

PEAK OIL, PEAK GOLD, PEAK WHATEVER... PHOOEY!

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PEAK OIL, PEAK GOLD, PEAK WHATEVER ... PHOOEY!

By Mickey Fulp

Non-renewable natural resources (e.g., industrial metals, precious metals, agricultural minerals, industrial minerals and rocks, energy fluids, and energy solids) are extracted from Earth's surface and its depths. Exploitation of these resources naturally leads to depletion and more must constantly be found, developed, and mined. In our economic system, unit prices of commodities reflect current supply and demand fundamentals.



here are two distinct and diametric philosophical positions on availability of adequate supplies required to meet future demand of nonrenewable natural resources.

On one side are the optimists, i.e., those who generally view a glass as half-full. These folks are called "cornucopians". They surmise that Earth contains an abundance and in fact, a bounty of all resources that mankind requires for his well-being, prosperity, and longevity as a species. Furthermore, they postulate that we will never run out of a critical resource, will find a substitute, or will invent a technology to get what we need when we need it.

The basis of cornucopian philosophy is capitalistic; i.e., as a resource becomes scarcer its price will rise. Stimulated by higher value, more will be found, developed, and produced, more will be recycled, new technologies will require less of it, and if beneficial or necessary, a substitute will be found. Inhabiting the other side are the pessimists, i.e., those who view the very same glass as half-empty. They are the malthusians, disciples of Thomas Malthus, a late 18th to early 19th Centuries English cleric, professor, and economist who predicted the pending decline of mankind due to rapid population growth that unless controlled, would outpace agricultural growth. He postulated that cycles of population growth in times of plenty beget famine, disease, and war in times of scarcity.

The malthusian philosophy looks at increasing demand as a negative. It universally predicts supply deficits, critical shortages, and economic crises leading to catastrophic cultural and societal declines in the human condition or even our extinction as a species.

Avowed iconoclast George Carlin added a bit of levity to this dichotomy by observing that the glass is twice as big as it needs to be. He had a point.

But I digress...



As an economic geologist and analyst, I am by nature an optimist (though always skeptical). With that philosophical mindset, I embrace the cornucopian viewpoint.

And today, I will unequivocally illustrate in a series of facts, figures, and graphs why the malthusians and other assorted pessimists and nihilists of their ilk (e.g., the religious enviro-fundamentalists and the ecosocio-fascists) have been, are, and will always be ...

Absolutely WRONG in their cynical, gloom and doom opinions of humankind and the bountiful planet on which we live and breathe.

In a think-piece a few years ago, I responded in print to a media query of whether Earth has ever run out of a natural resource. Based on my unabashedly cornucopian views, you may be surprised by the reply (*Mercenary Musing, March 19, 2012*). I answered yes but could only come up with one example and there were unique circumstances that led to its near exhaustion.

Read this short essay to learn the particular commodity and why it was all but used up in less than 35 years. Quite predictably, a substitute was soon discovered, a war was fought to control the new commodity, and the industry that needed it continued to

prosper. Since that period over 140 years ago, a second substitute that is man-made now supplies the exponentially growing world demand.

Let's flesh out the meat on the bone now. To establish my cornucopian case, I present evidence from four of the world's most valuable and essential commodities: Oil, iron ore, copper, and gold.

Oil is the most important natural resource exploited by modern man. The world's economy literally runs on oil and it supplies 33% of our annual energy needs. World oil production has long been predicted to decline in the nearto intermediate future. This platform grew out of a misappropriation of the thesis of a brilliant geologist and geophysicist, King Hubbert, in the late 1950s. Dr. Hubbert studied and wrote about giant oil fields and districts in the United States. Because all oil and gas fields have a natural and significant decline curve, Hubbert used historical data to predict that US oil production would peak in 1970.

And he was right on the money: US oil production did indeed peak in November 1970 at 10.0 million bbls/ day. It then fell off dramatically and dropped to little more than half that amount 30 to 40 years later.

"Peak oil" production for the world was in particular favor by the malthusians in the mid-2000s given rapidly increasing demand from China and other historically poor countries as they assimilated into the modern global economy.

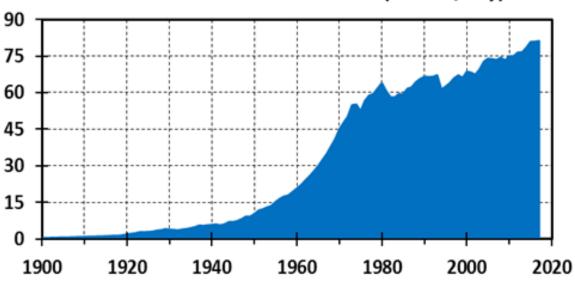
Despite an exponentially growing population and worldwide increases in the standard of living in the 20th and 21st Centuries, we have nevertheless constantly and continuously produced more oil to meet burgeoning demand.

In this graph, I illustrate world oil production in millions of barrels per day from 1900 to 2017:

Annualized growth in crude oil production has averaged a whopping 4.7% since 1900. Note the overall steady increase in demand thru 1920, the production surge as the automobile became a way of life in the US after WWI, the drop off during the 1930's depression, and a steep rise during and after WWII that continued thru 1960.

The latter 60-year period shows the accelerating increase in demand that continued until the first Middle East oil embargo and recession of 1973-1974. This was followed by robust growth until the second oil embargo and another recession in the early '80s. Overall demand has continued to increase over the past 35 years but with numerous perturbations that reflect geopolitics in the Middle East, the rise and fall of OPEC's power over world oil markets, accelerating demand from China and other developing countries, and most recently, the shale oil revolution in the United States that has more than doubled domestic production since 2008.

The relative flattening in the world production curve from 2015-2017 reflects a price crash in late 2014 largely driven by the phenomenal increase in US production. It hit an alltime record level in November 2017, 47 years after the prescient Hubbert was proven right.



World Crude Oil Production (M bbls/day)

Indeed, there has been a vast oversupply of crude oil for the past four years. It first resulted in weak prices and was followed last year with voluntary cuts by OPEC and Russia, in whole amounting to about 1.5% of annual production. These cuts were designed to stimulate prices and reduce record oil inventories. But domestic shale production just keeps going up, despite bottlenecks in pipelines to refineries and inadequate export capacities. Production is 11.7 million bbls/day and is projected to average over 12.0 million in 2019.

Folks, the malthusian prediction of peak oil that came across so loud and so vociferously ten to fifteen years ago was just a bunch of malarkey. In fact, the exact opposite has occurred: we have found, developed, and produced way too much oil over the past few years and have overwhelmed a yearly growth in world demand of 1.3-1.5%. All our numbers are from the US Energy Information Agency (EIA) and do not include natural gas liquids or condensate production. That said, crude oil production will be very near 30 billion bbls in 2018.

As an aside, note that 70% of the oil contained in fields discovered throughout the world remains in the ground and awaits development of the ways and means to extract economically.

Meanwhile, technological advances such as horizontal drilling and fracking have enabled additional production in old fields and basins from tight shales that until a decade ago, were viewed only as the source rocks for oil and not as potentially productive reservoirs. These new recovery techniques have been applied extensively to US onshore basins but at this juncture, nowhere else in the world to any extent.

Offshore exploration, development, and production technology has also made significant advances over the last few years with drilling in much deeper water and more remote targets now feasible. There are oil-bearing sedimentary rocks all around the globe and they are scattered throughout 500 million years of the geological record. Oil production is geographically diverse: Three countries currently produce more than 10 million barrels per day and another 17 produce more than 1 million barrels. In total, 41 countries produce greater than 100,000 barrels of oil each and every day.

You say, "Peak Oil." ... I say, "Phooey!"

Iron is overwhelmingly the most important metal consumed on Earth, comprising about 95% (as iron ore) of the total annual output from mining of metals. Iron ore is a very low value bulk commodity priced by the tonne. Unlike most other major metals, it is not traded on world exchanges or derivative markets but instead is priced mostly by annual contract negotiations between miners and consumers and a spot market.

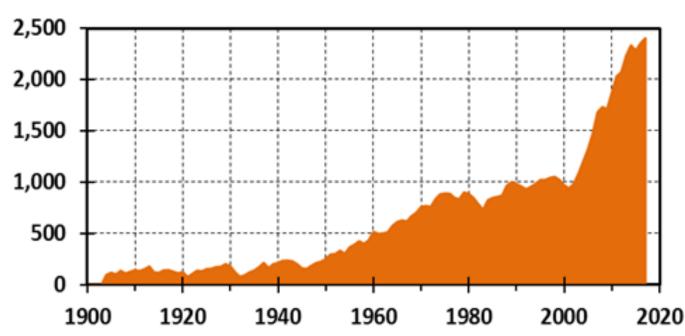
The world mine production chart for iron ore since 1904 (1900-1903 are not 🔊



🔊 available from our USGS source) is again a story of increasing demand for over 110 years:

From 1904 to 2017, the worldwide mining of iron ore increased over 25 times, from 95.5 to 2400 million tonnes for an

annualized growth rate of 2.9%. On a yearly basis, production increased and declined in a volatile fashion, affected



World Iron Ore Production (M t)

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Tel: 416 221-4124 email: Romios@Romios.com web: www.romios.com by both macroeconomics and armed conflict thru the middle of World War II.

With a post-war economic boom first driven by the United States and then by the rebuilding of Western Europe and Japan, iron ore production surged in a steep line thru the late 1970s. From the early '80s recession until the late '90s, growth was uneven but production grew to over a billion tonnes per year.

Then in 2002, demand for iron ore rose dramatically when China embarked on by far the largest program of industrialization and infrastructure build out in history. Over the past 15 years, iron ore production has gone from 1100 to 2400 million tonnes per year.

This rampant growth is slowing now but has shown little evidence of regressing. Shy of a major world economic recession, iron ore production is expected to remain strong with India and other countries in eastern Asia next to assimilate into a modern market economy.

The Earth is geologically endowed with vast quantities of near-surface iron ores in bulk mineable accumulations. Most of them formed from 2.4 to 1.8 billion years ago as sedimentary rock deposits when photosynthesis by blue-green

As with iron ore, a significant and growing amount of copper is recycled. In 2016, it comprised 29% of global usage according to the ICSG.

> algae caused the oceans to become oxidized. Dissolved iron in the water was precipitated as iron oxides and accumulated in massive deposits on the sea floor called banded iron formations.

> The USGS lists current iron ore resources at 800 billion tonnes. Given 2017's record production at 2.4 billion tonnes,

these resources constitute over 330 years of supply at current mining levels and grade requirements. Many giant deposits of lower grade material are known but are not presently economic.

Note also that iron is the fourth most abundant element in Earth's crust, behind only oxygen, silicon, and aluminum. The possibilities for iron ore resources are endless. In addition, a significant percent of annual iron and steel production is from recycled materials.

So folks, I think we can rest assured that the world is not going to run out of iron ore.

Next on the agenda is copper, aka the metal with a PhD in economics. Copper is required for everything electrical and is used extensively in building materials and alloys. As such, it is the third most utilitarian metal, behind only iron and aluminum.

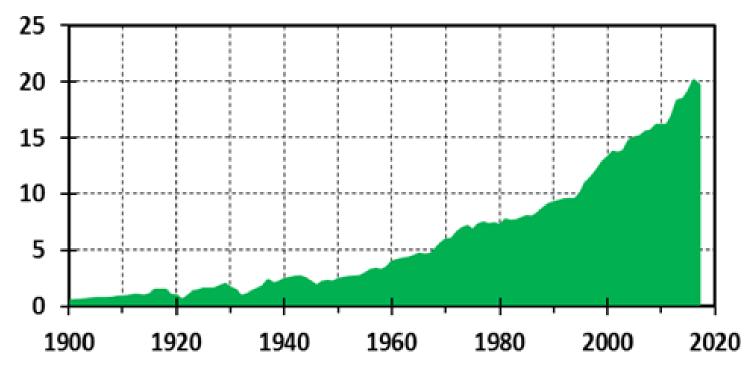
Since 1900, annual mine production of copper has increased quite systematically



from slightly less than half a million to over 20 million tonnes per year (>40 times) for annualized growth of 3.2%. Annual A graph of mine production from 1900 to 2017 follows:

From the advent of WWII to the height of the war in 1943, copper mining peaked. Although it did not recover

World Copper Production (M t)



worldwide consumption is best reflected by refined copper that includes scrap and recycled materials; it now amounts to over 24 million tonnes.

The rapid growth in copper consumption is driven mostly by electrification. World population and per capita consumption has grown from 2.6 billion people at 1.2 kg each in 1950 to 7.3 billion people at over 3.2 kg each in 2017. That, my friends, is astounding. The connection of copper production to world macroeconomics and geopolitical events is welldocumented by this graph. There was a steady increase in mined copper from 1900 to WWI, then a steep drop off as the economy recessed after the war. In the Roaring '20s, production soared until the crash of 1929. It bottomed at the depth of the depression in 1932 and took until the late 1930s to recover.

that level again until the early 1950s, production has been on the uptick constantly from 1946 to the present with hardly a respite as the world has and continues to become increasingly electrified. Brief perturbations occurred during periodic recessions over this 70-year interval.

Theemergenceand rapid industrialization of China starting in the mid-1990s is marked by a much steeper curve of



increasing mine production. In fact, world copper production doubled from 10 million tonnes in 1995 to over 20 million tonnes in 2016. China now accounts for about 45% of annual copper demand.

There is a dearth of new copper projects on the near-term horizon. I submit this has mostly to do with four years of low copper price and a concomitant lack of new development. It is generally accepted by analysts that a long-term base price of \$3.30/lb is required to stimulate financing and development of new copper mines. Average mine grades for copper have declined dramatically in recent years. But that is the general nature of all metals extracted over time. Easily discovered, surficial, highgrade deposits are exploited first. The history of mining for all metals has been one of larger tonnages, declining grades, and lower prices on a constant dollar basis.

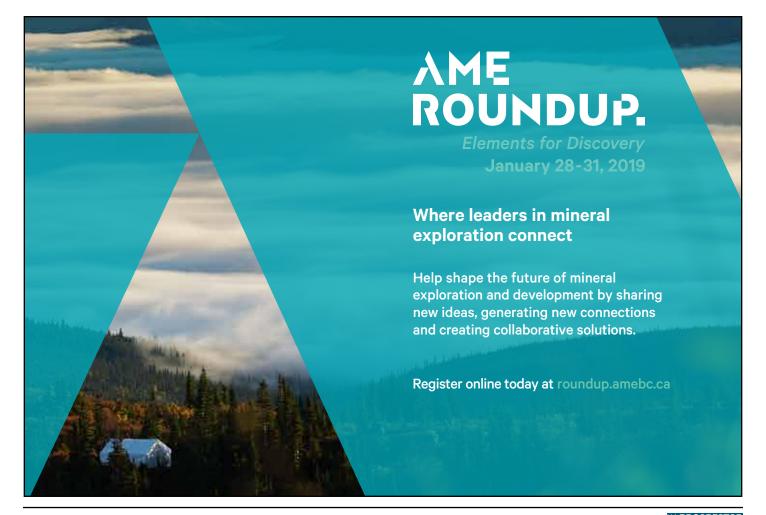
Be aware that there are thousands of known, drilled-out copper deposits in the world that are currently too low grade, too deep, too difficult to process and recover, too remote, too climate-challenged, too far from infrastructure, too large, too small, and/or too geopolitically risky to attract capital for development and mining in today's macroeconomic and nationalistic climate.

As with iron ore, a significant and growing amount of copper is recycled. In 2016, it comprised 29% of global usage according to the ICSG.

If supplies become short and insufficient to meet demand, then the price of copper will go up, new technologies will be developed, and some of the many known deposits will become economically attractive. That said, recall that the definition of ore is rock that can be mined at a profit. A corollary acknowledges the importance of economics over time: What was ore yesterday is not always ore today and may or may not be ore tomorrow (Mercenary Musing, August 25, 2008).

But folks, here's an ace in the hole: The USGS estimates there are 2.1 billion tonnes of known copper resources and another 3.5 billion tonnes of "undiscovered resources" in the ground. At current mine production levels, these numbers equate to a ready supply for the next 280 years. As with iron ore, a significant and growing amount of copper is recycled. In 2016, it comprised 29% of global usage according to the ICSG.

Plus substitution is always looming. For instance, remember back when phone and cable TV signals were carried in thick copper wires strung overhead on big wooden poles? Then along came underground fiber optic lines that transmitted much



cleaner and clearer signals several orders of magnitude faster for phone, television, and internet. That once big demand for copper was soon kaput.

Finally, let's look at money, i.e., gold. I recently wrote about the flawed premise of peak gold and will not rehash my position in detail here (Mercenary Musing, December 3, 2018). Suffice it to say that the price of gold is not governed by usual supply and demand fundamentals: 85% of gold is stored or hoarded in jewelry and bullion as a store of wealth and a safe haven against financial calamity. Because it is so valuable and does not corrode or oxidize, an estimated 98% of all the gold ever mined is still above ground and available for trade, barter, and recycling.

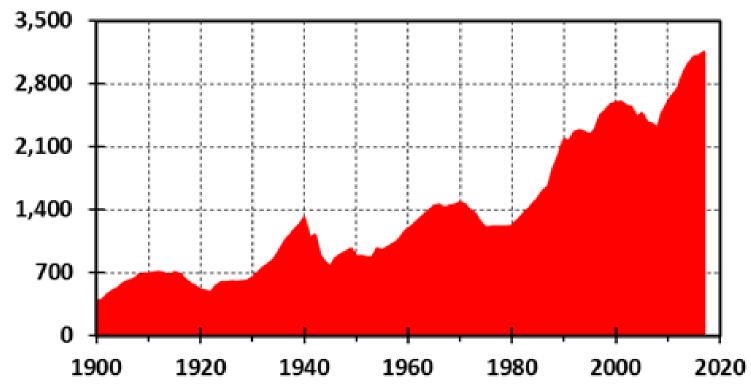
Annual gold production since 1900 is shown below:

Gold demand is driven by geopolitical unrest and economic duress. If global tensions and more importantly, the potential for world financial collapse are high, then the demand for gold as a safe haven and insurance policy will increase. Price will follow suit, gold mining will remain profitable, and robust production will continue.

I have shown that mining of four of the world's most important natural resources, namely oil, iron ore, copper, and gold, has increased steadily and relentlessly with few pauses over 118 years from the early industrial age to the present.

This is the strongest argument for a cornucopian outlook of Earth. Assuming past is prologue, the history of our industrialized age repeatedly shows us that as the world population increases and standards of living As further evidence, let's revisit some infamous curmudgeons of the malthusian camp and their false narratives. My arguments against this cabal are exemplified by two notable and failed predictions made during the social and political turmoil of the late 1960s and early 1970s.

The Population Bomb (1968) was a best-selling book written by Stanford University Professor Paul Ehrlich and his wife Anne in 1968. Its alarmist predictions were based on a premise of overpopulation that would spawn mass starvation and other societal upheavals in the 1970s to 1980s. It called for shocking and draconian actions to limit populations, such as cutting off of food supplies to countries that refused to address population growth. Among Dr. Ehrlich's more ridiculous predictions of the time: all important animal sea



World Gold Production (t)

World gold production increased from 386 tonnes in 1900 to 3150 tonnes in 2017. That is an eight times increase for an average gain of 1.8% per year.

The above chart of the118-year record of increasing gold production is a strong argument against peak gold. improve, resource demand increases at higher rates. That said, we have without fail found, developed, and extracted the supplies required for all of these heightened demands. I find no reason to think that paradigm will not continue. life will die off in 10 years; India will not be able to feed another 200 million people by 1980; and England will not exist as a country in 2000.

The Club of Rome's Limits to Growth (1972) used computer modeling to generate a collection of charts

Mankind inhabits a beautiful and

bountiful Blue Marble that has, does,

and will supply us with what we need and what we want on demand:

predicting serial resource depletion, economic and societal collapse, and a sudden decrease in population and industrial capacity within 100 years. The authors proposed that the only solution to the presumptive dilemma was to immediately stop population growth and to restrict industrial output per capita at then present levels. Their idealized world would be accomplished via a no growth scenario and exist in a state of global equilibrium with a selfsustaining society. The overall birth rate would equal the death rate and capital investment would equal the depreciation rate.

However, their dubious World3 computer model was based on flawed assumptions that resource use would grow exponentially while technological advances to increase resources would only increase linearly, that all non-renewable resources had a 110-year lifespan, and that the present amount of agricultural land was at its ultimate limit.

Included among its misfit projections: the world would run out of oil in 20 to 50 years (1992-2022) and gold would be mined out in 9 to 29 years (1981-2001). The work faced immediate ridicule and had lost all credibility by the 1990s. Its methodology has been described by the old computer maxim, "garbage in, garbage out" and the overall work as "Chicken Little with a computer".

The catastrophic forecasts made in these seminal books, the first written by a self-described malthusian and the second by a collective of environmental scientists and computer jockeys with a socialist agenda, have not approached any semblance of reality in the intervening 45-50 years.

Yet we as logical, rational, and practical scientists are repeatedly inundated with such dire and catastrophic forecasts by government-supported PhDs with malthusian bents. Furthermore, their inane doomsday prophecies are then promulgated as sure-fire scenarios by the popular mainstream media.

Other notable examples that have lost all credibility over the last half century

include: global cooling that would initiate a new Ice Age (1965-1975), acid rain that would kill all the fish and denude all the forests in northeastern North America and Northern Europe (1972-1983); ozone hole layer that would cause a worldwide outbreak of human skin cancers and c a t a r a c t s (1976-1989); and the global

warming h o c k e y stick that would result in a "20-foot sea level rise in the near future" (Al Gore, 2006).

Well, that's enough of that; let's get back to the "peak whatever" discussion.

I have shown in a series of facts, figures, and graphs that peak oil, peak iron, peak copper, and peak gold are all figments of imagination in the minds of malthusians. As these are four of the major and essential non-renewable resources that run our industrialized society, I can extrapolate and state that we are equally as unlikely to exhaust other commodities. That said, science is always a serial exercise of experiment, hypothesis, theory, and principle. It can never be exact, stagnant, or settled.

So perchance that we do in some future century or millennia eventually exhaust one or more of our essential natural resources on Earth: What then?

As a geologist, a cornucopian, and an optimist, I am convinced that humans will live on and will mine other rocky bodies in our solar system in the 21st Century,

whether they are asteroids, moons, or planets. And we will undoubtedly transport some of what we extract back to Earth.

Looking to the longer term and a worst-case scenario, I opine that we will have migrated to another blue-green planet in the Milky Way long before any catastrophic, malthusian-style socioeconomic event could possibly extinguish our by then significantly evolved species:



All hail science, reason, and logic and the driver of human evolution and progress: Optimism!

The Mercenary Geologist Michael S. "Mickey" Fulp is a Certified Professional Geologist with a B.Sc. Earth Sciences with honor from the University of Tulsa, and M.Sc. Geology from the University of New Mexico. Mickey has 35 years experience as an exploration geologist and analyst searching for economic deposits of base and precious metals, industrial minerals, uranium, coal, oil and gas, and water in North and South America, Europe, and Asia.

Mickey worked for junior explorers, major mining companies, private companies, and investors as a consulting economic geologist for over 20 years, specializing in geological mapping, property evaluation, and business development. In addition to Mickey's professional credentials and experience, he is high-altitude proficient, and is bilingual in English and Spanish. From 2003 to 2006, he made four outcrop ore discoveries in Peru, Nevada, Chile, and British Columbia.

Mickey is well-known and highly respected throughout the mining and exploration community due to his ongoing work as an analyst, writer, and speaker. Contact: Contact@MercenaryGeologist.com

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By David H. Smith

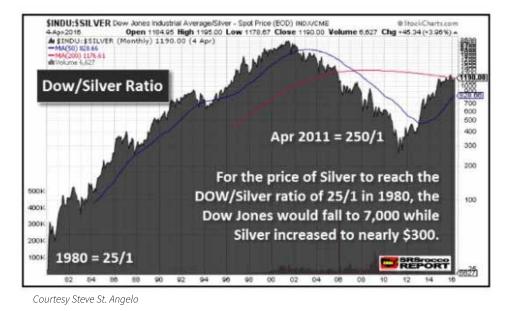
More than likely 2018 marked the end of the seven year cyclical bear market in silver, within the context of the ongoing secular precious metals' bull run. More than a few worn out silver devotees, some having held for decades, finally gave up the ghost and sold back at a loss. But this is just how Mr. Market operates. Endless sandpaper descents wear away all but the most determined...just in time for the birth of a new bull run.

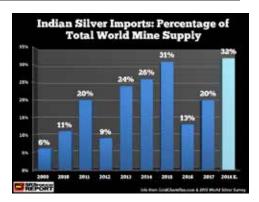
ould this next leg up be one for the history books? David Morgan, known for sticking his neck out near major turns, has indicated that the final leg up in any market tends to be a blow off, going higher than most

think possible. In a few years, silver could trade in triple digits, with precious metals moving into their third and most powerful bull leg expression, when the public driven by fear, greed and the capstone of inflation - piles in. Massive global demand colliding with stretched out supply could take volatility through the roof. Though U.S. silver investment is reported "at 10 year lows", buying by China and India (the "Chindian Connection") continues unabated. When rising prices lure U.S. (and European) investors back into the market, we'll see how the supply pipeline holds up.

Digital Silver. The New Third Rail in the Supply-Demand Matrix.

The Silver-Gold Ratio, currently near 85:1 may fall by half, two thirds...or more as over the next few years, wild card investment demand and industrial use determine the price and ratio changes.





Toss in a new and rapidly-evolving third rail factor - the return of physical silver as money wedded to the blockchain - and an "all bets are off" price appreciation scenario becomes quite likely. What David Morgan has long referred to in our wallets as "paper promises", have shown themselves throughout history to be also-rans when compared to "honest money" silver.

We often hear that "cryptoassets are not backed by anything" but that's changing. Several attempts at backing digital tokens or coins with gold, silver or other tangible assets are now underway. So far, the ideas seem to be about recording metal on a blockchain, stockpiling it in a physical location, and letting it accumulate storage fees.

The LODE Project - designed and being brought to life by a community of silver

enthusiasts from over 96 countries, is a paradigm shift. It proposes the establishment of a cryptographic silver monetary system (CSMS) operating on a blockchain, keeping track of every silver gram amassed, while being insured and stored in secure vaults around the globe.

The LODE System keeps track of physical silver, by the gram, on behalf of two parties - the silver contributors (LODE Token holders) and the silver users (AGX Coin holders). The relationship between the two users is governed by a commonlaw precedent known as Bailment. As the monetary mass circulates, LODE Token holders will receive rewards known as "AGXPay" - delivered to LODE Token wallets as micro-payouts. This makes it considerably different than any other proposed digital precious metals' "asset-backed" project to date. Ultimately - as blockchain guru Teeka Tiwari has noted - the pace of innovation and the pace of adoption will be the key factors that determine the success of any project in this sector.

For the People. By the People. Ian Richard, an Ambassador to the Project, states,

LODE puts idle silver to work and enables the creation of a sound digital medium of exchange known as AGX coins. See https://agxpay. com/ In fact, AGX may solve certain inefficiencies which currently inhibit the daily use of silver as spendable money. AGX is modern digital money for a global community. Private, borderless, low cost, high speed, redeemable silver-money for everyone, including the world's unbanked and inflation-oppressed peoples... think of how Uber/Airbnb systems connect private asset owners with quality users. All due to the advent of blockchain technology.

Silver's historic function as the "common man's money" has never really been forgotten. But even a decade ago, the idea that digital silver via blockchain technology might once again play a central role in commerce and wealth preservation for millions, if not billions of people would have seemed like nothing more than a pipe dream. Yet here we are, standing on the cusp of just such an event.



Courtesy, lode.one

Venezuelan Hyperinflation In the US

ltem	Current US price	Venezuelan Hyperinflation Price
Gallon of milk	\$3.25	\$1,487.46
Dozen eggs	\$2.5	\$1,144.20
Gallon of gas	\$3	\$1,373.04
6-pack Bud Light	\$6	\$2,746.08
Venti Americano	\$3.25	\$1,487.46
Monthly rent	\$1,200	\$549,216
Pair of shoes	\$75	\$34,326
Monthly internet	\$70	\$32,037.60
iPhone 8	\$600	\$274,608
Ruth's Chris steak	\$43	\$19,680.24
One movie ticket	\$12	\$5,492.16
One night hotel	\$150	\$68,652
Cash purchasing power	\$10,000	\$21.85
Gold (x1.8 inflation rate)	\$1,200	\$988,588.80

GOLD SILVER' Source: Various

Courtesy GoldSilver.com

The Path to Individual Sovereignty. A small amount of physical silver, or digital coins backed by it, redeemableupon upon demand, would help protect people in Venezuela, Zimbabwe or Argentina, and it might someday do the same for anyone reading this essay. Value stored digitally, immutably recorded on the blockchain, secure and borderless, protected by an individual's private key.

Was Jesse Livermore referring to you? Few people are paying attention to the historically-priced value proposition silver now offers as insurance, an investment, a speculation - or as money. The legendary speculator, Jesse Livermore had a nuanced take about how "most people" approach an idea. In the classic, Reminiscences, he said, "They (the public) are afraid to stand alone because they want to be safely included within the herd, not to be the lone wolf standing on the desolate, dangerous wolf-patrolled prairie of contrary opinion."

Where do <u>you</u> stand? When silver decides to move briskly into the stratosphere on another of its famous bull runs - an event readers of The Morgan Report have long anticipated, if you have "hold in your hand" silver, or digital coins backed by (and redeemable for) it, you'll be "Locked and LODED!"

David H. Smith is Senior Analyst for TheMorganReport.com, a regular contributor to MoneyMetals.com and the LODE Cryptographic Silver Monetary System Project (CSMS).

He has investigated precious metals' mines and exploration sites in Argentina, Chile, Peru, Mexico, Bolivia, China, Canada and the U.S. He shares resource sector observations with readers, the media, and North American investment conference attendees.



by Chris Temple - Editor and Publisher The National Investor

Since his near-Apocalyptic pronouncement early last October (his opinion at the time that the Federal Reserve was "nowhere near" a so-called neutral monetary policy stance) Chairman Jay Powell and some of his cohorts have had the markets on quite a roller coaster ride. His uber-hawkish pronouncement back then quickly led to a gut-wrenching cyclical bear market for U.S. equities and even more misery for beaten-up commodity-related shares.

ince then, Powell's about-face and the now near-universal view that the central bank is on hold as far as rate hikes go for the foreseeable future has led to a barn burner of an extended Santa Claus rally. Through January's first full week of trading, the S&P 500 has roared back to a key technical level around 2,600, a healthy surge that has given the U.S. stock

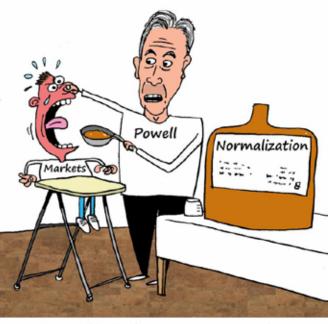
Now that these gyrations seem likely to settle down, where do we go from here?

market its best opening since 2006.

POWELL'S MOTIVATION

As I recounted numerous times until the markets finally decided to take Powell seriously in October, the Fed Chairman initially intended to go farther than most were contemplating in trying to "normalize" monetary policy. The markets were simply not taking him seriously. So used had they become to the Fed always having their back that it seemed strange that we were actually now being led by Powell back to a traditional market two-way with less of the Fed's proverbial thumb on the scale.

Powell has never made a secret of the fact that his agenda was all about



"Now, this is for your own good."



lessening the chances of a repeat of the busts in 2000-2002 and 2007-2008 caused by various financial imbalances *caused previously by the Fed itself*. So in a very matter-of-fact way he was, until now, of a mind to continue with quarterly hikes in the fed funds rate – and the roll off of some of the central bank's bloated holdings of 1.0.U.'s – until the spoiled and rattled markets made him stop.

That latter has just happened, for all of the reasons – and with all of the implications – I have been regularly reporting to my audience on (NOTE: a broader analysis of many of these moving parts can be read on my web site.)

What's next? The usual suspects among the perma-bears are telling us that – unlike in the two previous brief but sharp cyclical bear markets since the early 2009 bottom – this time really is the start of another "Big One." According to them the whole world is about to get sucked down into a new but gargantuan deflationary vortex that, in its wake, will see all asset prices



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settle at a fraction of their present valuations.

Even gold.

On the other side we have the usual suspects among the Pied Pipers of the Gold Bug Echo Chamber, as I often call them. Always looking for fresh reasons why their favorite asset is about to go to the moon, they insist that the Fed finally uttering that long-awaited word – "UNCLE!" – is but the first step towards a full reversal, rate cuts, ever more quantitative easing, etc. If that were really what the Fed had in mind right now, they would be correct. But it's not; at least, not yet.

To be sure, the Fed HAS at last made clear that its "normalization" quest IS flexible; and that Jay Powell's channeling of former Fed Chairman Paul Volcker already is lurching toward "Volcker 2.0." Having had to quickly back away from his hawkishness due to the fits global markets were starting to throw, Powell has made abundantly clear that he IS willing to support markets/asset prices as Volcker turned to in his own about-face starting back in 1982. (This, as I have often pointed out, is Volcker's forgotten and more important legacy; to start the process from 1982 onward of asset price bubble-blowing and the enabling by the Fed of eversoaring federal debt that his successors have only added to.)

The way I see things – and my apologies to ALL those who think the likely outcome for markets can be boiled down to the simplest and most spectacular predictions – **the real outcome may be relatively BORING.** All else being equal, I foresee neither of the extreme scenarios pushed by the above folks.

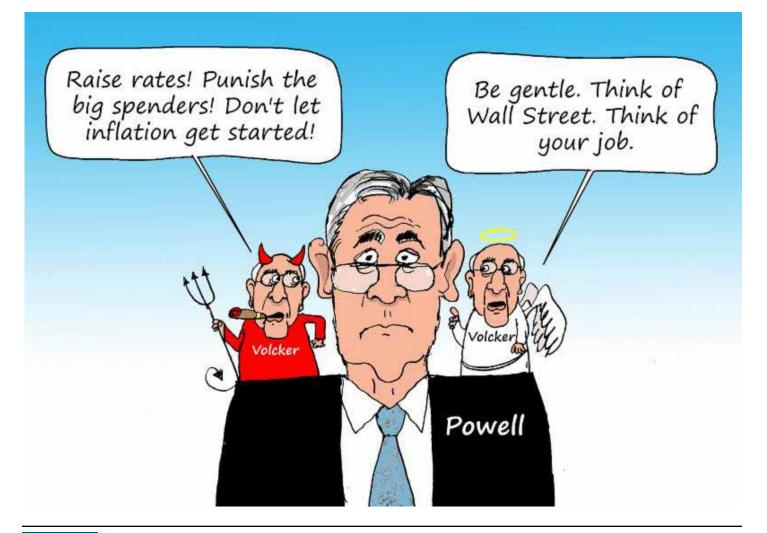
For present purposes and due to space limitations here, I present to you my two most likely outcomes for 2019:

A "GOING TO THE MATTRESSES" PORTFOLIO; WHEELS START TO RE-ALLY COME OFF THE GLOBAL ECON-

OMY AND MARKETS (30% PROBABIL-ITY)

One thing that needs to be kept in mind is that the global credit cycle 1. has peaked and 2. has already done pretty much all it can anyhow to just maintain a relative equilibrium. It's notable that – in 2019's first several days – authorities in China have pulled off a *record* combination of both fiscal and monetary stimulus; yet with fairly little to show for it save for an overdue bounce higher in the beaten-up yuan.

For China chiefly – and also for the euro zone, where bad debts continue to fester as Europe's economy slips into recession – the danger of a debt crisis/ implosion remains especially palpable. These days, with the incestuous, integrated relationships globally among banks and money managers and with derivatives on top of derivatives and the rest – any such crisis would quickly spread.





China trade war is the main catalyst to move the broad market back up to a somewhat higher range (though I don't see a chance of new all-time highs.) This and a Fed on the sidelines for the near term would be the scenario most likely to help out the beaten-up commodity sectors. A rally in energy and further screaming energy rallies in stocks would come about, together with long-overdue ones in base metals and cyclical stocks, as a part of the S&P its way slugging back to a higher range.

Though this scenario would not be the best for gold itself,

Sniffing out such a possibility as 2018 was winding down is why "The Odd Couple" - Treasury bonds and gold were star performers. Notably, even in the midst of the scorching rally for stocks as 2018 wound down and January began - both Treasuries and gold have held virtually all their price gains of the recent past.

I do not see further significant gains for either, barring a fresh breakdown in asset prices (stocks and energy, chiefly). In my opinion that time will come later.

Those who think I am wrong, of course, are even now loading up even more on Uncle Sam's I.O.U.'s, gold (the metal more than mining stocks) and CASH, "going to the mattresses" with their portfolios in fear of an impending crash.

A MUDDLE THROUGH/"STAGFLATION LITE" PORTFOLIO AND OUTCOME (70% PROBABILITY)

What little we have seen (and almost all on the part of the Fed) of central banks trying to take away that proverbial punch bowl is about over. Japan won't (indeed, can't) tighten policy, PERIOD. While claiming to be ending its own Q.E. policy, the European Central Bank is at the same time already propping up bad debts further via its open market operations through "the back door."

Indeed, as I write this, the Federal Reserve just suggested it can and will do the same as needed, propping up debt via its own open market operations even as it continues its overt slight winding down of its balance sheet!

Yet, the "inflationists" will have little to crow about if they think this all will finally lead to Weimar-like inflation rates in developed nations or \$5,000/ ounce gold. All this pull back by the central banks will do is make a "blah" situation less so, and perhaps less likely to tilt any time soon into outright deflation.

As I see it, the chief question is to what extent the renewed two-way market takes us to some kind of more stable, subdued range. In my bestcase scenario, a resolution to the U.S.- it would actually be healthier for gold stocks.

In a more subdued "Plan B" range for the markets, commodities generally may well remain on the back foot. This can't be ruled out, especially if things don't go well on the trade front, and especially as the U.S. policy front gets ever more acrimonious and begins to weigh more on market sentiment.

My own recommended portfolio mix reflects some of my own indecision right now whether we get a more constructive Plan A or Plan B scenario (indeed, as January's first full week is ending, I've already advocated selling some of our best trades in energy stocks and the broader market we rode up since the December lows.) Whatever this outcome, though, I DO continue to be pleased that value is again being embraced on Wall Street; a concurrent theme I have been discussing as we settle into the New Year, together with the kinds of companies I'm recommending for pretty much ANY of the above types of scenarios.

(NOTE: For a FREE COPY of Chris' latest sector-specific Special Report on the gold market, simply request it by writing him at chris@nationalinvestor.com.)

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BOLIVIA: WHERE REVOLUTIONARIES AND LITHIUM MINERS GO TO DIE

By Richard Mills

AS A GENERAL RULE, THE MOST SUCCESSFUL MAN IN LIFE IS THE MAN WHO HAS THE BEST INFORMATION

Other than being the country where Cuban revolutionary Che Guevara was killed, most North Americans know little about Bolivia.

he landlocked country is surrounded by Peru, Brazil, Paraguay, Argentina and Chile. Today, it is South America's poorest nation. But in the 1960s, Bolivia was going to be the launchpad of Che Guevara's socialist revolution.



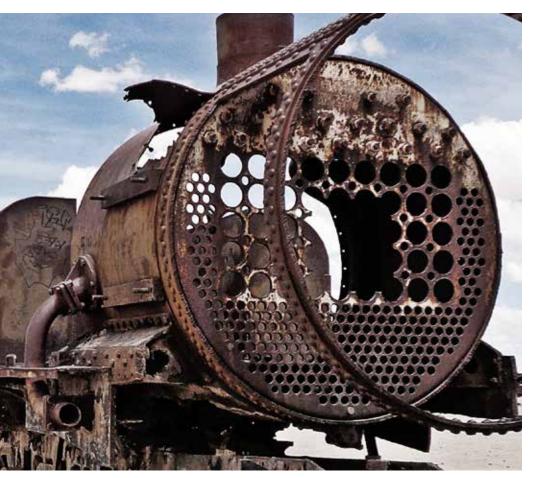
CHE'S LEGACY

Born in Argentina, Ernesto "Che" Guevara became radicalized by the poverty, hunger and disease he saw while traveling South America as a young medical student. He got involved in social reforms enacted by Guatemalan President Jacobo Arbenz, which were resisted by the United States. When Arbenz was overthrown by a CIA-assisted coup at the behest of the United Fruit Company, Che Guevara began a personal mission to destroy what he saw as the capitalist exploitation of Latin America by the United States.

When Guevara was living in Mexico City, he met Raul and Fidel Castro, joined their 26th of July Movement and sailed to Cuba aboard the yacht Gramma with the intention of ousting US-backed Cuban dictator Fulgencio Batista. Guevara rose quickly among the ranks of the insurgents, got promoted to second-in-command to Fidel Castro, and was pivotal in the two-year guerrilla campaign that deposed the Batista regime. He played a number of key roles in the new socialist government.

Guevara left Cuba in 1965 to spread "la revolution" worldwide. For a good read of Che Guevara's legacy published in 2017, 50 years after his death, read this article in The Guardian. A few colorful paragraphs summarizes what happened to him when he arrived in Bolivia following a failed expedition to the Congo:

The Bolivian recruits resented taking orders from the battle-hardened Cubans, and government propaganda sowed fear of the foreign interlopers among the campesinos. The United



States soon got wind of Guevara's presence and sent CIA agents and military advisers to assist the regime of René Barrientos.

On 31 August an army ambush wiped out half of Che's forces. The remainder trudged towards the mountains in a desperate attempt to break out of the trap.

Che, prostrated by asthma, rode on a mule towards the remote village of La Higuera. A local farmer informed on them – and amid a frantic gunfight, a bullet destroyed the barrel of Guevara's carbine. Wounded, he surrendered to a battalion of rangers - trained by US Green Berets - under the command of a 28-year-old captain, Gary Prado.

"Don't shoot – I'm Che. I'm worth more to you alive," Guevara reportedly said. In an interview with the Guardian, Prado recalled that moment. "I felt pity because he looked so poor, so tired, so dirty," said Prado. "You couldn't feel he was a hero, no way."

According to Prado, orders came the next day to "get rid of him".

A 27-year-old army sergeant, Mario Terán, volunteered for the job, and ended Guevara's life with two bursts of machine-

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gun fire. After being flown by helicopter to nearby Vallegrande and displayed for the world's press, Che's body – minus his hands – and his companions were buried in unmarked graves. They wouldn't be found for 30 years.

The United States was active in Bolivia during the 1960s, providing finances and training to the military dictatorship. The military controlled Bolivia until 1982, when a Congress

was established following a violent coup by General Luis García Meza Tejada. Since then governments have been democratically elected, with three parties predominating.

Current President Evo Morales was the first indigenous Bolivian to serve as head of state. His Movement for Socialism – Political Instrument for the Sovereignty of the

Peoples party was the first to win a presidential majority in four decades, doing so in 2005 and 2009.

POOR BOLIVIA

As mentioned at the top, Bolivia is poor. An estimated 80% of Bolivians are below the poverty line and 40% live in extreme poverty, largely due to unproductive small-scale farming. There is no mass food production and frequent water shortages. The country also lacks basic infrastructure like water management systems and roads. A major hit to the economy came in the early 1980s when the price of tin collapsed - being one of Bolivia's most important mined commodities (replacing silver) and sources of income.

According to The Borgen Project, a non-profit focused on poverty and hunger, there are four reasons why the country has failed to succeed economically: political instability, insufficient education, lack of clean water and sanitation, and low

A year after first getting elected, Morales strongly suggested he would nationalize parts of the mining industry. Six years later he confiscated and nationalized a silver and indium mine owned by South American Silver, without paying compensation to its Canadian owners. In 2016 his government announced a crackdown on mining cooperatives after a government official was murdered. The mining sector is dominated by 120,000 miners working in about 1,700 cooperatives.

productivity in rural areas.

The election of Morales in 2005 was an important development in the nation's quest to improve the plight of the poor. While the US dismissed Morales as another Hugo Chavez for his spirited anti-capitalist tirades and international push for the legalization of the coco leaf, his success in holding onto power has been a surprise, especially when he won a third term in 2014.

Morales' popularity has been attributed to higher economic growth (the highest from 2006-14 in 3.5 decades), a 45% boost in social program spending, and a near doubling of the minimum wage, states the Centre for Economic and Policy Research. Poverty has declined from 59% in 2006 to 36% in 2017. Indigenous communities have better access to electricity, water and sewage services. Like all long-lasting leaders, however, Morales's support is waning. After 12 years as President, native peoples are turning against him, Reuters asserts in a recent special report, "Angst in the

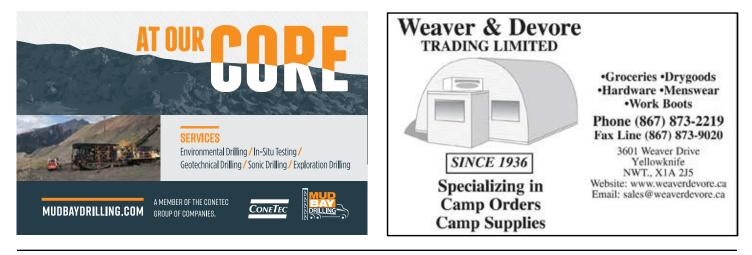
Andes". The discontent stems from a number of unpopular policies, including developing indigenous lands and controversial move а to consolidate power by ending term limits. Despite the constitution setting a limit of two fiveyear terms, he convinced the courts to let him run again in 2019. Morales is now the longest-serving head of state in the Americas and the last of a wave of leftist leaders

that included Venezuela's Chavez and Luiz Inácio Lula da Silva of Brazil, notes Reuters.

NO FRIEND TO MINING

But Morales' invincibility at home has not translated into likeability abroad.

He caused widespread consternation in 2006 when he nationalized the country's oil and gas industry; Bolivia has the second largest natural gas reserves in South America after Venezuela, and an agreement to sell natural gas to Brazil through 2019.



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Major nickel miner Glencore has initiated arbitration proceedings over its investments in two smelters and a tin mine nationalized between 2007 and 2012.

BATTERY-POWERED DREAMS

In 2017 Morales started talking about lithium mining. The country holds vast amounts of the mineral used in mobile phones, power tools and electric cars, but has so far done virtually nothing with it. The more than doubling of the lithium carbonate price between 2010 and 2017 no doubt had the President visualizing dollar signs. "We will develop a huge lithium industry, over \$800 million have already been made available," Morales told the German DPA news agency.

The biggest step so far came in April, when Bolivia secured a \$1.3 billion investment from Germany's ACI Systems GmbH. The plan is to work with the Bolivian government to develop a lithium battery industry that would generate a billion dollars a year, reports Americas Quarterly.

Last week, Bolivia and ACI announced that ACI will work with state-owned Bolivian Lithium Deposits (YLB) to install four lithium plants in the Salar de Uyuni - the world's second largest lithium deposit. The joint venture aims to build a lithium processing plant at Uyuni with an initial outlay of \$250 million. The plant would produce up to 40,000 tonnes of lithium hydroxide per year, for 70 years, by the end of 2022. (That's about double the capacity of FMC, the world's fourth-largest lithium producer, at its Argentina operations).

Bloomberg reports ACI will rely on "new, untested technology" from German company K-UTEC AG Salt Technologies that will produce lithium hydroxide directly from brine, thus speeding up the process.

Eighty percent would be exported to Germany, which is pledging to have a million hybrid or battery-electric vehicles on the road by 2022.

The general manager of YLB told Bloomberg in early December that the company will also start building a \$96 million plant with the capacity to produce 18,000 tons of lithium carbonate by early 2020.

But most are skeptical. Americas Quarterly notes that nine years into a pilot plant at its vast Uyuni salt flat, and investing \$450 million, the project produces just 10 tons of lithium a month - under 1% of what Argentina and Chile produce every 30 days.

Perhaps most importantly, ACI Systems has no experience mining lithium - a notoriously difficult mineral to extract and process. The industry is dominated by just four players who own nearly all the mines:



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Albemarle, SQM, FMC, and the latest, Tianqi Lithium. They have the technology and expertise to mine lithium economically. A lack of infrastructure and investor confidence considering Morales' record on nationalization are also black swans.

SALAR DE UYUNI

Still, the potential has to be considered. Bolivia is part of the "lithium triangle" with Chile and Argentina, where about 75% of the world's lithium comes from, given its abundance and high quality. Chile is currently the second largest producer of the main ingredient of lithium-ion batteries installed in electric vehicles, behind only Australia, home to the Greenbushes hard rock lithium and tantalum mine owned by Talison Lithium. Chile produces 70,000 tonnes a year and Argentina 30,000 out of the 230,000- tonne lithium market.

According to the US Geological Survey, the Salar de Uyuni salt flats alone contain 9 million tons of lithium, over a quarter of the world's known reserves.

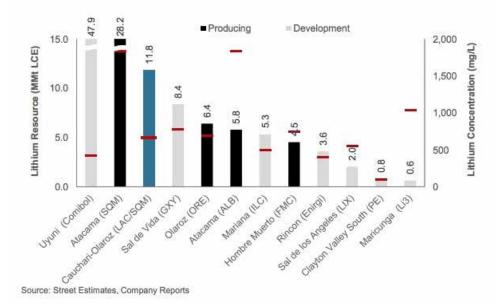
If other deposits are added to it, the

country may contain half the world's lithium.

PROBLEMS

But having it and mining it are two entirely different things.

The 4,000-square-mile Salar de Uyuni is the world's largest salt flat and unexploited lithium (Li) deposit. Uyuni is a huge prehistoric lake on a high Andean plateau.



Where Exploration Intersects Discovery Newrange Gold Corp. TSX-V: NRG, US: NRGOF Experienced management exploring high grade gold in mining friendly Nevada! **Recent RC Drilling Program Select Intercepts** Gold grams Intercept Hole From (meters) To (meters) per tonne length (meters) (g/T)P17-03 62.5 64.0 1.52 51.00 P17-05 21.3 22.8 1.50 17.90 P17-08 30.5 39.6 9.15 27.80 P17-10 25.9 38.1 49.49 12.20 27.4 29.0 1.52 340.90 Including P17-12 57.9 62.5 4.57 14.52 P17-17 8.4 13.0 4.57 43.80 P17-18 54.1 64.0 9.91 15.27

Phase III drilling starting February 2018

Robert G. Carrington President & CEO – www.newrangegold.com

Contact: Fidel Thomas - Corporate Communications - 1-778-228-5735 - info@newrangegold.com

Lithium contained in Bolivian salars are higher in altitude, not as dry, and contain more magnesium (Mg) and potassium than in neighboring Chile, making the extraction process much more complicated, and costly.

Chile and Argentina supply 78% of global lithium carbonate and hold more than 90% of the proven lithium carbonate reserves. The Salar de Uyuni has the lowest average grade of Li at .028 and has an extremely high ratio of Mg/Li at 19.9. At Chile's Salar de Atacama the rate is 6:1 and at the Hombre Muerto salar in Argentina, it's 1:1.

The Mg has to be removed by adding slaked lime to the brine. The slaked lime reacts with the magnesium salts and removes them from the water. If the Mg/Li ratio is 1:1 in the original brine, and if slaked lime costs \$180/ tonne, it costs \$180/tonne to produce lithium carbonate. At 20:1 the extra production cost would be \$3,600 per tonne. A common industry axiom says that the ratio of Mg to Li in brines must be below the range of 9:1 or 10:1 to be economical. "It will be expensive to remove the magnesium," Brian Jaskula, lithium specialist at the US Geological Survey was quoted in an article by Lithium Today. Also, "altitude, precipitation rate, and evaporation rate are not in Bolivia's favour if the country adopts Chile's sun-based evaporation pond route," he added.

A major factor affecting capital costs is the net evaporation rate – this determines the area of the evaporation ponds necessary to increase the grade of the plant feed. These evaporation ponds can be a major expense. The Salar de Atacama has higher evaporation rates than the world's other salt plains and evaporation takes place all year long.

Uyuni's higher rainfall and cooler climate mean that its evaporation rate is not even half that of Chile's Salar de Atacama, which is ideal for lithium mining because the lithium-containing brine ponds evaporate quickly and the solution is concentrated into lithium carbonate and lithium hydroxide used in EV batteries. Bolivia's rainy season lasts from December to March, converting Uyuni into a lake for parts of the year. Bolivia's rainfall is about 168mm a year compared to the Atacama's 15mm.

Though its evaporation rate is only about 72% of Atacama's, Salar de Hombre Muerte in Argentina is still commercially successful because costs are low and are further offset by the sale of recoverable byproducts like boric acid.

Moreover, the lithium in the Uyuni brine is not very concentrated and the deposits are spread across a vast area. Bolivia also has limited infrastructure compared to Chile, Argentina or the US, and lacks access to the sea.

Consider also the high "country risk" factor companies face doing business in Bolivia. Morales has nationalized the oil and gas industry, the electricity grid, telecoms, and several mines. Why should he be trusted?

"The state doesn't see ever losing sovereignty over the lithium. Whoever



wants to invest in it should be assured that the state must have control of 60% of the earnings." - Morales at a 2009 press conference.

In 1990 hunger strikes and massive protests US-based forced Lithco out of a \$46 million investment in Salar de Uyuni. The company set up operations at Argentina's Salar de Hombre Muerto, and became eventually part of FMC.

eventually became part It's not surprising that while Chile and Argentina

have thriving lithium and potash production, Bolivia lags far behind.

WHO WANTS IT?

As for who has the expertise and might be willing to front the billions it would take to develop a lithium industry in Bolivia. at considerable risk, there are only two interested parties: Germany and China.

Several companies have tried and failed, including attempts by US-based FMC Corp, which operates in Hombre Muerto,

South Korean steelmaker POSCO, and two In 1990 hunger strikes French companies. and massive protests Mitsubishi forced US-based Lithco and Sumitomo Corp were also previously out of a \$46 million involved. investment in Salar de

Besides the state-run pilot plant, The Guardian reports just two other projects underway, a lithium carbonate project by German company K-UTEC Ag Salt Technologies and a battery manufacturing plant built by Linyi Dake

Corp

Trade, a Chinese firm.

Uyuni. The company

set up operations at

Argentina's Salar de

Hombre Muerto, and

of FMC.

China bought Bolivia's first export of lithium from its pilot plant, 15 tons of lithium carbonate in 2016, more a symbolic shipment than anything that could be built upon. The plant produced just 250 tons this year.

Sydney Morning Herald quotes Joe Lowry, head of Global Lithium and a leading expert on the mineral, on the challenges Bolivia faces in luring potential lithium producers.

FMC, my former " employers, wished to develop Uyuni in the late '80s and early '90s," he said. "But the governmental chaos and poor infrastructure were too much too deal with. Argentina ultimately got chosen. Thirty years later Bolivia still lacks both infrastructure and the sort

of government investors can be comfortable with.



Another lithium authority, Chris Berry of research firm House Mountain Partners LLC, was equally skeptical, telling Bloomberg, "Bolivia is quite frankly very risky relative to other parts of the world for lithium investment. Investors are concerned with both return on capital and return of capital."



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CONCLUSION

In the risky but potentially very rewarding world of resource investing, two well-worn terms are "country risk" and "resource nationalism". Most experienced investors steer well clear of countries with even a whiff of either. Bolivia has both, in spades. Being a poor country, it's understandable that its current President. Evo Morales. would do what he can to alleviate the sad legacy of poverty. In developing countries though, the easiest targets are the rich: wealthy, powerful people and companies within Bolivia, and foreign companies that want to come in and strike deals.

But foreign companies have targets on their backs for people like Morales. It's just too tempting, when the government runs short of funds, to tap a foreign, rich corporation. If Bolivia gets into lithium mining, there's no reason to believe Morales won't expropriate and nationalize, as he has done many times.

Then there's the technical challenges of mining lithium. Bolivia's salars are too low in elevation, meaning too much rain, the evaporation rate is too low, and the magnesium to lithium ratios are too high. This makes it extremely challenging for any company to mine lithium at a profit. The costs are simply too high and the grades too low. If somebody had the technology to make it work in Bolivia, it would have happened by now. Bolivia's vast lithium reserves are no secret. The inevitable conclusion: this dog won't hunt. Save your hard-earned investing dollars for one that will.

I continue to hold Cypress Development Corp. (TSX-V:CYP) for its Clayton Valley Lithium Project which is due to release a prefeasibility study early in the new year. Visit my home page for lots of background and stay tuned for news on CYP.

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PDAC 2019 CONVENTION - THE EVENT YOU CANNOT AFFORD TO MISS

By Author



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The Prospectors & Developers Association of Canada's (PDAC) annual show—celebrating 87 years—will take place at the Metro Toronto Convention Centre (MTCC).

In 2018, the PDAC Convention attracted more than 25,000 attendees from 135 countries, including analysts, mining executives, geologists, prospectors, investors, students and government officials from all over the world.

"The PDAC Convention is the industry's most-attended yearly event, leading the way in professional development, networking and educational opportunities," says PDAC President Glenn Mullan. "This accolade is not coincidental, it is something that we work very hard to achieve each year, and something we are very proud of." The Aboriginal Program, Capital Markets Program, Short Courses, Sustainability Program and Technical Program return, along with a Keynote Session that will focus on people under 40 years of age in our industry.

The PDAC Convention is seen as a temperature gauge for the sector, and participation measures how hot or cold the investor climate might be in the year ahead," says Mullan. "It is also the best opportunity for junior miners and individual prospectors alike to showcase their latest projects and discoveries, and for students to mingle and find their big break.

The International Mines Ministers' Summit (IMMS)—a unique event that brings together Mines Ministers from around the world—returns for the fourth year in 2019. This event is co-hosted with the World Economic Forum and provides an important setting for the global exploration and mining community to share insights and take part in discussions that aim to enhance the positive impacts the industry can provide to communities and regions globally. Almost every country in the world is represented at the PDAC Convention each year, including international governments and representatives who oversee mining operations," says Mullan. "The IMMS is just one of the important platforms PDAC provides for governments to learn from one another and collaborate.

Some highlights to look forward to at PDAC 2019 Convention include:

- Awards Gala & After Party: A prestigious event where outstanding achievements in the Canadian and international mineral exploration and mining industry are celebrated.
- Mineral Outlook Luncheon: Is the mining industry investing enough or are metal shortages inevitable? Julian Kettle, Vice Chairman of Metals and Mining, Wood Mackenzie discusses the possibility of metal shortages due to lack of investment in the mining industry.
- Student-Industry Networking Luncheon: This reception-style buffet luncheon provides an opportunity to make valuable connections with industry professionals and peers.
- Trade Show Reception: Network with Trade Show North exhibitors and attendees from international and domestic companies, including organizations promoting technology, products, services and mining jurisdictions.
- Grand Finale: After four outstanding days at the world's hottest convention for mineral exploration and mining, it's time to party at this free event! Enjoy the action and network, while the Dave Murphy Band performs live.

PDAC is the leading voice of the mineral exploration and development community. With over 8,000 members around the world, PDAC's mission is to promote a globally responsible, vibrant and sustainable minerals industry. As the trusted representative of the sector, PDAC encourages best practices in technical, operational, environmental, safety and social performance.

More information about the #PDAC2019 Convention is available at www.pdac. ca/convention.





March 3 – 6

Metro Toronto Convention Centre Toronto, Canada





25,000+ ATTENDEES from 135 COUNTRIES



550+ SPEAKERS





1,000+ EXHIBITORS





REGISTER AT pdac.ca/convention







