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In this issue:

Exponential secret suppliers

Exponential growth + massive government backing = your chance to make 747%

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This month's recommendation sits at the heart of two of the most powerful trends in the world today.

The first is the exponential growth of a technology that is reaching its "tipping point" – where it hits the market in a big way.

The second is the world's second biggest economy massively upgrading its economy, putting billions – perhaps even trillions – of dollars of capital on the line to do so.

I think I've found the perfect way to play both trends. It returns to the idea of technology "secret suppliers", which I've discussed before. I'll come back to that shortly. The important thing to recognise is this is a story that's developing fast, right now. And I see the opportunity to make 747% gains.

Let's dive in.

A tale of two megatrends

We talk a lot about exponential growth here at *Frontier Tech Investor*. But sometimes it's worth taking a step back and considering just how quickly it can turn the world on its head.

Compound Interest is the most fundamental example of exponential growth I can think of and it is something we all have experience of. I grew up when interest rates were in the teens, so as a child I would go to the post office with my grandmother and we could check how the investment was growing. Those little saving certs paid for summer camps and part of college when I was a teenager so I've always been intrigued by compound interest and the rule of 72.

The rule of 72 is a handy mathematical tool for calculating how long it will take for a sum invested at a given interest to double. For example, 1,000 invested at an annual rate of

7.2% will take ten years to double (72/7.2).

At 14.4% it would take five years to double. That's impressive, not least because interest rates right now are nowhere near that figure so it could take a lifetime for one's money to double. My children don't have the same experience I had because they are growing up in an age where interest rates are nothing. The only way to achieve that kind of growth is to speculate, so instead of savings bonds we buy shares.

Let's map that idea on to the markets. We want to find examples of exponential trends that give us the benefit of compound growth (with the added benefit that exponential growth always surprises and shocks people when it's too late to do anything about it, giving us the chance to get in early).

Here's a major exponential growth trend: the market for electric vehicles grew at more than 50% a year between 2010 and 2016. **When a market is growing at that speed it doubles in less than a year and four months.**

MEGATREND #1: exponential growth

In 2016 the rate of expansion fell to about 40%, which means the market doubled every 1.8 years. If this were the interest rate you were getting at the bank the rate of inflation would be reminiscent of the Weimar hyperinflation. But this is exponential growth writ large. That's why Albert Einstein was so insightful when he said "Compound interest is the eighth wonder of the world. He who understands it, earns it… he who doesn't… pays it." Compound interest is not just about interest rates, it's about the human experience. Those of us who understand it benefit from it, those who don't get left behind.

In 2016 electric cars represented 2% of the global total. It's still a small number and linear thinking causes people to skip over the sector completely. They miss the fact it is growing at 40% ANNUALLY. That means if the growth merely holds stable, incredible things are going to happen.

By the end of 2018 it will be 4%. At the end of 2020 it will be 8% and by 2022 it will 16%. Linear thinking would think of this as an aggressive forecast, but that doesn't allow for the possibility the rate would reaccelerate to 50% which would mean the doubling is even faster. Even if the growth rate falls to 30% within the next five years there are going to millions of new electric vehicles on the world's roads.

Let's talk real numbers because all this talk of percentages doesn't have the tactile feel for how big this evolution is. In 2010 the global market for electric vehicles was around 50,000 vehicles total in the world. In 2015 the number of cars on the road was 1.25 million. In 2016 750,000 were sold to take the total to 2 million.

It's only January so we don't have global numbers for 2017, but we do have for the US. In 2017, 199,826 electric vehicles were sold in the US. That was 25% more than in 2016. Perhaps more importantly, 2017 was a down year for car sales in the US so the electric car market was able to grow even in a down market. The US car market sold 17 million vehicles in 2017. That means those electric car sales now represent about 1.1% of the total. What that tells us is the US market for electric vehicles is growing quickly but somewhere else is accounting for a lot more sales.

That place is China.

> They miss the fact that the electric car market is growing at 40% ANNUALLY.

MEGATREND #2: China is investing BIG in electric cars

I first visited Beijing in December 2005. The smog was like soup. Visibility was about 100 metres if you were lucky. I started coughing as soon as I got off the plane and didn't stop until I got back to London.

When I told my granduncle what it was like, he said that is what London was like when he

first arrived. They used to hang blankets over the doors and the smog would follow you in. He had a wonderful talent for exaggeration but even the most casual observer to our capital would wonder at the absence today of London's famous fog. Until this year, a visitor to any city in the northern half of China got a first-hand glimpse of London's smog 75 years ago.

China is now a middle-income country. More than any other factor, that means the economy derives more value from the productivity of its workers than it does from investing in infrastructure and property. That realisation has transformed the services sector; coming from nothing about five years ago to representing a vibrant source of growth today.

The one big bug bear people have is the pollution. It's not only a public health issue but is now something the government has to do something about if it is going to keep public unrest within acceptable limits.

Imagine if in your family there is only one child who carries the hopes and dreams of her parents and four grandparents but has to go to the hospital every other month because of a chronic lung infection. That's the daily reality for many of our family and friends back in Beijing. In a culture where criticism of the government is unwelcome, to say the least, pollution is one area where people really have a lot to say.

Global electric vehicles sales are increasing exponentially. China is mandating its economy shifts towards renewables and electric cars. That spells opportunity.

So it makes total sense the government is investing heavily in renewable energy sources and electric cars.

China is building solar panels faster than anyone. It is erecting wind farms fast as well and it announced in January that 1 million electric and hybrid electric vehicles will be sold in 2018 and that will ramp up to 2 million by 2020 for a total of 5 million vehicles by the end of that year.

That marks the convergence of the two major megatrends I've been outlining. Global electric vehicles sales are increasing exponentially. China is mandating its economy shifts towards renewables and electric cars. That spells opportunity. That's the reason I'm revisiting the battery sector in this month's issue. Chinese government sponsored profits are on the horizon and I want to carve out a piece for all of us.

Batteries are vital to the future of electric cars

You see, every one of those vehicles whether full electric or hybrid electric is going to need a battery.

I think at this stage most people have heard about Tesla Motors' battery gigafactory in Nevada that came online last year. It's called a gigafactory because when it reaches full capacity it will be the world's largest structure at over 5 million square feet and will represent a significant call on the global supplies of lithium, cobalt, graphite and nickel all on its own.

However, the primary success Tesla has had is in designing an all-electric vehicle that people desire to own. I know more than a few Tesla owners and they are all delighted with their purchases. The company has a fanbase whose only comparison is the commitment Apple inspires in its devotees. Every car manufacturer that wants to survive now has plans to emulate Tesla with their own electric and hybrid electric vehicles and the race is on to develop as much battery manufacturing capacity as possible to feed them.

On 1 February Contemporary Amperex Technology Ltd (CATL) announced an initial public offering (IPO) with the aim of raising $2 billion to build another gigafactory in China to rival Tesla's, which it anticipates having fully operational by 2020. That expansion will make it the world's largest producer of lithium batteries. Those batteries are all going to be for domestic

supply. The company is in discussions with Toyota, Honda, Nissan, Volkswagen and BMW to supply them all with batteries for their Chinese manufactured cars. It has job adverts in LinkedIn for positions in Detroit suggesting CATL has ambitions at dominating the global battery sector. All told, various Chinese interests have plans to take capacity up to 120 gigawatts.

It's a truly global trend. Daimler's subsidiary Accumotive has plans for a $550 million plant aimed to quadrupling lithium-ion battery production to 320,000 units. In Thailand, Energy Absolute has plans for a $2.9 billion factory which will take production up to 50 gigawatts hours by 2020. A US consortium is aiming to scale up a production plant to 50 gigawatt hours in Boston by 2020. The same consortium, in conjunction with Eastman Kodak, plans to copy that factory in Queensland, Australia.

Meanwhile Tesla has no intention of allowing these interlopers to take away its mantle of top electric vehicle manufacturer. It has plans for up to four more gigafactories, one of which will be in Europe and possibly another in Shanghai.

Bloomberg New Energy Finance estimates that global capacity will grow to 278 gigawatts by 2021 from about 103 gigawatts today.

Secret suppliers

This brings me back to my "secret suppliers" idea. I've spoken about this before, mostly in relation to our lithium and rare earth plays (Orocobre and Alkane Resources, respectively).

The concept is simple. When we see a new technology taking off, growing globally and being developed by multiple businesses, sometimes the smart thing to do is back a supplier. Find the scarce resources needed to produce the technology and invest in the firms that provide them. It's a simple strategy, but one that's done well for us so far.

The composition of all those batteries is made up primarily of three metals. We already have a position in lithium producer Orocobre, which is up over 100% and has just signed a non-dilutive deal with Toyota to increase current production at its flagship Olaroz project in Argentina from about 17,500 tonnes to 42,500 tonnes. The outlook for Orocobre is still very positive and it is right on track to delivering on the promise to be the world's pre-eminent pure play on lithium.

But this is about more than just lithium. There is three times more copper in an electric car than a conventional vehicle, not least because of all the additional wiring required, but importantly the copper in an electric vehicle is not required for the functioning of its battery. We could consider opening a position in a copper miner, but the problem with that is the fact copper is used in everything and while the price might rise because of synchronised global economic expansion, it would not give us a pure play on the evolution of batteries. Therefore, copper is not a particularly attractive avenue for playing the rise of electric vehicles.

The other two metals are nickel and cobalt and the best way to describe their relationship is like warring siblings. It's this internecine conflict that forms the basis for this month's recommendation.

> Sometimes the smart thing to do is back a supplier.

Historically cobalt has primarily been a by-product of copper and nickel mining. As discussed above, copper is not an appropriate metal for the cathode of a battery. That means the relationship between cobalt and nickel in the manufacture of a battery's cathode is where the value proposition lies. This is a story of brand new uses for metals superseding the conventional use case, shady regimes, and increasingly of substitution.

Increasing demand is sending cobalt prices through the roof

Two years ago, the price of

cobalt was $21,950 per tonne. At the time of writing, it is $80.750. By any definition that's an impressive move. Like any commodity there is both a supply and demand argument for why the price moved so abruptly and through understanding that relationship we can come to a conclusion about how best to play this market going forward.

We know that copper and nickel production account for the vast majority of cobalt supply.

The copper price topped out at just over $10,000 a tonne in 2011 and bottomed out at $4,372 in early 2016. Between the middle of 2014 and early 2016, nickel prices collapsed from $19,900 per tonne to $8,090.

Copper and nickel weren't alone. The industrial metals peaked in 2011, along with the wider commodity complex, and trended lower for five years to the early 2016 low. That lengthy contraction resulted in mining companies shelving expansion plans, firing miners and administrative staff and focusing more on free cash flow and survival than expansion. More than a few mining companies went bust or restructured, while the survivors closed uneconomic sites. That resulted in supply being withdrawn from the market and set up the conditions for prices to rally.

That reduction in supply of both copper and nickel meant that as prices finally bottomed and turned in early 2016, cobalt represented a high-beta play on the recovery in commodity prices. The fact that electric car ownership started to take off at the same time and is growing at an exponential rate helped boost prices even more and remains the base case for an investment in the cobalt complex.

The big question is, what's next?

Shady suppliers

Historically, the supply of cobalt to the global market was heavily dependent on the fundamentals of the global copper markets. The Democratic Republic of Congo and Zambia copper belts represent major sources of supply for the world's copper industry. Copper is a vital resource for the global economy and the Democratic Republic of Congo has been able to mine it productively and economically for years. As a result, this is also where the majority of the world's cobalt has come from.

The Democratic Republic of Congo has been known by half a dozen names in the last century, which if anything tells us more about the identity crisis facing one of Africa's largest countries than any other factor. Right now, President Joseph Kabila has been delaying elections since 2016, not least because he is constitutionally barred from running for the third term. Voice of America announced on 1 February that he intends to announce a successor by July in anticipation of a December ballot.

It is therefore no coincidence The Times reported over the weekend that Kabila is announcing a royalty increase for cobalt mining from 2% to 10% as well as a 50% levy on excess profits. That's going to result in a $250 million windfall tax for Glencore alone.

The DRC is geopolitically unstable and if the election does in fact pass off it will probably install a Kabila puppet so the status quo is sustained. War has been a constant barrier to develop over the last 40 years, which represents a continued non-trivial risk. Due to the fact that mining royalties represent the vast majority of the country's income, any administration can be expected to ensure production survives regime change. However, that does not protect mining companies from additional taxes as we have just seen.

That means we'll take a pass on investing in the DRC for now.

But this is an opportunity worth hunting for. The growth figures predicted for cobalt demand are truly incredible. For example, investment bank UBS estimated last year that the eventual end

This is an opportunity worth hunting for.

state of the transportation sector, at 100% electrification, will result in **1,928% of additional new cobalt demand.**

Many companies see cobalt as a way of avoiding the high cost of using metals like platinum and palladium, which are priced in ounces rather than tonnes. For example, researchers at the University of California announced on 29 January they have discovered how to use cobalt as a catalyst in a new kind of fuel cell which reduces the high cost of production by 99%. The high cost of fuel cells is why we don't see more of them. If the cost can be reduced by this order of magnitude, it is going to merit a whole issue all to itself in the near future.

The secret behind element 27

It was when I read this story that I knew I had to write to you about cobalt. Something clicked in my head because the magic number for compound interest and exponential growth is 72. Cobalt's atomic number is 27 so it is the mirror image of exponential growth. Believe me I know this is nothing more than a coincidence, but I thought it was a coincidence worth bringing to your attention anyway.

Until now the vast majority of cobalt has been produced as a result of copper mining. However, cobalt is also a by-product of nickel mining.

Today, the vast majority of nickel is used in the manufacture of stainless steel. The quality of nickel produced for this purpose is not particularly fine and is primarily a by-product of nickel pig iron mining. China accounts for a large quantity of this low-quality nickel, but while it is suitable for stainless steel production it is not pure enough for batteries.

Researchers at the University of California announced on 29 January they have discovered how to use cobalt as a catalyst in a new kind of fuel cell which reduces the high cost of production by 99%.

That is why the London Metal Exchange (LME) is currently talking about splitting the nickel contract in two. The first contract would cater to the needs of the stainless steel industry, while the proposed nickel sulphide contract would provide the feedstock for the global battery sector which requires much greater purity. Right now, nickel prices are improving but it's still largely a stainless steel story until the new contract is confirmed.

When that happens, the demand for both nickel and cobalt will help to drive interest in the nickel mines which produce nickel at higher grades. It will mean that nickel miners will offer the kind of pure plays on evolving battery chemistry that copper miners will never be able to do. Right now, only about a third of all the nickel produced globally is appropriate for battery production.

This month's pick

That is why I am recommending **Sherritt International.**

Sherritt International is active in Madagascar, Cuba and Canada. Its primary business is nickel mining so cobalt is a by-product of that low-cost production business. The company estimates that its Cuban operations account for 4% of global cobalt supply and its Madagascar operations for 3%.

In line with the estimates about the ratio of nickel, manganese and cobalt quoted above, Sherritt International estimates that every 50 kilowatt/hour battery will require 34.4kg of nickel, 4.3kg of manganese and 4.3kg of cobalt by 2025 from 24.1kg for each at present.

As well as that, it focuses its production on high-purity nickel with 100% of production going to Class I nickel in briquette form.

In Cuba, the company has a 50/50 partnership with the government and has 37,000 tonnes per year of nickel production. It is also the island's largest independent power producer with the management of the Varadero power facilities and produces oil at a cost of $9.75/barrel. In 2016 that portion of the business accounted for $84.4 million in revenue. In 2016 it also opened its own acid plant which removes the need to import and helped to

further reduce the cost of nickel production.

The company has been actively pursuing cost reduction measures, not least because of the challenging price environment that has prevailed in nickel markets over the last seven years. This means cost per pound has fallen from $3.55 to $1.94 in the year to the end of the 3rd quarter 2017. That resulted in the cost of nickel production being the company's lowest since 2004.

With such a rosy picture you might ask, why isn't the price higher? The first reason is that the company has $720 million in unsecured debentures but it has already negotiated extending their maturities out to 2021, 2023 and 2025.

It has also deferred payments on $565.1 million of principal payments on its Ambatovy project to 2021 or earlier. In the meantime, it had $291 million in cash equivalents at the last reporting on 30 September 2017.

At the same time, the company has recently removed $1.3 billion in debt from its balance sheet after restructuring the terms of a joint venture in Madagascar with the Sumitomo and Korea Resources corporations, while still operating the mine there until 2024.

In aggregate this means the company has a clear runway to book profits without having to worry about debt payments until 2021.

The company has just completed placing C$132 million of additional shares at a cost of C$1.40. The dilutive effect of that placement resulted in the price of the share falling back to test the C$1.20 area. However, with that event now complete and with continued strength in the nickel and cobalt markets I believe this represents an opportune time to purchase the share.

My target price is $2.50 within the next 12 months as the nickel price recovers further and more investors look at the nickel/cobalt market favourably. In the event that the LME splits the nickel contract and the ratio of nickel to cobalt use in batteries continues on its current trajectory, I expect the share to trade at C$10 within three years. That would represent a 747% gain from today's prices.

The biggest risk to the share's recovery remains the difficult trading environment nickel has been under. If the price fails to rally there will be little incentive for investors to support the share in as optimistic a manner as I am expecting. Meanwhile, while it is a significant nickel miner there are larger operations which could decide to invest the capital necessary to upgrade their operations, which would then represent a threat.

I think those risks are worth it. With electric car demand picking up worldwide – and China specifically backing the industry in a big way – I think right now is the time to move on this opportunity. As we see electric cars compete with "regular" cars increasingly on the streets of Britain – and worldwide – owning a stake in a secret supplier could be the smartest thing you do in 2018.

Name:	**Sherritt International Corp**
Ticker:	**S CN**
Closing price as of 06.02.2018:	**C$1.18**
Buy up to:	**C$1.80**
52-week high/low:	**C$1.87/C$0.74**

Figures accurate as of last market close: 06.02.2018

Past performance:

Data as of 06/02/2018

Energy

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Orocobre Ltd	ORE. AX	07/04/16	A$ 2.92	A$ 6.60	126.03
Ormat Technologies	ORA on NYSE	06/06/17	$58.79	$65.29	11.06
Smart Metering Systems	SMS LN	03/10/17	735.5p	710p	-3.47
Sherritt International Corp	S CN	06/02/18	C$1.18	C$1.18	0

Technology

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Cyberdyne	7779	30/05/16	JPY 2,353	JPY 1,880	-20.10
IBM	IBM LN	07/06/16	$153.33	$152.53	-0.52
SAIC	SAIC US	05/07/16	$58.20	$71.66	23.13
Garmin	GRMN US	02/08/16	$55.75	$60.79	9.04
2U INC	TWOU: US	06/02/17	$33.25	$69.10	107.82
Cisco Systems Inc.	CSCO: US	03/04/17	$33.80	$38.78	14.73
Advanced Micro Devices	AMD US	26/07/17	$14.76	$11.57	-21.61
Microsoft	MSFT	31/07/17	$73.04	$88.00	20.48
Northrup Grumman	NOC US	06/07/17	$301.66	$322.37	6.79

Medical

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Terra Tech Corp	TRTC	11/10/16	$0.41	$0.28	-33.25
Autodesk	ADSK	19/07/17	$108.83	$109.18	0.32
Abcam	ABC	07/03/17	907.5p	1248p	37.52
Zynerba Pharmaceuticals Inc	ZYNE: US	03/04/17	$20.10	$10.77	-46.42
Illumina	ILMN	04/09/17	$207.15	$213.00	2.79
PureTech Health	PRTC-L	09/01/18	155.75p	176p	13.00

Moonshot

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
SolarWindow	WNDW	07/04/16	$3.96	$86.86	73.23
Alkane Resources Ltd	ALK: AU	05/09/16	AU$ 0.31	AU$ 0.28	-8.20
Editas	EDIT: US	07/03/17	$21.02	$33.98	59.68
Haydale Graphene Industries	HAYD	02/5/17	178.5p	118.50p	-33.61

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