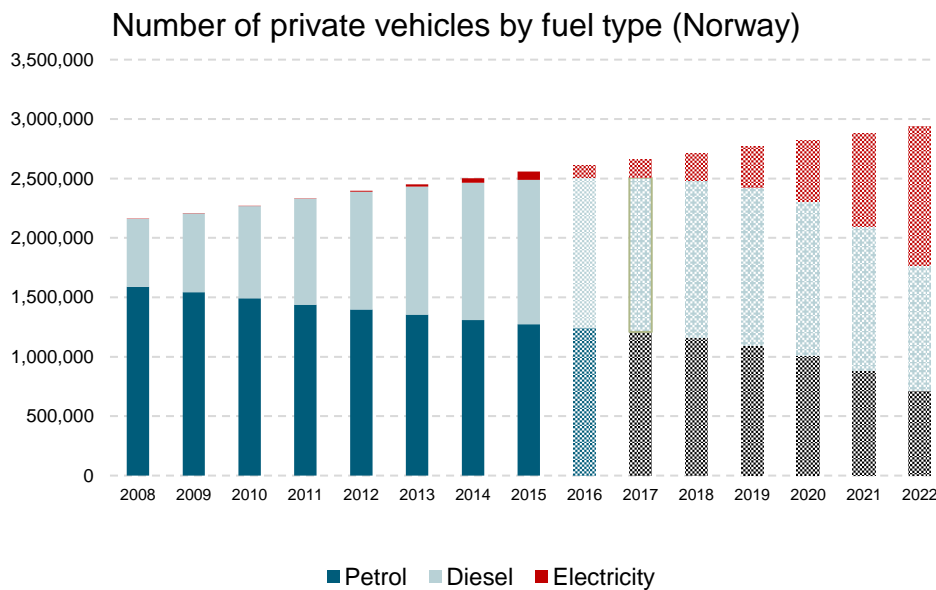
In addition to automotive use, a further development associated with price deflation in solar and battery cells is the deployment of batteries in homes and in the grid for energy storage solutions.



Each presentation we attended was certain on three things: the potential of even more efficient (and safer) solar and battery technology is emerging; we should expect further real price deflation battery based energy storage; and, that consumers will seek energy alternatives that are more environmentally friendly.

With respect to this final issue a key recurring issue in questioning speakers was whether the environmental costs of processing Li-on were reducing the green image of Li-on technologies. Several alternative battery technology companies presented at the conference that sought address the green versus clean issue.

How energy transformation impacts your portfolio today may not be intuitively obvious, but all these trends have the potential to change the structure of both the energy and transport markets. A trip to Norway to see the future might be on the cards.



Source: Bloomberg and Harbour estimates

This links to another theme: awareness of not only the environment, but the impact on society of investment decisions. Many corporates see the tide turning on income inequality, and are making positive change. Investors in part are forcing the conversation. It was powerful that Drew Barrymore was a guest speaker at the conference, talking about her business ethics and philanthropy. Investors ignore ESG matters at their peril. We'll be releasing a note by our ESG specialist Blaine Abraham in the coming days.

Fintech continues to shape discussions

Artificial intelligence, big data and Blockchain are also colliding and proving potential disruptive models in the financial services sector. However, a number of presenters were cautious about time lines and the actual potential scope for break-through fintech technology to disrupt, as opposed to enhancing corporate productivity. It seems that stock exchanges and companies requiring enhanced document security verification stand to benefit most from early adoption of Blockchain. We will be exploring Blockchain's potential to impact on the banking and payment systems in future research.

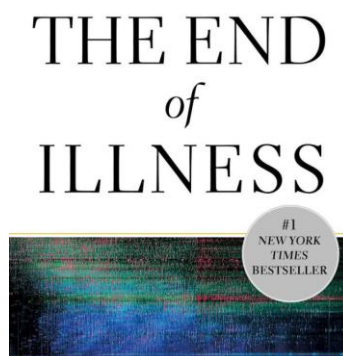
Presentations on **smart and advanced beta** developments continued to show patterns of strong funds growth and lower fees. Use of new non-financial data sources and artificial intelligence to

describe financial behaviour continue to see a lot of interest, but practical application again seems more distant in the context of anything but fast trading platforms.

How to thrive in the brave new world of health

Finally, we attended a lecture by David Agus, Professor of Medicine at University of Southern California where he leads the Cancer Centre and the Centre for Applied Molecular Medicine. We found the lecture so compelling we wanted to share it. The best way to do this is to suggest reading his latest book: *The End of Illness*. Agus shared what he has learned from his work as a pioneering cancer doctor. He revealed the innovative steps he takes to prolong the lives of not only cancer patients, but those who want to enjoy a vigorous, lengthy life. He believes optimal health begins with our daily routines. We will cover more of this topic in future communications.

"A convincing guide to some of the most confusing issues currently discussed in popular health writing." — *The Washington Post*



David B. Agus, MD

With a New Foreword and Epilogue

Andrew Bascand

Managing Director at Harbour Asset Management

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