



Battery Metals Report 2019

Everything you need to know about the Battery Metals Lithium, Cobalt and Vanadium!



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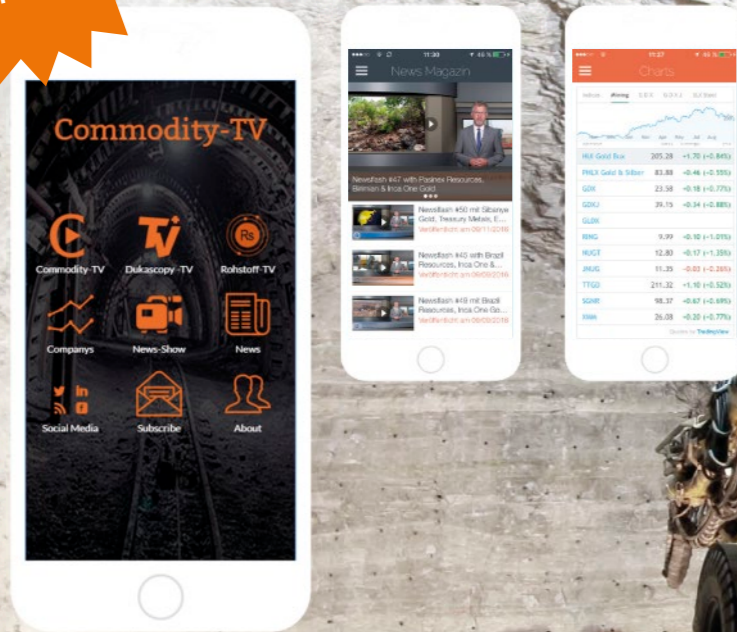
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Imprint

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Preface

Dear Readers,

with pride and joy we are already entering the second year of our Battery Metals Report, the successor of our Lithium Special Report.

About two and a half years ago we started our special report series with lithium because we see this metal, as well as cobalt and new: vanadium, as one of the great energy future metals and see great opportunities and potential in the long term despite the boom that has already taken place. Battery developments are only at the beginning of a long road and the electric car must first conquer its place among consumers and in automotive history. Lithium and cobalt are the main components of all batteries and rechargeable batteries available in large series and thus the main link of the electric vehicle dream. A boom of at least the same magnitude will be experienced in the coming years by decentralised storage facilities, which will be able to help to achieve the base-load capacity of wind power and photovoltaic systems that has been lacking up to now. This in turn requires larger quantities of vanadium.

In recent years, the annual Paris Motor Show has been all about electromobility, and in Geneva and Tokyo it should be no different at the upcoming shows. In the coming years, new battery technologies are likely to make the short-range brake shoe self-sufficient, which will create enormous demand for the electric car. Among experts, the formula 500+200 kilometers i.e. 500 kilometers range plus 200 kilometers reserve is valid for a broad growth of demand. Then, it is assumed, even the hard-boiled combustion engine driver would switch to electric drives. Over the next 5 years, Volkswagen intends to invest a good 10 billion euros in electric mobility and sell one million electric cars per year from 2025. Meanwhile, the world's largest unit of a vanadium redox battery will be built in Germany from 2019.

All these will be enormous drivers of the demand for lithium, cobalt and vanadium and you will read in an interview with Tobias Tretter how and where the developments are going. Raw materials are the basis of our economic activities. Without them, there would be no products and no technical innovations that can be produced with new materials.

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My team and I hope you enjoy reading the Battery Metals Special Reports and we hope to provide you with lots of new information, impressions and ideas.

Yours, Jochen Staiger



Jochen Staiger is founder and CEO of Swiss Resource Capital AG, located in Herisau, Switzerland. As chief-editor and founder of the first two resource IPTV-channels Commodity-TV and its German counterpart Rohstoff-TV, he reports about companies, experts, fund managers and various themes around the international mining business and the correspondent metals.



Tim Roedel is chief-editorial- and chief-communications-manager at SRC AG. He has been active in the commodity sector since 2007 and held several editor- and chief-editor-positions, e.g. at the publications Rohstoff-Spiegel, Rohstoff-Woche, Rohstoffraketen, Wahrer Wohlstand and First Mover. He owns an enormous commodity expertise and a wide-spread network within the whole resource sector.

The electric revolution is only just really getting underway – lithium, cobalt and vanadium play a key role!

Combustion and direct consumption were yesterday – electromobility and decentralised storage are the future!

Energy turnaround, ban on diesel driving, nuclear phase-out, climate change – these and many other terms used in our daily language have led to a true turn of events in recent years that hardly anyone thought possible 25 years ago: The leap from the age of fossil combustion and consumption as immediate as possible to the decentralisation of energy production, the corresponding need for on-site storage and, ultimately, to a true revolution in mobility. After more than 100 years of combustion engines, the next stage of development is finally being ignited, and that is called electromobility or „electro mobility“.

Musk makes it possible – or how a South-African breaks the omnipotence of the oil multinationals

Even though China has long set the tone, the electro-revolutionary movement is primarily due to one name: Elon Musk! The eccentric South African, who was bullied as a child and beaten to unconsciousness and first made headlines with the invention and sale of the PayPal payment system to eBay, had a vision of a purely electric locomotive at the beginning of the 21st century and founded Tesla Motors in 2004. This triggered a real chain reaction that led many states, companies and private individuals to clearly opt for the electric motor as their future drive and energy storage system. Although Musk did not invent the electric motor, it will always be recorded in history books as the one who broke the omnipotence of the oil multinationals and ushered in a new era of locomotion.

The age of electromobility has begun!

Many countries are now fully committed to the electromobility card

Above all, several countries have already jumped on the electric mobility bandwagon in order to achieve the climate targets they have set themselves and have initiated measures that will further accelerate the process of turning away from the internal combustion engine and towards the electric motor at the same time. Norway and the Netherlands, for example, have decided to ban sales of vehicles with internal combustion engines from 2025. India and France want to achieve this by 2030, as do Germany and China, although no final decision has yet been taken. Great Britain wants to follow by 2040. So is California.

Car manufacturers plan to build many millions of electric vehicles

These planned measures put the car manufacturers under pressure, so that they have already reacted and have spent the following company goals:

- ▶ **BMW:** By 2025, 15 to 25% of all vehicles produced are to be powered purely by electricity, which is equivalent to a total of around 300,000 to 600,000 vehicles;
- ▶ **Chevrolet:** After 30,000 electric vehicles sold in 2017, no concrete targets defined yet;
- ▶ **China:** The Chinese carmakers, which now number more than 170, want to put at least 4.5 million electric vehicles on the roads by 2020;
- ▶ **Daimler:** By 2025, 15 to 25% of all vehicles produced are to be powered purely by electricity, which will affect a total of about 300,000 to 600,000 vehicles;
- ▶ **Ford:** By 2020, at least 13 models are to be powered electrically, which is about 10

to 25% of the entire model range;

- ▶ **General Motors:** Complete conversion to electromobility – period still open;
- ▶ **Honda:** In 2030, two thirds of all models are to run with an electric motor – according to today's figures about 3.3 million;
- ▶ **Hyundai:** At least 10% electric vehicle share by 2025 – 800,000 vehicles;
- ▶ **Peugeot:** 80% conversion to electric drive by 2023;
- ▶ **Porsche:** Conversion of 90% of the product range to electric drives;
- ▶ **Renault/Nissan:** 1.5 million vehicles from 2020;
- ▶ **Tesla:** 1 million vehicles from 2020;
- ▶ **Toyota:** 100% conversion to electric drive by 2050;
- ▶ **Volvo:** 100% conversion to electric drive by 2019 (500,000 vehicles);
- ▶ **VW Group:** By 2025, 20 to 25% of all vehicles produced are to be powered purely by electricity, which is equivalent to a total of around 2 to 3 million vehicles.

Altogether, the leading car manufacturers plan to produce at least 16 million electric vehicles per year from 2025 alone. From 2030, 25 million electrically powered vehicles per year are expected, from 2040 even 60 million vehicles per year. Daimler alone plans to invest over 80 billion euros in electric mobility in the coming years.

Lithium-ion batteries are considered to be the non-plus-ultra battery for electric vehicles.

The heart of every electric vehicle is not only the motor but also the energy storage device, i.e. a rechargeable battery. In order to be operated economically in the long term, electric vehicles, but also increasingly emerging decentralised storage systems – such as for photovoltaic or wind power plants – require ever more powerful batteries. In the meantime, the lithium-ion battery has emerged as a clear favourite. One of the reasons for this is

that the voltage within a lithium-ion battery is reached by exchanging lithium ions. Due to their high energy density, lithium-ion batteries deliver constant performance over the entire discharge period and have no so-called memory effect, i.e. a successive loss of capacity over many years of use or frequent partial discharge. The name „lithium ion battery“ is only the generic term for a whole series of possible chemical structures, such as the lithium cobalt (dioxide) battery, the lithium manganese (dioxide) battery, the lithium iron phosphate battery and – less commonly – the lithium titanite battery and the tin-sulfur lithium ion battery.

Vanadium redox batteries are better suited for use in the field of regenerative energies.

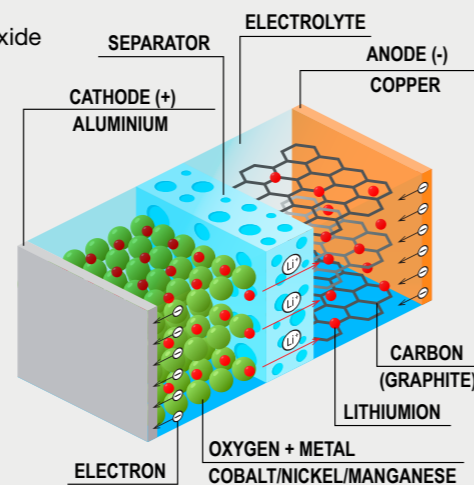
The use of lithium and cobalt in lithium-ion batteries or rechargeable batteries of the same name in automotive engineering is one side of the coin. Correspondingly larger energy storage facilities are being used more and more for storing electricity from alternative energy sources. The virtually explosive expansion of energy generation from wind farms or solar cells is a huge step forward in terms of environmental protection, but an enormous challenge for the electricity grids. This is because renewable energy sources often exhibit extreme fluctuations in power generation. When the wind is blowing, or the sun is shining, large amounts of electricity „pumped“ into the grid. In the short term, enormous overcapacities of electricity arise, some of which are not needed at all. According to calculations, up to 20 percent of the annual yield of a wind farm is already lost today because the turbines have to be shut down at short notice due to grid overload. This can be remedied by storage facilities that initially absorb the excess energy and later release it back into the grid when needed, i.e. when there is a threat of undersupply. The vanadium redox accumulator plays a decisive role in this process.

Composition and operating principle of a lithium-ion accumulator

Composition of a lithium-ion accumulator

Essentially a lithium-ion accumulator consists of the following components and materials:

- ▶ **Positive electrode (cathode):**
Lithium-Cobalt(III)-oxide
Lithium-Nickel-Manganese-Cobalt-Oxide
Oxygen
Aluminum as conductor material
- ▶ **Negative electrode (anode):**
Graphite or related carbon materials
Silicon
Tin dioxide
Copper as conductor material
- ▶ **Electrolyte (solution)**
- ▶ **Separator of polymer membrane**



Operating principle of a lithium-ion accumulator

In simple terms a lithium-ion accumulator generates an electromotive force by the movement of lithium-ions. During charging the positive lithium-ions migrate through the electrolyte and the separator from the positive to the negative electrode. In the process the lithium-ions can move freely between the two electrodes through the electrolyte within the accumulator. Unlike the lithium-ions the transition metal and graphite structures of the electrodes are stationary and protected by a separator from a direct contact. The mobility of the lithium-ions is necessary for the compensation of the external current during recharging and discharging so that the electrodes stay largely

electrically neutral. The negative electrode is a so-called graphite intercalation compound where lithium exists as cation. During discharge the intercalation compound emits electrons which flow back to the positive electrode via the external circuit. Simultaneously many Li^+ ions migrate from the intercalation compound through the electrolyte also to the positive electrode. At the positive electrode the lithium-ions do not receive the electrons of the external circuit but the present structures of the transition metal compounds. Depending on the type of accumulator these are cobalt, nickel, manganese or iron ions that change their charge.

Vanadium redox battery – Higher operational reliability than lithium-ion battery, but not suitable for electric vehicles

The vanadium redox accumulator is a so-called flux accumulator which uses vanadium compounds in aqueous solutions in both electrolytes. Vanadium redox flow cells offer a very high operational reliability compared to other storage systems (especially lithium-ion accumulators), as the electrolyte is neither flammable nor explosive due to its high water content. The commercial batteries currently available are used exclusively in stationary applications, such as regenerative energy sources for peak load coverage and load balancing, and uninterruptible power supplies. By mid-2017, more than 40 large vanadium redox flow batteries were in operation worldwide. However, the vanadium redox accumulator is not an option for powerful electric cars, as the volumetric energy density of the battery is much too small, i.e. the battery needs too much space.

The largest application for vanadium redox batteries in the future: decentralized energy storage

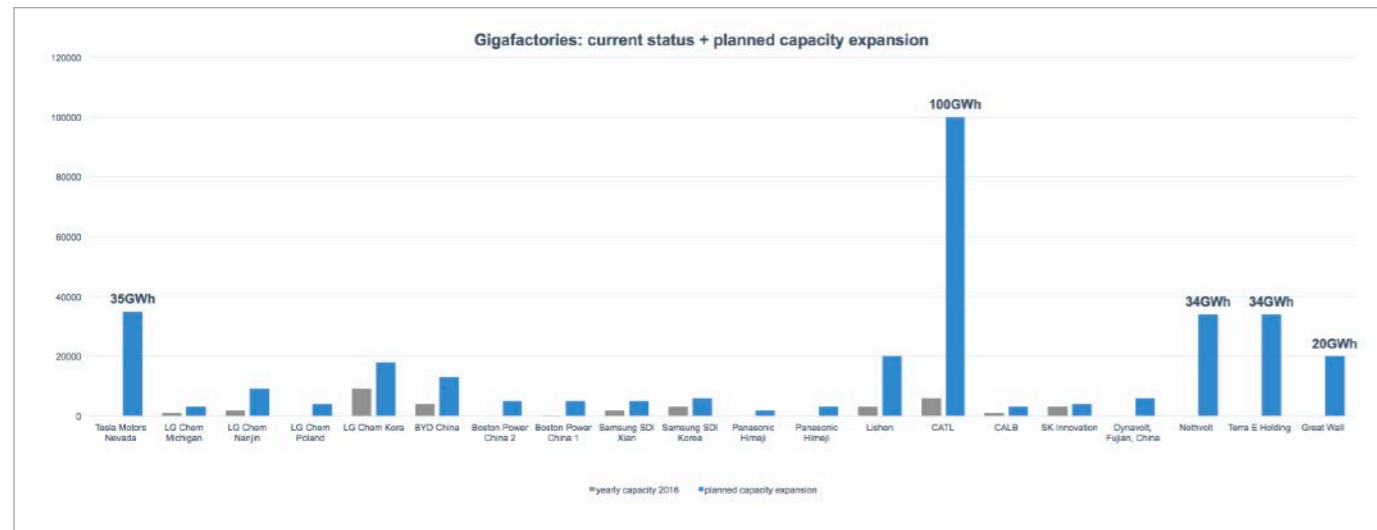
So-called smart grid systems require a large number of short- and medium-term energy storage devices that absorb too much generated energy and can later release it back into the grid when wind and sun are absent. Vanadium redox batteries can clearly remedy this by storing too much energy temporarily and only releasing it back into the grid when required. Many manufacturers are already trying their hand at efficient vanadium redox batteries, which are primarily intended for decentralised use, such as directly in the household of a family with a photovoltaic system on the roof or near wind farms.

North America is Tesla country ...

Outside Asia, North America in particular has taken the dominant position in lithium-ion battery production. Tesla Motors has a lot to say about this. The company is currently building its so-called „Gigafactory 1“ in Nevada. Since 2016, lithium-ion batteries, battery packs, electric motors and drive units for up to 500,000 electric vehicles per year have been built there. To date, Tesla has only signed purchase agreements with two lithium developers in Nevada and Mexico. These two companies (Pure Energy Minerals and Bacanora Minerals plus their joint venture partner Rare Earth Minerals) are unlikely to start production before 2020 and will only be able to meet part of Tesla's demand. On the one hand, this indicates that Tesla does not yet have reliable lithium and cobalt suppliers for the period up to 2020, and on the other hand that further purchase agreements have to be secured for the period after 2020 in order to be able to guarantee acceptable prices on the one hand and to become independent of intermediaries such as Panasonic on the other. In the case of cobalt, Tesla currently has no valid purchase agreements with Western mining companies.

... but the music is made in Asia!

Although Tesla will account for about 8 to 10% of total global lithium and cobalt demand when its Gigafactory 1 is completed, it is already clear that much more material will be needed in Asia. China alone already accounts for about one third of total demand. According to expert estimates, this will remain the case for the time being, as China still has by far the largest output of rechargeable batteries and accumulators. This stimulates the country's immense consumption of lithium and cobalt. It is also expected that China will continue to see the strongest annual increase in lithium and cobalt demand of all major market players over the next 5 to 10 years, mainly due to the expected multiplica-



(Source: Nemaska Lithium / own chart)

tion of the number of rechargeable batteries. Other major suppliers of lithium-ion batteries, including South Korea and Japan, are also expected to guarantee a robust increase in lithium and cobalt demand. The electronic giants Panasonic, Samsung, LG Chem, BYD, Boston Power, Lishen, CATL, Dynavolt and Great Wall are to be mentioned above all here.

More Gigafactories are already in the making

Tesla is by far not the only lithium and cobalt consumer planning to produce more lithium-ion batteries. LG Chem already started production for Chevy in Michigan in October 2015. Furthermore, Foxconn, BYD (the world's largest producer of rechargeable batteries, especially for mobile phones), Lishen, CATL and Boston Power are working on the construction of their own Gigafactories, also for so-called Power Banks, i.e. decentralized power storage units. Outside Asia and North America there are currently only a few serious players to be found. Worth mentioning are Northvolt from Sweden and Terra E Holding from Germany, each of which is aiming for a production capacity similar to Tesla.

Lithium-cobalt batteries are the latest state of the art and market leaders

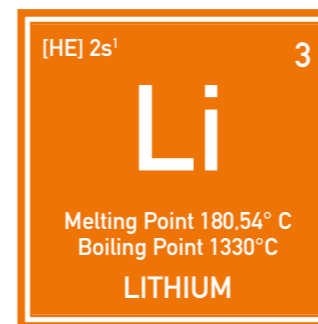
In addition to the aforementioned raw materials lithium, cobalt, nickel and manganese, a lithium-ion battery essentially consists of aluminum, copper, graphite, zinc, tin, silver and steel. The majority of (lithium-ion) batteries currently on the market are lithium-cobalt (dioxide) batteries, which is why this report deals primarily with the „battery metals“ lithium and cobalt.

Lithium

The element lithium

Lithium is a light metal from the group of alkali metals. It has the lowest density of all known solid elements. It is only about half as heavy as water, silver white by nature and relatively soft. Lithium is highly reactive, which is why it always occurs in nature as a lithium compound. It starts up rapidly in the air, which is due to the formation of lithium oxide and lithium nitride. In pure oxygen, it burns

with a bright red flame at 180°C to form lithium oxide. Lithium reacts very strongly with water to form lithium hydroxide.



Lithium production is either tedious or expensive

Worldwide lithium production is divided into several different branches that produce the following types of lithium compounds:

1. Lithium carbonate,
2. Lithium hydroxide,
3. Lithium chloride,
4. Butyllithium and
5. Lithium metal.

Metallic lithium is usually produced from lithium carbonate in a multi-stage process and is usually traded with a purity of 99.5%. This metallic lithium is used as a catalyst in the chemical and pharmaceutical industries and for the production of aluminium-lithium alloys.

The industry essentially distinguishes three types or qualities of lithium compounds:

1. „Industrial grade“, with a purity of over 96%, mainly for glass, casting powder and lubricants,
2. „Technical Grade“, with a purity of about 99.5%, mainly for ceramics, lubricants and batteries and
3. „Battery Grade“, with a purity of over 99.5%, especially for high-end cathode materials in batteries and accumulators.

There are two types of lithium deposits

Lithium is generally obtained from two different sources.

1. So-called „brine“, i.e. (salt) sheet or brine deposits: Lithium carbonate is obtained mainly in salt lakes from salt solutions containing lithium by evaporation of the water and addition of sodium carbonate. To obtain metallic lithium, the lithium carbonate is first converted with hydrochloric acid. This produces carbon dioxide, which escapes as a gas, and dissolved lithium chloride. This solution is concentrated in the vacuum evaporator until the chloride crystallises out.
2. So-called „Hard Rock Spodumene“, i.e. hard rock pegmatite deposits: Lithium compounds are not obtained from the salt of lakes, but from spodumene, a lithium-bearing aluminium silicate mineral. The concentrate obtained is often converted to lithium carbonate with a purity of more than 99.5% using conventional mining technology. The intensive thermal and hydrometallurgical process required for this is considered to be very costly. Such deposits are currently almost exclusively exploited in Australia, and most of the processing takes place in Chinese facilities.

New processing processes and lithium sources could revolutionize production

Recently, more and more exploration and development companies have been relying on new technologies to help them extract lithium from brine deposits within days and even hours, rather than by means of natural evaporation, using specially developed processes in corresponding plants. The processes of Tenova Bateman and IBC Advanced Technologies should be mentioned here.

In addition, a third lithium source was identified by several lithium development companies. This makes it possible to extract lithium from old, exploited oil reservoirs. The lithium is extracted from the waste water remaining in the reservoirs. The fact that this process works has already been proven several times. In addition, this seemingly unusual lithium recovery also seems to be economically feasible. This means that brine-containing (former) oil fields will also become a focus of the lithium industry.

Larger lithium deposits concentrated in a few regions

Lithium accounts for about 0.006 % of the earth's crust and is therefore somewhat less abundant than zinc, copper and tungsten and somewhat more abundant than cobalt, tin and lead. Estimates by the US Geological Survey assume that around 40 million tonnes of lithium can be extracted worldwide. About 65% of them in the South American countries Bolivia, Chile and Argentina alone. The largest lithium carbonate production currently takes place in Salar de Atacama, a salt lake in the northern Chilean province of Antofagasta. Around 40 percent of global lithium production comes from this region. There are also significant lithium deposits in North America, Australia and China.

Lithium production currently concentrates mainly on four countries and four companies

These three countries plus Australia currently account for around 80 percent of the world's total lithium production, which is divided between four companies. As a result, the entire lithium market is very non-transparent, which is why the large battery and accumulator manufacturers such as Panasonic and the leading electric car manufacturers, above all Tesla Motors, have recently relied primarily on long-term supply contracts with relatively

small development companies, some of which will not provide subsidies before 2020. As a result of this oligopoly, lithium is currently also not traded on the stock exchange, the actual trading prices are strictly confidential.

treated. One reason for this, which is always mentioned by the few suppliers, is that the available and required lithium qualities are too different for a standardized stock exchange.

Main fields of application are alloys, lubricants and rechargeable batteries

Its above-mentioned special and versatile properties make lithium a sought-after material in many different applications. So, it should come as no surprise that the main field of application for lithium has constantly changed in the past. Initially mainly used in medicine, the element began its triumphal march in the 1950s as a component of alloys. Its low weight, but also its positive properties in terms of tensile strength, hardness and elasticity, made it an integral part of aerospace technology. This picture has changed once again in the past 20 years. In the course of the beginning electrical revolution one recognized quite fast that it is suitable due to its low normal potential almost perfectly as an anode in batteries. Lithium batteries are characterized by a very high energy density and can generate particularly high voltages. Lithium batteries are not rechargeable. Lithium-ion batteries, on the other hand, have this property, in which lithium metal oxides such as lithium cobalt oxide are connected as cathode. As a raw material for the production of rechargeable batteries, however, higher purity grades than 99.5% are required. Lithium hydroxide is used in the „Industrial“ quality as a raw material for lubricants and coolants, among other things; with the higher „Technical“ quality grade, it is also used in battery and battery production. Lithium carbonate – crystalline, granulated or powdered

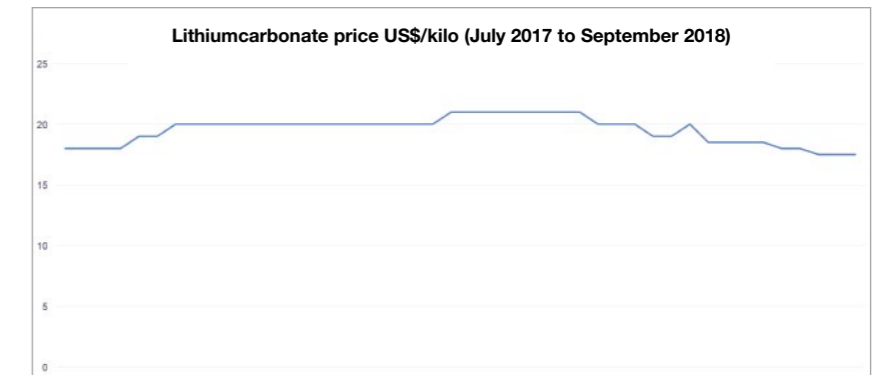
– is used, for example, in the electrolytic production of aluminium, in the ceramic and pharmaceutical industries and in alloying technology. Special degrees of purity of lithium carbonate in the form of very fine powder (battery grade powder) are suitable as raw materials for the production of lithium ion batteries. The extraction and processing of (especially high-grade) lithium is considered to be very costly.

The manufacture of lithium-ion batteries requires a large quantity of lithium

A large quantity of lithium is required for the production or operation of lithium-ion batteries. Every smartphone, for example, contains between 5 and 7 grams of LCE (lithium carbonate equivalent). With a notebook or tablet it is already 20 to 45 grams. Electric tools such as cordless screwdrivers or electric saws require about 40 to 60 grams for their batteries. A 10 kWh storage unit for domestic use requires around 23 kilograms of LCE, while batteries for electric cars require between 40 and 80 kilograms. An energy store with 650 MWh capacity needs about 1.5 tons of LCE. With quantities in the billions (smartphone) or in the millions (notebook, tools, cars, e-bikes, etc.), several 100,000 tons of LCE demand per year quickly accumulate.

Lithium production will (and must) increase sharply

In 2015, worldwide lithium production (often referred to as LCE for standardization purposes, which stands for „lithium carbonate equivalent“) amounted to around 175,000 metric tons of LCE. Projections assume that this figure could rise to around 330,000 tonnes of LCE by 2020, although no concrete mine extensions or new mines have yet been identified for the time being, so that lithium is likely to run into a huge supply deficit.



(Source: own chart)

The decisive factor is always the price, which is relatively insignificant for battery production!

Ultimately, it is the price alone that decides whether the existing lithium deposits are economically viable. And this has picked up strongly in recent months. While in mid-2015 the price was still around US\$ 6,000 per tonne of lithium carbonate, since then it has peaked at over US\$ 20,500. Certainly, just a snapshot. It can be assumed that in the medium to long term this will settle at between US\$ 10,000 and US\$ 12,000 per tonne of lithium carbonate. One way or another a lucrative business for the producers, the pure promotion costs for the current projects are only around 3,200 to 6,500 US\$ per ton. This is similarly the case with lithium hydroxide. **Since lithium makes up a considerable part of a battery in terms of quantity but is only responsible for around 4-5% of the cost of a battery, the price of lithium is ultimately relatively insignificant for the production of lithium-ion batteries and should therefore be kept at an economic level for lithium producers.**

Development companies are working intensively on new projects, ...

While the big names Albemarle, SQM, FMC and Tianqi have (probably) plans to expand their production, but at the same time have



(Source: Lithium Chile / own chart)

no great interest in falling lithium prices, numerous development companies are working on the advancement of new lithium projects and the identification of concrete deposits and resources.

... partly in new lithium hot spots

In addition to the classic lithium regions of South America and Australia, more and more North America is crystallizing as well, with Canada, Mexico and (due to its proximity to the future top consumer Tesla Motors) the USA and in particular the US state of Nevada emerging as the lithium hot spot. In Nevada, the **Clayton Valley in particular has** become a lithium Eldorado in recent years, after being home to Albemarle's Silver Peak Mine, the only operational salt brine lithium mine in North America. The Clayton Valley is one of the few areas in the world where commercially degradable lithium salt brines are found. Recently **Pure Energy Minerals** had concluded a supply contract with Tesla Motors. Another important lithium hot spot is located in northwest **Argentina**, where **Orocobre** operates the Olaroz lithium mine. There and in neighbouring Chile there are also a number of development companies that have already reported several top-class results, such as Millennial Lithium.

Conclusion: The demand for lithium is rising rapidly!

The demand for lithium appears almost gigantic not only because of, but above all because of, the new boom sector of electro-mobility! While in the case of lithium this was still around 65,000 tons of LCE in 2000, by 2017 it was 145,000 tons of LCE that were in demand each year. Experts expect LCE demand to rise to over 530,000 tonnes per year by 2025.

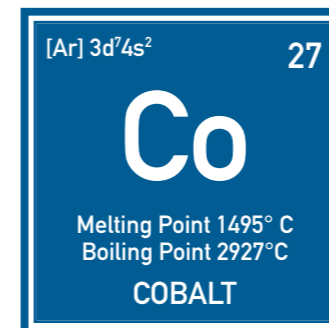
The main driving factor will be demand from the battery and accumulator sector and the associated automotive industry. While in 2015 only about 40% of lithium demand came from the battery and accumulator sector (60% of demand came from other sectors), its share is expected to rise to 70% by 2025.

Cobalt

The Cobalt Element

Cobalt is a steel-grey, very tough heavy metal (ferromagnetic transition metal) with a density of 8.89 g/cm³. As a typical metal it conducts heat and electricity well, the electrical conductivity is 26 percent of that of copper. Its chemical behavior is similar to

that of iron and nickel, and it is resistant to air passivation; it is only dissolved by oxidizing acids.



Cobalt extraction is relatively simple and inexpensive

Cobalt extraction is a well-known, relatively simple process. Cobalt is mainly extracted as a by-product from copper and nickel ores. First, part of the iron sulphide present is converted into iron oxide by roasting and slagged with silicon dioxide as iron silicate. The result is the so-called rough stone, which in addition to cobalt also contains nickel, copper and other iron as sulphide or arsenide. Further roasting with sodium carbonate and sodium nitrate removes further sulphur. Sulfates and arsenates are formed from part of the sulfur and arsenic, which are leached out with water. The corresponding metal oxides remain, which are treated with sulphuric or hydrochloric acid. Only copper does not dissolve, while nickel, cobalt and iron dissolve. With chlorinated lime, cobalt can then be selectively precipitated as cobalt hydroxide and thus separated. This is converted into Co₃O₄ by heating and then reduced to cobalt with coke or aluminium powder.

The majority of cobalt deposits lie beneath the seabed.

Cobalt is a rare element with a frequency in the earth's crust of 0.004 percent. This puts it thirtieth in the list of elements ordered by fre-

quency. Cobalt can be found in many minerals but is usually only found in small amounts. The element is always associated with nickel, often also with copper, silver, iron or uranium.

The world's known cobalt reserves are around 25 million tonnes, with the largest deposits in the Democratic Republic of Congo, Zambia, Canada, Morocco, Cuba, Russia, Australia, Uganda and the USA. Over 100 million tons of cobalt are believed to be present in the earth's crust on the soils of the Atlantic, Pacific and Indian Oceans.

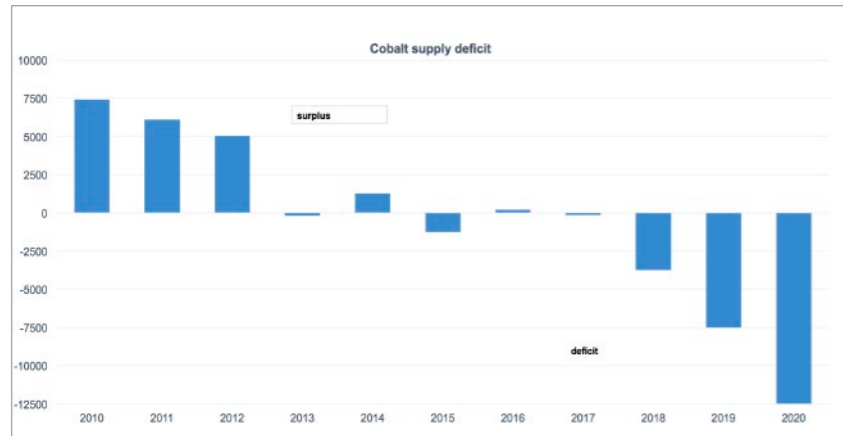
So far, cobalt has mainly been produced in politically unstable regions.

The majority of the annual cobalt supply comes from mines in the Democratic Republic of Congo. About 55% of the total production volume comes from the Central African civil war country. Followed by China with 6.3%. Russia accounted for a further 5%, Zambia for 3.7%, Cuba for 3.4% and the Philippines and Madagascar for almost 3% each. These are all countries that are regarded as rather unstable or at least not necessarily inspiring confidence. The remaining production is divided between Canada (just under 6%), Australia (4.15%), South Africa (2.45%) and several other countries with even lower production volumes.

The future security of supply appears to be extremely critical on the basis of the current producers, which is why there have recently been more and more attempts to develop new mines in Canada, Australia and the USA and to increase production accordingly.

Main fields of application are paints, alloys, medicine, magnets and rechargeable batteries.

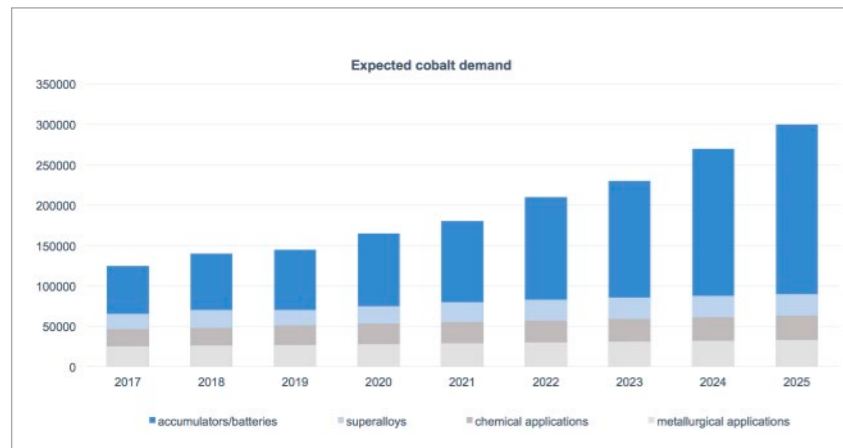
In history, cobalt was used in the form of oxides, sulfates, hydroxides or carbonates for heat-resistant paints and pigments. The



(Source: M2Cobalt / own chart)

best-known decorative application is blue cobalt glass. Today cobalt is mainly used as an alloying component to increase the hot strength of alloyed and high-alloy steels, especially high-speed steels and super alloys, as a binder phase in hard metals and diamond tools, as a component of magnetic alloys, as a dryer for paints and varnishes, as a catalyst for desulphurisation and hydrogenation, as a hydroxide or lithium cobalt dioxide (LiCoO₂) in batteries, in corrosion- and wear-resistant alloys and as a trace element for medicine and agriculture. In addition, cobalt is used in the production of magnetic media such as tape and video cassettes, where it improves the magnetic properties by doping. Since the 1990s, cobalt has been used as an anode material in the anode of lithium-ion batteries.

(Source: M2Cobalt / own chart)



Electric vehicles in particular need a lot of cobalt – but not only the

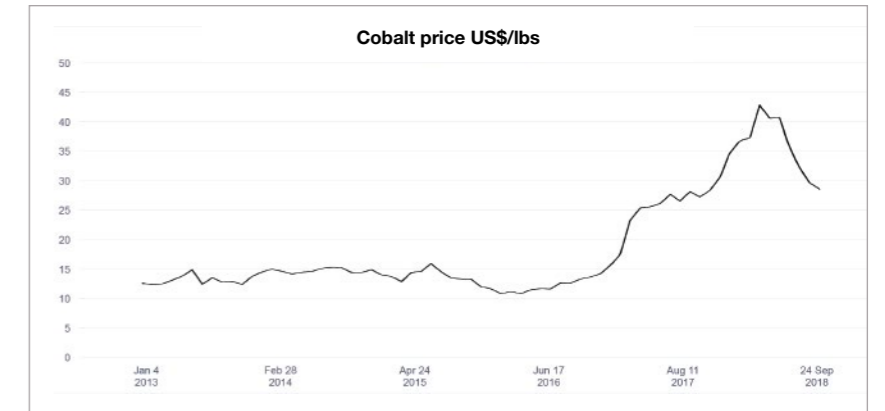
Similar to lithium, cobalt is also consumed in corresponding batteries. Depending on the version, between 5 and 10 grams of cobalt flow into a single smartphone. With a notebook or tablet it is already 30 to 100 grams. Power tools need about 50 grams for their batteries. A 10 KWh storage unit for domestic use (such as Tesla's Powerwall) requires about 7 kilograms of cobalt, while the batteries for hybrid vehicles require about 4 kilograms and for purely electric cars 10 kilograms of cobalt. Tesla's Model S even reaches 22.5 kilograms. A passenger plane devours about 4,000 kilograms of cobalt. With quantities in the billions (smartphone) or millions (notebook, tools, cars, e-bikes, etc.), several 100,000 tons of cobalt are quickly required per year.

The cobalt supply must be increased

And this is also urgently necessary, because the lithium-ion battery sector will demand ever larger quantities of cobalt in the coming years. While annual production in 2016 was still around 123,000 tonnes, leading experts assume that this production will be difficult to expand at present. The fact is, however, that Congo will remain the absolute world market leader for the time being and will expand its market share to as much as 70% by 2021. The world's two largest mines, Kamoto and Kolwezi, will play a major role in this, producing about 50,000 tons of cobalt per year alone. Outside the Congo, although several companies are working to expand their existing mines (including Glencore, Norilsk, Umicore, Sumitomo and Vale), these mine expansions are likely to be only a drop in the ocean due to the expected increase in demand.

Cobalt price explodes!

Many market participants have already realised that cobalt production cannot be expanded so easily from now on, which is why the cobalt price has exploded from around US\$ 10 to just over US\$ 40 since mid-2016 and is currently around US\$ 30 per pound. However, the all-time high of US\$ 52 from 2008 has not yet been reached, which is only a matter of time given the threat of a massive supply deficit.



(Source: own chart)

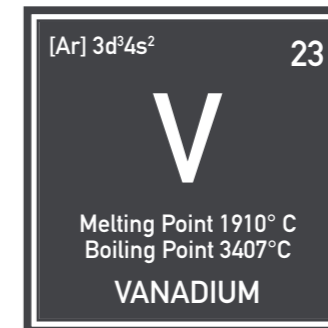
Several junior mining companies have already advanced cobalt projects

In recent times, junior companies in particular have been particularly outstanding. **First Cobalt**, for example, a merger of three formerly independent companies, is working on bringing the former cobalt camp in the Canadian province of Ontario back into production. **eCobalt Solutions** owns an almost production-ready cobalt project in the US state of Idaho that could go online in a short time. Another hot spot is Africa, where several companies have secured promising projects outside the Democratic Republic of Congo. For example, **M2Cobalt**, which found what they were looking for in neighbouring Uganda. Australia, too, is currently engaged in the development of promising cobalt deposits.

Conclusion: Cobalt will experience an immense surge in demand and a supply deficit in the coming years!

The demand for cobalt should explode in the coming years! While this was still around 60,000 tonnes in 2008, by 2017 the demand had already reached 125,000 tonnes per year. Experts expect demand for cobalt to rise to over 300,000 tonnes per year by 2025. The main driving factor will be demand from the battery and rechargeable battery sector.

Due to the current situation that demand is rising sharply, but at the same time only a few existing mines have any possibility at all to increase their production, there are signs of a significant supply deficit for cobalt in the coming years. Already from the current year 2018, a supply deficit seems unavoidable, which will gradually widen in the coming years and will exceed the 10,000 tons per year mark as early as 2020.



Vanadium

The element vanadium

Vanadium is a steel-grey, bluish shimmering transition metal which is very soft when pure. Although pure vanadium is relatively soft, it becomes harder through the addition of other elements and then has a high mechanical

strength. The majority of vanadium is therefore used as ferrovanadium in steel production. The addition of vanadium to chromium-vanadium steels leads to an increase in toughness and thus to an increased resistance of the steel.

Extraction is simple

Although the extraction of vanadium involves many intermediate steps, it has been tried and tested over decades and is therefore now quite simple. In order to obtain pure vanadium, expensive calcium or aluminium is used as a reducing agent, otherwise high purity cannot be achieved. Whereas pure vanadium is obtained directly with calcium, a vanadium-aluminium alloy is first formed with aluminium, from which pure vanadium is obtained in a vacuum. However, the majority of vanadium is not processed as a pure metal but in the form of the iron-vanadium alloy ferrovanadium, which contains at least 50% vanadium. To produce ferrovanadium, the slag containing vanadium and iron is reduced to ferrovanadium with ferrosilicon and lime. This alloy is sufficient for most technical applications.

Occurrence and extraction

Vanadium is a relatively common element, with a similar element frequency to chlorine and chromium. Its share of the continental crust is about 120 parts per million (ppm). The element occurs predominantly bound in different minerals. Despite the frequency of vanadium, deposits with high concentrations of the element are rare, many vanadium minerals do not occur frequently. Most of the vanadium is found in traces of other minerals, especially iron ores. The most important producing countries are South Africa, China and Russia.

Main field of operations: (Steel) alloys

91% of the vanadium mined in 2017 was used in a variety of alloys, mostly with the metals iron, titanium, nickel, chromium, aluminium or manganese. This makes vanadium particularly suitable for use in buildings, bridges, tunnels and automotive parts, as well as in the aerospace industry. In addition, pipelines are frequently lined with it and power lines or high-voltage pylons are reinforced with it. Vanadium is also used for many infrastructural applications such as chemical plants, oil refineries, offshore platforms, railways, railway wagons, freight containers, construction machinery and ships.

Use in the field of renewable energies as load balancing for wind farms and photovoltaic systems

Recently, there has been a growing use in the field of renewable energies for covering peak loads and load balancing, often in the immediate vicinity of wind farms or photovoltaic systems. By mid-2017, more than 40 large vanadium redox flow accumulators were in operation worldwide. The largest such battery is located in Japan and has an output of up to 15 MW. Some vanadium redox flow systems are also in use in Germany. Germany's largest vanadium flow battery, a river cell system with 660 m3 tank capacity and initially 1 MW capacity and 10 MWh energy storage capacity, was commissioned in 2017. The world's largest battery will also be a vanadium redox flow cell battery. It should be able to generate 200 MW and store 800 MWh of energy. It will be installed in the northeast of China on the peninsula near Dalian and will consist of ten units with 20 MW and 80 MWh each. Completion is expected in mid-2019. In July 2018, the Irish company redT was awarded the contract for a similarly large project to be implemented in Germany. The company signed an exclusivity agreement

with Energy System Management GmbH (ESM), a German energy development company belonging to WWF solar, for the supply of two 40 MWh grid-connected energy storage projects in Germany, with a further 690 MWh of projects planned for the future.

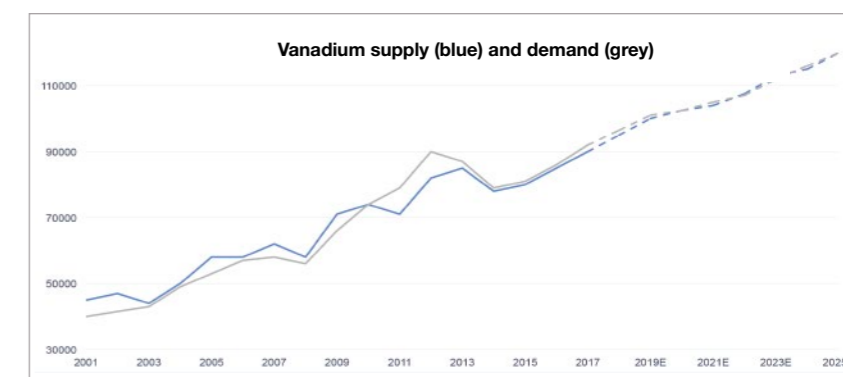
Vanadium price has increased six-fold

The number of commissioned plants and their size have multiplied in recent years, which is mainly due to the fact that ways must finally be found to make fluctuating power generators such as wind power plants or photovoltaic plants halfway capable of base loads by means of battery storage technologies. The price of vanadium has increased six-fold since the beginning of 2016, and the trend continues to rise.

While experts expect global steel production to grow at only 2% per year from 2017-2025, the increasing intensity of vanadium consumption, combined with specific growth drivers for the end consumer, will allow vanadium demand to increase further. By the way: the growth of global steel production rates has caused 85% of the increase in vanadium consumption between 2001 and 2017.

Conclusion: The price of vanadium will continue to rise as the current production is needed only for steel production.

Vanadium therefore has one advantage: the current vanadium production is almost entirely required for the production of steel alloys. An expected demand from the area of the storage technologies cannot be covered at the moment quasi at all. The expected exponential development in demand from this new area of application will therefore immediately lead to a supply gap in vanadium, which can already be seen from the steadily rising price of vanadium. On the other hand, there are currently few or no new vanadium



(Source: own chart)

mines in operation. If this is the case, then vanadium can only be increasingly extracted within the next 2 to 3 years from old tailings piles, for example uranium mines. There will clearly be a need for new primary vanadium capacity in the future, which historically has always been a major challenge and cannot be met within 2 or 3 years. Vanadium, for example, will become a relatively unnoticed booming element, because one thing is certain: the decentralized storage of excess energy will become THE decisive issue in the future when it comes to the question of where base-load energy is to come from to „refuel“ millions of electric vehicles.



(Source: own chart)

Conclusion: The electric revolution is just beginning to take off and will lead to a long-lasting boom in lithium, cobalt and vanadium!

The demand for lithium, cobalt and vanadium will in future be mainly determined by three different parties:

Interview with Tobias Tretter – Manager of the Structured Solutions Next Generation Resources Fonds

1. From the Asian electronics companies that are mainly focused on the mass production of high-performance lithium-ion batteries and rechargeable batteries for everyday use, in multimedia devices, etc...
2. From the automobile manufacturers and (initially) above all Tesla Motors, but also from almost all established automobile manufacturers worldwide.
3. From the manufacturers of decentralised energy storage systems that are used wherever electricity is generated by photovoltaic or wind power plants and is to be used later by means of storage.

This constellation will cause the demand for lithium, cobalt and vanadium to increase many times over in the coming years, with decentralized storage systems generating the greatest growth in demand and even putting the other two areas in the shade.

A summary of the above is therefore not too difficult, a glance at the most important numerical estimates is basically sufficient. The number of electric vehicles will multiply in the coming years: From 1.2 million electric cars in 2017 to at least 16 million electric vehicles per year from 2025. 25 million electric vehicles per year are expected from 2030, and 60 million vehicles per year from 2040. In parallel, lithium-ion battery demand will rise from 21 GWh in 2016 to 1,300 GWh in 2030! By 2021 alone, capacity demand will increase to an estimated 270 GWh, driven by the expansion plans of the upcoming storage production giants LG Chem, Samsung SDI, CATL, Lishen, Tesla and others.

The imminent supply shortfall will reward the most advanced developers in particular

On the whole, there are signs of a supply shortfall in the lithium, cobalt and vanadium markets with immediate effect, as the increase in demand is likely to (far) exceed the in-

crease in supply in the future. As there is no end in sight to the increase in demand beyond 2025, and as there are no major production projects worth mentioning in the pipeline, this situation is likely to continue for the foreseeable future.

The development companies in particular, which have already advanced their respective projects, should offer the greatest price opportunities in the coming months, also with regard to possible consolidation, i.e. takeover scenarios.

Some of these committed development companies, as well as prospective producers, are presented below.

Mr Tretter, you are Manager of the Structured Solutions Next Generation Resources Fund. What strategy do you pursue and what does the fund specifically reflect?

The fund was launched in 2010 and invests in companies that benefit from the success of electromobility and thus from the exponentially increasing demand for battery metals. Initially limited to lithium companies as a passive index fund, the fund has been actively investing in other battery metals such as cobalt and graphite for 3 years. The strategy change has been crowned with success so far and the fund won the Lipper Fund Award in 2016 and 2017 for the best fund of the past 3 years in the field of commodities. We believe that we are only at the beginning of a new cycle and that demand for energy commodities will continue to rise significantly until at least 2025. In addition to lithium, the demand for cobalt, graphite, nickel and zinc is also likely to rise significantly in the coming years, and the fund offers our investors a good opportunity to profit from the boom in lithium batteries.

Is such a fund, which is focused on relatively niche raw materials that are narrow in the market, not too specialised and therefore too risky?

Yes and no. We believe that specialization is one of the factors for our success. The lithium sector is very special and requires considerable experience and due diligence to filter out the successful companies of the future. Since every lithium project is unique, lithium companies in particular require much more intensive due diligence than gold or copper producers, for example. However, the fund's specialisation also increases its volatility. The fund cannot easily escape a correction such as the one in the first few months of this year, as even good lithium companies initially lose value in a correction. However, we see the opportunities offered by the fund's specialisation as

much greater and the fund is primarily intended for investors who believe in the long-term success of electric cars and want to profit from this trend. We have already expanded our universe to include companies from the graphite, cobalt and nickel sectors, thus significantly reducing the risk of lumps, but we will retain our specialisation in battery metals.

For example, cobalt has some superior properties when used as a cathode, such as faster battery recharging. However, battery manufacturers are currently not making full use of this potential, as the majority of global production comes from the Congo and is therefore not a reliable source of raw materials. Moreover, the mining conditions in Congo are extremely critical and not only investors but also customers avoid this production. The need for reliable sources and ethically and ecologically cleanly extracted cobalt is enormous and will be another trend in the coming years. We have therefore positioned the fund even more broadly and can thus diversify even more strongly. Should other commodities become interesting due to demographic trends or their reduced exploration, the fund can realign itself at any time. If an investor believes in the success of electric cars or Powerbanks, he is faced with the choice of buying shares in one or two companies in the sector or a specialised fund. Due to the specifications of the sector, investors should prefer diversified funds or certificates to direct investments in order to minimise individual equity risk to a large extent.

Which raw materials – in addition to lithium and graphite – do you currently regard as important for the electric revolution? – Which of these are to be regarded as „critical“, i.e. particularly scarce for the coming years?

We are currently seeing massive developments and changes in the production of lithium batteries. In the coming years, batteries



Tobias Tretter has been active in the mining sector since 2000. During his activity at Dr. Jens Ehrhard Wealth Management he supported the management of the DJE Gold & Resources Fund, which was awarded as the best performing commodity fund of 2003. From 2005 to 2008 he co-managed the Stabilitas Funds, which have been awarded as the "best performing Gold Fund" in 2006. Since 2009, Mr. Tretter acts as CEO and responsible person for the Index- and Portfolio-Managements of Commodity Capital AG. He is managing the Commodity Capital Global Mining Fund (ISIN: LU0459291166), the Structured Solutions Lithium Index Strategie Fund (ISIN: LU0470205575) and the Managed Accounts of Commodity Capital. Tobias Tretter holds a business diploma degree from the University of Bayreuth.

will become significantly more powerful, lighter and faster to recharge. This will also lead to changes in the metals needed to manufacture these batteries. In our discussions with the major battery manufacturers, however, we were repeatedly assured that many years will pass on the way to the ultimately optimal battery – a solid state battery without liquids within the battery, and in particular the proportion of lithium will hardly change. However, in the coming years, significantly more nickel will be used in batteries at the expense of cobalt or graphite. Basically, we will see bottlenecks in all battery metals in the next 5 years. We see the lithium bottleneck most critically, as there is no solution in sight for the next 5 to 8 years. Graphite is critical, but a few projects should be able to meet the demand. So, it's also important here to be the first to go into production. Cobalt is critical because it is only mined in small quantities outside the Congo and battery manufacturers are urgently dependent on alternatives from politically stable regions. The emerging increase in the use of nickel in batteries will also lead to production bottlenecks for nickel and we see a considerable need for new projects in this area. In the case of nickel, the enormous initial investments for a new mine are primarily critical. The incentive to bring new projects into production for billions of USD was not there in the past years due to the falling nickel prices and now the interest in new projects is increasing again, but these projects also need some years to be brought into production. We wait for nickel shortages over the next 5 years before the situation should ease again.

For stationary energy storage, vanadium will play a central role in the coming years and we need some new projects to meet the demand in the coming years. Vanadium is similar to the situation with graphite. It will be important for companies to be the first to go into production, as demand is urgently dependent on new projects, but a few new projects should be able to meet the additional demand.

Where are the main mining areas for lithium and cobalt at the moment and which could be added? Are there currently political, environmental or similar restrictions in these regions that could lead to future supply bottlenecks?

Since this year, Australia has been the world's largest lithium producer and we see further potential in Australia to expand production from hard rock projects. Traditionally, the majority of lithium production comes from the country triangle of Chile, Argentina and Bolivia, as the low price of lithium meant that production from the salt lakes in particular was cheaper and thus economically profitable. There are lithium deposits worldwide and in the future we will see various locations for new lithium production. With lithium there is unfortunately a certain risk with all current projects. Australia certainly has few political risks, but lithium companies in Australia are currently mining „only“ lithium concentrate, which is then converted into lithium hydroxide or lithium carbonate for battery manufacturers in refineries in China. Unfortunately, dependence on China cannot be dismissed here and represents a certain risk. In South America, and especially in Argentina, political and economic reliability has traditionally been a problem. Currently, the immense inflation and the enormous currency devaluation of the peso is very positive for lithium producers, as most costs are incurred in the weak national currency, but the lithium can be sold in USD. However, we have learnt from history that such extreme scenarios never end well, and we expect additional taxes and levies for all exporting companies but hope that the country will not relapse and continue along the path of opening the market for foreign companies and investors. Cobalt is primarily extracted as a by-product from copper production and unfortunately a large part of the production comes from the Democratic Republic of Congo. Congo is primarily known for its non-existent labour and safety standards, child labour and political instability, so that investors cannot avoid

Congo. The industry and we investors are therefore looking for cobalt projects outside the Congo that can be mined at cost-covering prices. I am sure that battery manufacturers and car manufacturers would be willing to pay a premium for ethically and ecologically degraded cobalt.

Basically, I believe that in the future cobalt can also be mined in North America or South America at reasonable prices and see considerable potential here for purchase agreements or joint ventures with the automotive industry for the first new producers.

For lithium, I assume that the number of Hard Rock projects will increase due to the increased lithium prices and that production will be more strongly distributed worldwide. South America and Australia will remain the main mining regions.

So-called gigafactories, i.e. large production facilities for lithium-ion batteries, are currently springing up like mushrooms. Is there already enough raw material for processing for these production capacities?

Gigafactories are the key or motor for lithium demand and play a decisive role. Tesla's gigafactory alone will double the worldwide production of lithium batteries. Elon Musk has already announced the construction of 5 more gigafactories. But not only Tesla, but also BYD, Foxconn, LG and Daimler are building new gigafactories and investing billions of US\$ in the expansion and establishment of new battery productions. Production will triple to at least 87 GWh by 2020. However, this is not only about the batteries for future electric cars, but in particular also about the decentralized storage of regenerative energies with batteries.

As already mentioned, the price of lithium plays a rather minor role in the cost of battery production, so that the availability of lithium is of primary importance. The Gigafactories certainly don't want to stop their production because there is not enough lithium available. The lithium market therefore has so-

mething of a race against time at the moment. There are certainly enough lithium resources worldwide, but the massive expansion of lithium battery production and the demand for lithium in the coming years will pose considerable problems for mining companies, which have hardly invested in recent years due to the general crisis in the mining sector.

The question for the lithium sector in the coming years is therefore not: „How high is the lithium price, but where do I get the lithium from and what is its availability“.

Lithium is certainly the most critical factor as it cannot be substituted. But the supply of cobalt, graphite or nickel is also critical and far from secure. Massive investment is needed to discover and develop new deposits and there will be a shortage of all these commodities, at least for some time. The steadily increasing investments in new gigafactories will certainly worsen the situation in the coming years and we do not expect an easing in the supply of raw materials before 2025.

Over the past 10 years, bubble formation has been observed from time to time in so-called „trend raw materials“. Just remember the uranium bubble and the hype about rare earths, graphite & Co. Why should this be any different with raw materials for the production of batteries?

Hypes are not necessarily negative for investors. The only important thing is to identify them early on and to exit these markets in good time. With all three „hypes“ mentioned it was always a hype among the investors, which however did not have rising demand on the part of the industry as a basis. Yeah, there was a rising demand for uranium until the bad events in Fukushima. Thereafter, however, nuclear power plant operators in Japan acted as sellers rather than buyers and were the main reason for the falling uranium prices. In rare earths, there was never a bottleneck in the production of raw materials, but in their processing in Chinese refineries.



Switching to electric cars and regenerative energy sources and thus decentralized energy storage is not possible without lithium-ion batteries.
(Source: shutterstock)

And with graphite it is simply the problem that the demand increases analogously to the demand for lithium, but it is also possible to produce graphite artificially. Furthermore, it is difficult even for „experts“ to estimate which raw material project really has the right quality for the end user, i.e. the battery manufacturer.

With lithium, the fundamental situation is completely different. Switching to electric cars and regenerative energy sources and thus decentralized energy storage is not possible without lithium-ion batteries. This can also be seen from the massive investments made by industry in new battery factories, all of which will require lithium. Since lithium makes up a considerable part of a battery in terms of quantity but is only responsible for about 4-5% of the cost of a battery, the price of lithium is ultimately insignificant for the manufacture of lithium-ion batteries. It is only a matter of sufficient supply with lithium. And this can definitely be doubted in view of the massive investments in new battery produc-

tion facilities. By 2025 at least 1,000,000 tons of lithium will be needed. This corresponds to four times the current production of about 250,000 tons of lithium. Even with an optimistic view, it will not be possible to bring 40 to 50 new projects into production in 7 years. In addition, we expect the sector to face further significant problems. It became known that there will be no new water licenses for the Atacama Desert in the foreseeable future. The Atacama Desert is currently the world's largest lithium producer and there were big plans to significantly expand current production. These plans should be off the table for the time being. The economic problems in Argentina are also increasing the uncertainty and, last but not least, in the past two years Chile and Argentina have experienced weather caprioles which have led to losses in production. At present, we do not see the possibility of obtaining lithium even close to what would be necessary for the massive expansion of lithium battery factories and currently see no hype in the lithium sector, but

rather a very strong increase in demand in the medium term with only little potential for expanding production.

Mr Tretter, let us come back to your fund. What are the largest individual positions in your fund and why?

In general, we follow the life cycle of commodity companies very closely – also with our global mining fund – and see by far the best risk-reward ratio for junior companies that have just gone into production or will go into production in the near future. These are the companies that have already successfully overcome the biggest risks and represent the potential takeover targets of the major majors. Therefore, in addition to the established major producers, Lithium Americas and Nemaska Lithium in particular are overweight as the coming producers. While Lithium Americas is about to start production on the Chaucari-Olaroz project in Argentina, Nemaska owns one of the world's highest and largest hard rock projects in the politically secure province of Quebec, where it can benefit from very low electricity prices.

Which second-tier companies could be of additional interest to investors due to their presence, location, management or other reasons?

After the correction in recent months, we are seeing very good entry prices again and are seeing some interesting companies which are currently very attractive for us due to the projects, the management teams or in the best case both. Infinite Lithium, for example, is a company with a highly interesting project in Canada. We are very excited about the upcoming drilling results and see significant opportunities for new projects in Canada. Nemaska has shown with the successful start of production of 1.1 billion USD that it is possible to implement hard rock projects in Canada and we are already curious who can bring

themselves as „new“ Nemaska in the coming months in the focus of investors.

Another of the „new“ companies in which we see considerable potential continues to be Standard Lithium, a relatively young lithium company that has attracted a great deal of attention through a joint venture with Lanxess in Arkansas as well as other projects. The company is trying to extract the available lithium cheaply from old oil wells – which also carry a lot of lithium in addition to oil – and is already working on the pilot plant here. Even with the support of the German chemical giant, Standard Lithium is likely to become the first significant lithium producer in America. We see considerable potential and expect a takeover competition for this still young company after the successful demonstration of the pilot plant.

Bankers Cobalt

With a unique business model on the way to the first direct hit

Bankers Cobalt is a Canadian exploration and development company focused on cobalt and copper. The Company is one of the very few to have a high-quality portfolio of approved copper-cobalt concessions in the Democratic Republic of Congo (DRC) and Namibia, which it explores using Canadian mining standards. The Company's objective is to generate a reliable, certified supply of conflict-free cobalt and copper for existing and new processors in the DRC that have overcapacity but do not have available certified resources to meet growing market requirements.

Unique business model

Bankers Cobalt pursues a unique business model filling a gap in the resource supply chain. The strategy is quite simple and synergistic with existing operators in the DRC. Bankers Cobalt acquires high quality projects in the DRC and intends to develop them into certified cobalt and copper resources using

highly professional exploration techniques rarely practiced in the Democratic Republic of Congo. Thereafter, mainly Chinese processors in close proximity will be offered the resources and avoid fines for non-certified supplies of cobalt and copper. This model is strongly supported by the affected mining parties in the DRC.

27 Concessions in DRC – 1 in Namibia

Bankers Cobalt is one of the very few foreign pioneers to early secure cobalt copper concessions in the DRC. The company currently holds 100% of 6 concessions in the DRC. There are also 21 private joint venture agreements with reputable partners. In total, these concessions comprise 391 km² of potentially high-grade exploration properties. The acquisition of these 27 licenses was preceded by over 5 years of research and operating experience in the DRC. In Namibia, a 70% option on a 135

km² license was secured to provide for risk diversification. In addition to having a superior land package, Bankers is one of the few mining companies outside of the majors to have built an effective operating team in the DRC.

Project 1: Kabolela DRC

Bankers Cobalt's first advanced project is called Kabolela and is 55% owned by the company. Kabolela is located approximately 130 kilometres northwest of Lubumbashi and approximately 10 km northwest of Kambove and covers 3 km². To the east and west of the concession area there are several operating copper and cobalt mines. The mineralization known to date extends over a strike length of approximately 200 metres. Drilling has already confirmed copper and cobalt mineralization. The company is currently planning additional drilling in the southern and south-central part of the concession.

vers 10.3 km². 3 km to the east is the operating Kimpe mine, which currently hosts a resource of approximately 3 million tonnes of 4.4% copper and 0.54% cobalt. Kankutu has a strike length of 2.15 km and shows mineralization in the eastern and southeastern areas, on the line of the Kimpe structure. Sampling (over 1,100 samples) and geophysical surveys have been completed and drill targets have been identified. In addition, around 4,500 metres were drilled. The results are still pending.

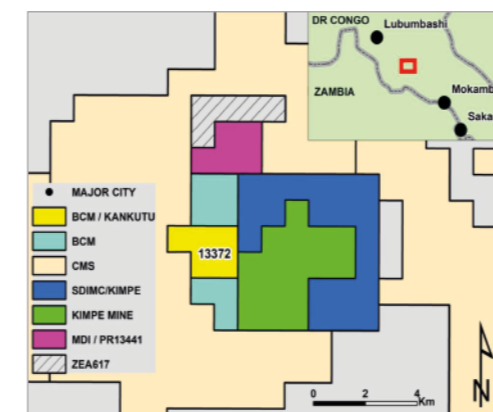
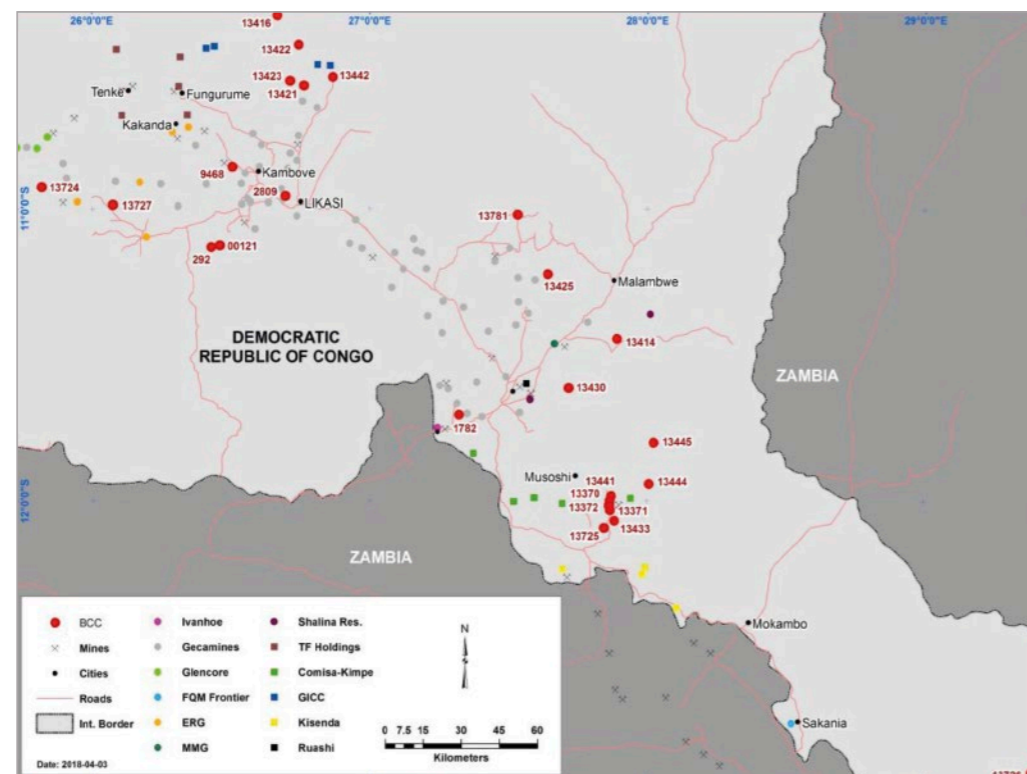
Project 3: Comipad Comima (292) DRC

Bankers Cobalt's third advanced project is the Comipad Comima Copper Cobalt Project. This consists of the two concessions and is 70% owned by Bankers Cobalt. Project 292 is located approximately 35 km southwest of Likasi and covers 3.4 km². The project is located on an east-west trending strike anomaly that extends over a length of 2.7 km. 10 km west is the Mwomba deposit which hosts cobalt, nickel, gold, platinum and palladium. Geophysical sampling and trenching has been completed. A drilling program is in preparation.

Project 4: Kamanjab – Namibia

Bankers Cobalt's fourth ongoing project is called Kamanjab and is located in the politically stable country of Namibia. It is located in the northwest of the country, about 90 km from the city of Kamanjab. Kamanjab Project covers 135 km² and is under a 70% option to Bankers Cobalt. The project has several visible outcrops of supergene copper mineralization over a strike length of several kilometres. These also show traces of gold, silver, lead and zinc. Early grab samples have been assayed by ALS Laboratory in Johannesburg and returned copper results ranging from 1.2% to 24.60% and silver results ranging from 2 g/t to 239 g/t. These samples were ta-

The concessions of Bankers Cobalt comprise 391 km² of potentially high-grade exploration properties. (Source: Bankers Cobalt)



Kankutu is located approximately 110 km southeast of Lubumbashi. (Source: Bankers Cobalt)

Project 2: Kankutu DRC

Bankers Cobalt's second area of focus is called Kankutu and is located approximately 110 km southeast of Lubumbashi. The project consists of a total of 4 concessions, in which 65% and 70% respectively are held and co-

Kamanjab Project covers 135 km² and is under a 70% option to Bankers Cobalt.
(Source: Bankers Cobalt)



ken over a large area and this project has the potential for a large world class deposit. Additional minerals are also present. Kamanjab is located in a semi-arid environment and exploration can continue year-round.

Catalysts for the coming weeks and months

In the current year 2018, exploration work was carried out on a total of 12 concessions, mainly during the rainy season. Multiple drill targets have been identified and are currently being further developed through drilling. Drilling programs have been or will be carried out on three projects totalling 7 concessions in 2018, which are expected to provide results before the end of 2018. A further 7 concessions have had initial work completed. Based on the Kamanjab assay results additional exploration activity including drilling is expected prior to the end of 2018.

Competent and experienced management team

Bankers Cobalt has a highly competent and experienced management team. CEO Stephen Barley has more than 35 years of experience in structuring mergers and ac-

quisitions and financing listed companies. He has participated in a number of TSX-listed resource companies involved in large international projects.

Kevin Torudag, President of the DRC wholly owned subsidiary and the Founder of Bankers has over 25 years in the public markets and directly participated in the financing of and development of multiple resource deposits. He has spent the majority of the past five years living and working in the DRC assessing projects and developing the necessary experience and relationships to evaluate and operate successfully in the DRC.

President and COO Grant Dempsey is a mechanical and electrical engineer with over 40 years experience in all aspects of mining. He also has 17 years of experience in the DRC, where he is considered one of the most respected leaders in the mining sector, including a strong network within the country. Prior to his current appointment at Bankers Cobalt, Dempsey was technical advisor to the Board of Gecamines, the state-owned mining company of the DRC. Dempsey was also President of Boss Mining (just 3 km from Bankers Cobalt's Kabolela project) and Frontier's activities, where he helped increase copper cathode production by 70% through plant expansion while reducing operating costs by 42%.

Bankers Cobalt has strong independent Directors. Peter Dickie has more than 35 years of experience in listed and private companies, including over 25 years in executive positions. He is a former President, CEO and Director of NioCorp Developments, a company developing the largest super-alloyed mineral deposit in North America (niobium, titanium and scandium). Simon Tuma Waku was a former Minister of Mines in the Democratic Republic of Congo and is the State owned mining company Gecamines's representative on the world class operating Tenke copper and cobalt mine. Shu Zhan is a senior geologist and for the past seven years was responsible for mergers and acquisitions for a large Chinese investment bank in the DRC.

Summary: Early Stage Chance of a Real Direct Hit

Bankers Cobalt is one of the early pioneers when it comes to cobalt licenses in the DRC. The company secured a potentially high-calibre portfolio of concessions, most of which are close to proven deposits. To date, 3 projects have been or are being drilled with most results pending and expected by year-end

2018. Based on the experience gained so far on the projects, there is a high potential for one or more direct hits that could take the company to a whole new level. The experienced and extremely successful management team has proven impressively in the past that it is capable of taking full advantage of early staged opportunities in both the DRC and Namibia.

Exclusive interview with Stephen Barley, CEO of Bankers Cobalt

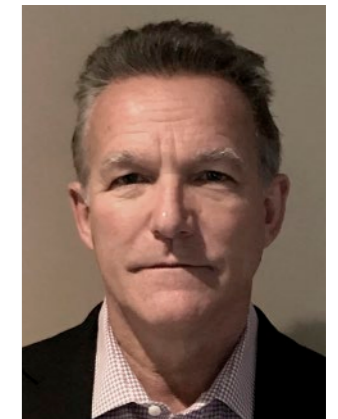
What did you and your company achieve within the last 12 months?

Bankers Cobalt became a publicly traded company on the TSX.V (TSX.V: BANC), FSE (BC2), and the OTCQB (NDENF) in late 2017. During the last 12 months we have successfully acquired an impressive land portfolio of 27 concessions in strategic locations in both the DRC and Namibia. We raised over CD-N\$8m in financing and have built from the ground up a highly effective operating and management team in the DRC, a country where execution is key. No other junior mining company has recently achieved these successes. Our experienced team has evaluated over 14 concessions and operated during the challenging wet season in the DRC to develop drill ready targets and complete drilling programs on a total of 7 concessions with more exploration and drilling to follow. We take our community and social responsibilities very seriously. We accomplished these goals while adhering to world class Canadian standard exploration and operating activities and business ethics not always abided by in the DRC. We are proud of over 100,000 injury free man hours of operations. All of our concessions have clean title and have no governmental involvement. We have achieved or

exceeded every stated goal during this time frame and based on experience will strive to continue to improve our performance moving forward.

What are the main catalysts for your company within the next 6 months?

We will continue to advance our projects in the DRC and Namibia and to evaluate our portfolio and acquire further interests when it is advantageous to Bankers. Based on our track record of performance and relationships in the DRC, we are being offered more advanced stage projects and are assessing a number of projects with known resources and early stage cash flow potential. Our project portfolio was created by Bankers by being early entrants in the DRC cobalt and copper sector and would be difficult if not impossible to recreate. The demand for quality land packages has increased tremendously over the past six months and the acceptance of DRC country risk as shown by the recent Barrick acquisition of Randgold can only serve to organically increase the inherent value of our exploration portfolio in the DRC. We are waiting for drill results from the current completed programs and based



Stephen Barley, CEO

on the results from property evaluations currently underway, intend to pursue further programs. We are extremely pleased with the impressive initial high-grade grab sample assays (including 16.6% Cu and 239 g/t Ag) from the Namibia based Kamanjab large copper and silver project and intend to pursue further projects in the stable country of Namibia to provide our stakeholders with risk diversification. We are considering qualified joint venture partners on certain of our projects as this is a prudent business approach given the current and expected to be expanded 400 km² of projects in the DRC and 135 km² of licenses in Namibia. Zambia is also a resource rich country with a number of opportunities that are of interest to Bankers given its proximity to both the DRC and Namibia. All acquisitions must be accretive from a value perspective for the company and our stakeholders.

What is your opinion about the current conditions of the battery metals market?

Bankers is fortunate to be primarily pursuing cobalt and copper, both being battery metals. Market prices have softened recently, however given the expected increasing demand especially from EV's and the inelastic demand of the consumer products manufacturers, we expect prices to improve over both the short and long term. The DRC has over 60% of the world cobalt production and known supplies and investments in companies having a presence in the DRC must be considered for investors in the battery metals sector. The demand for cobalt and copper feedstock in the DRC can only increase as there are numerous processors in country operating well under capacity and currently expanding the capabilities of their operations. We see the market for battery metals remaining strong well into 2025.

Bankers Cobalt Corp.

ISIN: CA06612P1018
WKN: A2H6NH
FRA: BC2
TSX-V: BANC

Outstanding shares: 106.8 million
Options: 7.5 million
Warrants: 46.5 million
Fully diluted: 160.8 million

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eCobalt Solutions
Leading Cobalt Project in the USA Goes Commercial in 2020

eCobalt Solutions (eCobalt) is a Canadian mining development company specializing in the development of cobalt deposits. The Idaho Cobalt Project is already so far advanced that it is expected to go into operation in 2020. While many cobalt companies are still in their infancy, eCobalt will benefit from the upcoming cobalt boom right from the start.

completed and settling ponds installed. The building for the water purification plant was completed in September 2018, as was the foundation for the mill.

In September 2018, a pilot test series was successfully completed. This showed that the cobalt deposit of the Idaho Cobalt Project can be used to produce a clean cobalt concentrate containing less than 0.5% arsenic and opening up all markets for purchase of the company's production.

Idaho Cobalt Project – Location and previous design work

The Idaho Cobalt Project, 100% owned by eCobalt, is located near the city of Salmon, within the historic Idaho Cobalt Belt in Idaho State. This is the only advanced cobalt project in the USA that has already received environmental approval. Initial construction work was already started in 2011, before it was put into maintenance and repair condition in 2013. Construction work was resumed in 2017, initially concentrating on earthworks. 16 million dollars of long lead time equipment has already been purchased and has been delivered to site. This includes in particular the main components for the mill and the concentrator, including the ball mill, flotation cells, hoppers, grates, etc. The earth and foundation works for the water purification plant and the main mill components were

Idaho Cobalt Project – Reserves and Resources

The Idaho Cobalt Project has reserves of 34.5 million pounds of cobalt, 49.7 million pounds of copper and approximately 53,200 ounces of gold, all reported in 2017 and based on the 2017 Feasibility Study. In 2018, an updated resource model was developed with 45.7 million pounds of cobalt, 65.8 million pounds of copper and 68,000 ounces of gold in the Measured and Indicated categories and 16.7 million Pound cobalt, 29.4 million pounds copper and 27,000 ounces of gold in the Inferred category. The currently ongoing optimized feasibility study is based on these resources.



A large part of the mine installations is already in place or in the process of being built. (Source: eCobalt Solutions)

Idaho Cobalt Project – Feasibility Study

In November 2017, eCobalt published an extremely positive feasibility study. This was based on underground production, an assumed cobalt price of US\$26.65 per pound of cobalt, a corporate income tax rate of 34% and a discount rate of 7.5%. As a result, the independent company Micon International calculated an after-tax net present value (NPV) of US\$ 135.8 million and an after-tax profitability of a solid 21%. The initial cost of capital was estimated at US\$ 186.7 million and the pre-tax payback period was 2.9 years. Net cash production costs amount to US\$5.05 per pound of cobalt. A total of 31.8 million pounds of cobalt, 42.8 million pounds of copper and 39,240 ounces of gold were projected to be produced over a 12.5-year mine term during which gross proceeds of an estimated US\$ 1.129 billion and net after tax cash flow of US\$ 331.4 million will be generated.

With a daily output of 800 tonnes, annual production averages 2.4 million pounds of cobalt, 3.3 million pounds of copper and 3,000 ounces of gold.

It is important to note that the 2017 feasibility study was to produce a cobalt sulphate. Due to changes in market dynamics, the company has decided to produce a clean cobalt concentrate, which is a further upstream product requiring a much more simplified processing flowsheet. This will further reduce risk of the project as well as improve the required CAPEX. The new optimized feasibility study will be completed in October 2018 and will outline new project economics.

Optimized feasibility study in progress

eCobalt is now working on an optimized feasibility study based on another end product, a cobalt concentrate, to be released in the fourth quarter of 2018. On the one hand, additional resources and the production of a more marketable product (high-grade cobalt concentrate) will be incorporated, which should improve the figures. In January 2018, 3 tonnes of rock were sent to a special laboratory to confirm that a large proportion of the arsenic contained could be removed and reduced to below 1%.

Recent drilling successes have also enabled the Company to improve its resource model and potential mine life.

In addition, the recent US tax reform, which drastically reduced corporate income tax to 21%, should have a positive effect.

Idaho Cobalt Project – District-Scale Exploration Potential

The Idaho Cobalt Project has significant exploration potential as demonstrated by the most recent drill program. Especially in the area of the previous main deposit Ram, which is still open both in depth and strike direction. Corresponding drillings from underground are to determine the further potential here. There is also increased exploration potential in the Sunshine and East Sunshine deposits, where historical drilling has returned grades above the cut-off grade.

Negotiations with potential customers and investors

eCobalt is currently in negotiations with several potential customers. According to the company, several letters of intent have already been signed for this purpose. Several interested parties have also begun due diligence. The company is also working on the complete financing of the mine and the processing facilities. These are to be carried out as efficiently as possible so that the targeted start of production can continue in the first half of 2020.

Catalysts for the coming months

Investors can look forward to some milestones for the coming months at eCobalt. Several successful purchase agreements should be announced as soon as possible. Furthermore, an optimized feasibility study is to be published in the fourth quarter of 2018, which

should quickly lead to a production decision. In addition, serious construction progress can be expected on the mine site.

Highly experienced and successful management team

eCobalt has a highly experienced and successful management team.

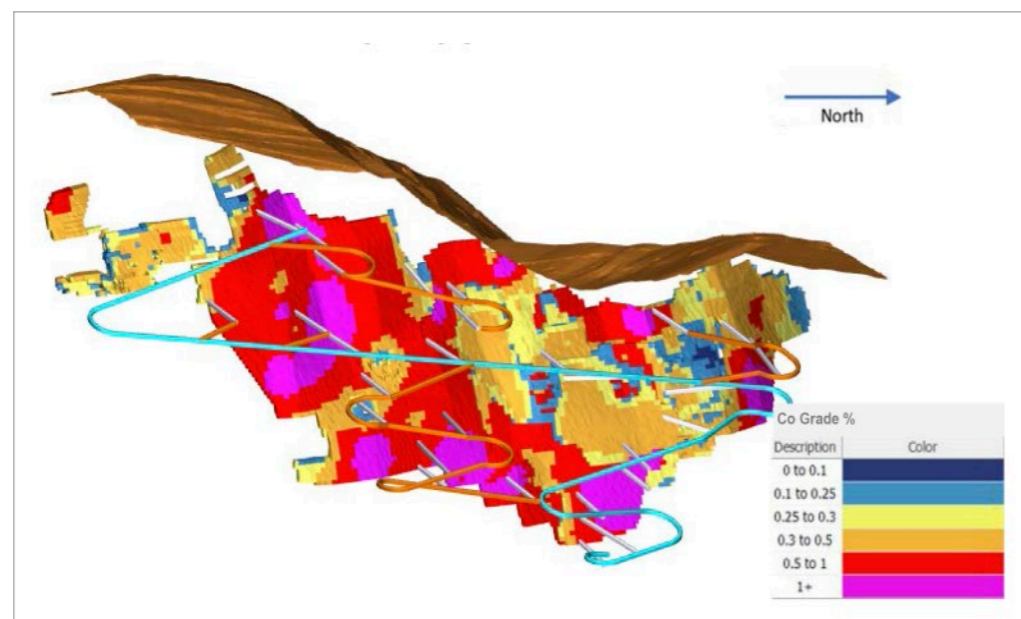
The new CEO, Michael Callahan, is an experienced operational and listed executive who has held senior management positions at numerous development and production stage mining companies, including Hecla Mining and Silvermex Resources, which was acquired by First Majestic Silver Corp. in 2012. As President of Hecla's Venezuelan mining operations Callahan successfully managed two gold operations with a 1,000-man workforce and transformed the La Camorra mine from an unprofitable asset into the largest gold producer in Venezuela with significant cash flow. Callahan developed Silvermex from a \$12 million junior explorer with three employees to a \$175 million gold and silver producer with over 300 employees in just over two years. In 2013, Mr. Callahan became President of Western Pacific Resources Corp., a mineral exploration and development company focused on rehabilitating and exploring the Deer Trail Mine in Utah.

Director Robert Metka is the current head of Hatch Ltd, the world's largest and leading mining engineering company. He was also V.P. of Projects at Noranda Minerals (now Xstrata).

Director Gregory Hahn was District and Senior Geologist and Chief Mine Geologist at Noranda.

Director David Christie was, among others, an analyst with Scotia Capital, and CEO and Director of Eagle Hill Exploration Corporation, which was acquired by Osisko Mining Corp. He is currently Director of Osisko Mining.

Director David Smith is currently Senior Vice-President, Finance und Chief Financial Officer at Gold-Major Agnico Eagle Mines.



Mine design of the Idaho Cobalt Project
(Source: eCobalt Solutions)

Summary: Most developed project in North America

Not only does eCobalt have a large cobalt-copper-gold resource that is expected to expand dramatically, but a feasibility study has demonstrated that the Idaho Cobalt Project is economically viable. An optimised feasibility study is in progress and will be published shortly. In addition, large parts of the construction work have already been completed or are in progress and major parts of the planned processing plant on the mine site have been procured. What is still missing

are the necessary underground works as well as the construction of the plant for the production of concentrates in Blackfoot. With the help of a improved feasibility study and several expected acceptance agreements with potential cobalt customers, it should be possible to finance the project quickly. The goal would be to start production in 2020, which will allow the company and its shareholders a quick start into the upcoming booming cobalt market. The 29.9 million CA\$ that eCobalt was able to raise from a financing in February 2018 will certainly help to make this a huge step forward.

With all of these catalysts achieved our goal is to begin mine development in the early spring of 2019. Production is expected in 2020.

What is your opinion about the current conditions of the battery metals market?

The market for Battery Metals remains very strong. Long term fundamentals have created a market for cobalt like we have never seen before. Government policies and consumer demand for more sustainable technologies are creating a paradigm shift in how we get around and how we create and store energy. In response, every major car manufacturer has announced plans to electrify their fleets. So, although we are seeing some softness in the market today, the need for cobalt is going to more than triple by 2030. We will need all of the cobalt we can find. As the only near-term,



Concentrator Building Construction
(Source: eCobalt Solutions)

primary cobalt producer in the United States, eCobalt will provide a safe, secure and transparent source of cobalt for this growing market.



Michael Callahan, CEO

Exclusive interview with Michael Callahan, CEO of eCobalt Solutions

What did you and your company achieve within the last 12 months?

eCobalt has been advancing towards production: optimizing the Feasibility Study for production of a clean cobalt concentrate, successfully completing pilot-level testing, and ramping up construction at the mine and mill site.

In addition, discussions are advancing with numerous potential off-take partners and project financiers in multiple jurisdictions. eCobalt has received strong interest for our clean cobalt concentrate, as well as for financing the Idaho Cobalt Project.

What are the main catalysts for your company within the next 6 months?

The key major catalysts include finalizing the Optimized Feasibility Study in Q4 2018 and securing project financing by Q1 2019. The Optimized Feasibility Study will be a robust document that focuses on three key impro-

vements from the 2017 Feasibility Study: expanding high grade resources; reducing dilution and risk in the mine plan; and simplifying the flowsheet for the Cobalt Production Facility to reflect the change in end product to a clean cobalt concentrate – a highly desirable product for the cobalt market. Once the Optimized Feasibility Study is complete, we will finalize our project financing structure, as well as secure agreements for off-take. Following the successful completion of pilot-level testing last September, samples have been shipped to those we have been in negotiations with. We expect these agreements to be finalized by the end of the year. We are also advancing construction activities at the mine site. By the end of the year our goal is to have all of our environmental systems in place: the water treatment plant, installing the liner for the tailings waste storage facility and water treatment ponds, and electrifying the pump back wells. These systems must be in place so that we can start treating the water, a requirement we must satisfy before commencing mine development.

ISIN: CA27888J1084
WKN: A2APZ7
FRA: ECO
TSX: ECS

Outstanding shares: 157.7 million
Options: 6.3 million
Warrants: 21.2 million
Fully diluted: 185.2 million

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eCobalt Solutions Inc.



Energy Fuels

Uranium producer with start-up vanadium production



Energy Fuels is one of only three uranium producers in the USA. In addition, the former vanadium production will be resumed from mid-November 2018 in order to benefit from increased vanadium prices and a possible boom in larger vanadium redox batteries in the upcoming electric revolution. At the start of production, Energy Fuels will be the world's newest vanadium producer and the only primary producer of V₂O₅ in North America.

Focus on vanadium

In addition to the uranium business itself, Energy Fuels has for some time focused on restarting its vanadium cycle in its White Mesa Mill and exploiting existing stockpiles. Vanadium is a metallic element used in the transformation into ferrovanadium (an alloy of vanadium and iron) mainly as an additive for the reinforcement and hardening of steel. In addition, vanadium continues to see interest in energy storage technologies, including vanadium redox flow batteries, which are used on a larger scale to store grid power. In addition to assessing the potential for recovering vanadium from the mill tailings and evaporation ponds, the Company is also reviewing the economics of processing certain

previously mined uranium/vanadium ore stockpiles near the mill and restarting conventional mining at certain of its uranium/vanadium mines and recovering vanadium alone or in combination with uranium from other potential vanadium-bearing mines. The objective of the Company's vanadium review is to better quantify short- and medium-term vanadium revenues in light of recent price increases for vanadium (six times the price since the low in early 2016) while minimizing the risk of market volatility. In September 2018, the company announced that it would resume vanadium production on White Mesa in mid-November 2018.

White Mesa Mill

The White Mesa Mill is located in the southeast of Utah and is currently the only operational and running conventional uranium processing facility in the USA! It has a fully licensed annual processing capacity of 8 million pounds U₃O₈. The White Mesa Mill has several special features. Firstly, it accommodates a separate process circuit, with the help of which such material can be processed cost-effectively. In addition, White Mesa has an additional process loop for processing vanadium and has

had significant vanadium production in the past. However, the greatest advantage of the White Mesa Mill is certainly its unique location. It is located centrally between several mines with the highest uranium grades in the USA. In addition to the possibility of feeding the plant from these mines, a clean-up program is being developed with the US government that could also generate significant amounts of uranium. Last but not least, Energy Fuels processes uraniumiferous rock in the White Mesa Mill for a third party on a toll milling basis. This means that around US\$ 7.1 million per year can be generated in 2018. The company is currently working on restarting vanadium production, which is scheduled to start in mid-November. To this end, the existing vanadium processing plants will be renovated and upgraded. It is estimated that over 4 million pounds of V₂O₅ with contents between 1.4 and 2.0g/L are stored in ponds. Most recently, Energy Fuels funded 1.5 million pounds of vanadium on White Mesa in 2013. A total of over 45 million pounds of vanadium have been mined there in the 38-year production history.

Further approved top projects with vanadium component

Energy Fuels has a number of additional projects that host significant vanadium deposits and are already fully approved for production.

La Sal Complex in Utah

The La Sal Complex is located approximately 100 kilometers northeast of the White Mesa Mill and consists of the two mines Beaver and Pandora, which were already in production until 2012. Both mines together have approximately 4.5 million pounds of U₃O₈ and 23.4 million pounds of vanadium. The La Sal Complex could be put back into operation within 6 months. In addition, the Company is currently preparing a test mining program selectively targeting high grade V₂O₅ resources at its

100% owned La Sal Complex of uranium/vanadium mines in Utah with the goal of significantly increasing productivity and mining grades and reducing mine costs per pound of V₂O₅ and U₃O₈. In February 2018, Energy Fuels received regulatory approval to expand the La Sal Complex. Two former access tunnels are currently being restored.

Whirlwind Mine

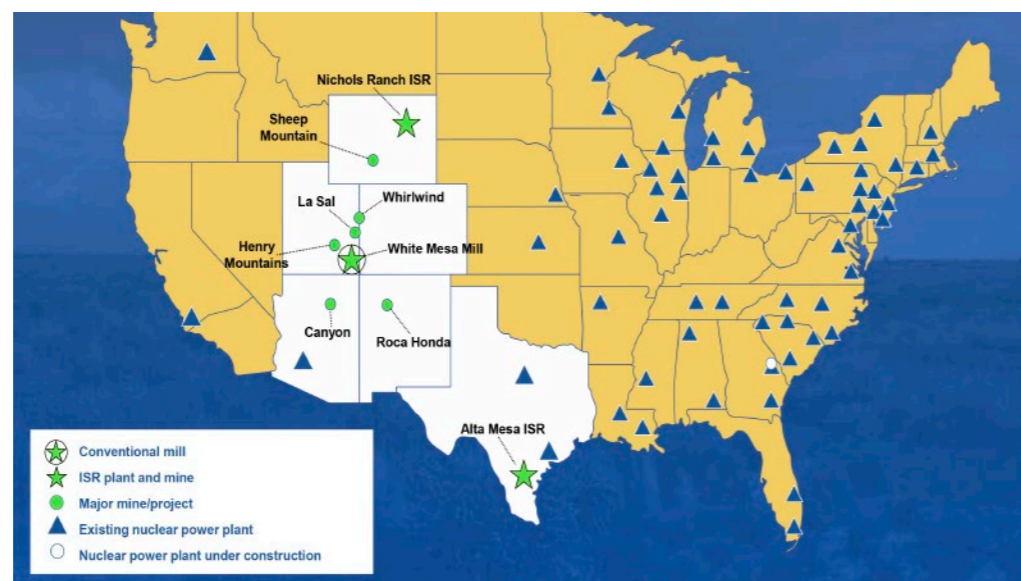
The Whirlwind Mine is located approximately 120 kilometres northeast of the White Mesa Mill and has approximately 3.0 million pounds of U₃O₈ and 10.1 million pounds of vanadium. Whirlwind could be put into operation within 12 months.

Uranium Projects

Canyon Mine

Another mine that the White Mesa Mill will (again) feed with uranium-rich rock in the future is the fully licensed and currently standby Canyon Uranium and Copper mine in northern Arizona, which has the highest uranium grades of any conventional uranium mine in the U.S.! The Canyon Mine currently has approximately 1.6 million pounds of U₃O₈ resources (as of 2012) but has only been sporadically explored for existing deposits to date. Since 2012, the Company has been able to report some high-profile drilling results. Taking the average of the best 12 drill intersections, 1.15% U₃O₈ and 9.36% copper over a total length of just under 330 metres is found! The superficial infrastructure and the production shaft have already been completed. It is estimated that Canyon would be among the conventional uranium mines with the lowest mining costs in the world. The actual processing of the extracted rock would take place in the White Mesa Mill about 300 kilometres away. Canyon could be put into operation within 12 months at a stable uranium price of between US\$40 and US\$50 per pound of U₃O₈, provi-

Energy Fuels owns some of the most important projects and facilities in the USA. (Source: Energy Fuels)





ding annual production of between 500,000 and one million pounds of U_3O_8 . Drill results published in 2017 confirmed Canyon Mine up to 2.88% U_3O_8 and 14.85% copper. In particular, the high copper content could lead Energy Fuels to process the rock from the Canyon Mine at an almost unbeatable price in the White Mesa Mill. The corresponding test procedures are already underway. In August 2017, Energy Fuels released a new, expanded resource estimate for the Canyon Mine. Accordingly, the Upper, Main and Juniper zones contain approximately 2.6 million pounds of U_3O_8 with average grades between 0.20 and 0.89% and approximately 12.5 million pounds of copper with average grades between 5.70 and 9.29%.

Nichols Ranch ISR Project

The Nichols Ranch uranium project is located in the state of Wyoming, USA. Nichols Ranch is an in-situ-recovery-(ISR)-project and could be won by the fusion with Uranerz Energy. ISR mining is considered to be an extremely cost-effective production method, which is why Energy Fuels can operate this project at extremely low uranium prices. At Nichols Ranch, more than 1 million pounds of U_3O_8 have been mined and processed at the central licensed 2 million pounds of U_3O_8 per year facility since the start of operations. In addition, Nichols Ranch offers other wellfields that can be exploited in the future. Nichols Ranch is regarded as the central piece of the puzzle for a whole series of other (potential) satellite projects. The Jane Dough and Hank projects, which are only a short distance away, have at least another 30 wellfields with corresponding additional resources, which can be connected relatively easily and cost-effectively to the existing pipeline system. Jane Dough currently has resources of approximately 3.9 million pounds U_3O_8 , Hank has 1.7 million pounds U_3O_8 . Both projects have already been fully approved for future funding. Nichols Ranch could significantly ramp up production within just 6 months if a uranium selling price of between US\$40 and US\$50 per pound of U_3O_8 could be achieved.

For 2018, the company expects uranium production at Nichols Ranch to range from 140,000 to 160,000 pounds of U_3O_8 .

Alta Mesa ISR plant

The Alta Mesa ISR system is located in the southeast of Texas and is currently in standby mode. Alta Mesa produced a total of 4.6 million pounds of U_3O_8 from 2005 to 2013 and has a fully licensed processing capacity of 1.5 million pounds of U_3O_8 per year. The associated license area has approximately 20.4 million pounds of U_3O_8 resources and could resume production within 12 months if a uranium sales price of between US\$40 and US\$50 per pound of U_3O_8 could be achieved. The approximately 200,000 acres license area continues to have high exploration potential which could further extend the estimated 15-year mine life.

Petition to strengthen US uranium production

In January 2018, the only two remaining US uranium producers, Ur-Energy and Energy Fuels, filed a petition with the U.S. Department of Commerce to highlight the relevance of U.S. uranium production in terms of potential security concerns and increasing dependence of the energy industry on uranium imports. The two companies argued that imports from successor countries of the former Soviet Union (namely Russia, Kazakhstan and Uzbekistan) now account for 40% of US demand for uranium, while only 5% of demand is produced in the US itself. The dependence, both of the US energy industry (after all, 20% of the electricity consumed in the USA is generated from nuclear power plants) and of the military, on these nations has increased alarmingly as a result. With their petition, the two producers want both the Ministry of Commerce and President Trump to work out a clear assessment of the import dependence of the USA on Russia, Kazakhstan and Uzbekistan and to promote the US's own uranium industry.

In July 2018, the U.S. Department of Commerce initiated an investigation into the impact of uranium imports on U.S. national security. A decision can be expected within 360 days.

Summary: The ability to quickly commission multiple mines provides a big leverage on vanadium and uranium prices!

Energy Fuels is the second largest uranium producer in the USA after Cameco and has production capacity of over 11 million pounds of U_3O_8 per year! The company owns several low-cost mines at the same time and could significantly restart production from a uranium

price of around US\$ 40. In addition, there are several of our own processing plants, which can produce more cheaply with increasing utilization. These are very flexible with regard to increasing production and can also extract other raw materials such as vanadium and copper. Energy Fuels thus not only has a significantly high leverage on the price of uranium and vanadium, but also a unique variability. Energy Fuels will soon be the only primary vanadium producer in North America and with a total of 130 million pounds of U_3O_8 resources, Energy Fuels is also among the top 3 companies with the largest uranium resources in the USA.

Exclusive interview with Mark S. Chalmers, CEO of Energy Fuels

What did you and your company achieve within the last 12 months?

In the past 12 months, Energy Fuels made the decision to go back into vanadium production in 2018. Once we commence production in Q4-2018, we will be the only primary producer of vanadium in North America. Vanadium, which is used in various battery technologies that are currently being commercialized around the World, has risen in price by over 150% in the past year from about \$9.00 per pound in September 2017 to today's price of \$22.88 per pound. Energy Fuels, which is also the largest uranium producer in the U.S., owns the only operating conventional uranium/vanadium mill in North America; the White Mesa Mill in Utah, USA. Energy Fuels estimates that the White Mesa Mill has produced about 45 million pounds of vanadium since it opened in 1980, having last produced 1.5 million pounds of V2O5 in 2013. So, this is a well-known facility in the U.S. market.

As we recently announced, our initial tranche of V2O5 production will come from the recovery of dissolved vanadium in our pond water at the White Mesa Mill. We estimate that our tailings and evaporation ponds contain approximately 4 million recoverable pounds of V2O5. We plan to recover this material over the next 16-20 months at a rate of about 200,000 to 225,000 pounds of V2O5 per month. We have not announced to the market what we think our costs will be, as we have never recovered vanadium in this particular manner. However, for as long as vanadium prices remain strong, we believe this project has the potential to generate significant cash flow. We also own several fully-permitted, developed, and past-producing uranium/vanadium mines near the White Mesa Mill. During Q4-2018, we also plan to commence a test mining campaign that targets high-grade vanadium resources at our La Sal Complex. We are testing whether we can lower our cost of production for uranium and vanadium at these



Mark S. Chalmers, CEO



mines, using new technologies and mining methods, and extend our vanadium production profile beyond the current pond campaign.

What are the main catalysts for your company within the next 6 months?

As long as vanadium prices remain strong and our costs are as we expect, we plan to produce all 4 million pounds of the recoverable dissolved vanadium from the pond water at the White Mesa Mill. As added flexibility, we will be able to turn production on-and-off quickly, and at little cost, in response to evolving market conditions.

Another catalyst for our mines would come from the ongoing Section 232 probe by U.S. government into today's high levels of uranium imports into the U.S. We are seeking a trade quota that limits uranium imports to 75% of U.S. demand, thereby creating a separate market, and higher price, for U.S. uranium that would fulfill the other 25% of demand. If this occurs, our uranium/vanadium mines, inclu-

ding the La Sal Complex (mentioned above) and others, are likely to become even more economic. Under this scenario, we believe Energy Fuels has the potential to produce 1.5 – 2.5 million pounds of V2O5 per year.

What is your opinion about the current conditions of the battery metals market?

Today, vanadium batteries are being commercialized throughout the world to store electricity generated from renewable sources. We expect vanadium prices to remain strong for the next few years, mainly due to major production cuts around the world and new rebar standards in China that mandate increased use of vanadium. Today, over 95% of vanadium demand is in the metallurgical and chemical industries, while less than 5% is for batteries. However, some estimates indicate that this number could increase to over 20% in the coming years. Energy Fuels stands ready to produce into these growing vanadium markets.

Infinity Lithium Strategically Significant Establishment of an Open Pit Lithium Mine and Battery Chemicals Processing Facility in Europe!

Infinity Lithium is an Australian development company with an interest in the San Jose flagship project located in the Spanish province of Extremadura. A rising number of investments in European battery assembly and cathode production place Infinity in a strategically important position in relation to end users of lithium battery chemicals.



San Jose Lithium – Tin Project – Location and Infrastructure

Extremadura has a long history of mining activity and the San Jose deposit was mined for tin in the 1980s and early 1990s by a Spanish mining company. The availability of lithium has been known for a long period of time, however the construction of gas pipeline adjacent to the project area in 2007 and the changing dynamic of lithium markets led to the evolution of the project economics with the implementation of a fully integrated lithium chemicals project. Gas energy is required for the sulphate roasting process, and

the availability of gas, electricity and water provide world class infrastructure to support downstream processing requirements. There is a dual lane and sealed highway adjacent to the project area, ensuring easily access during the construction phase and ongoing logistical advantages for the end product.

San Jose Lithium – Tin Project – Resource

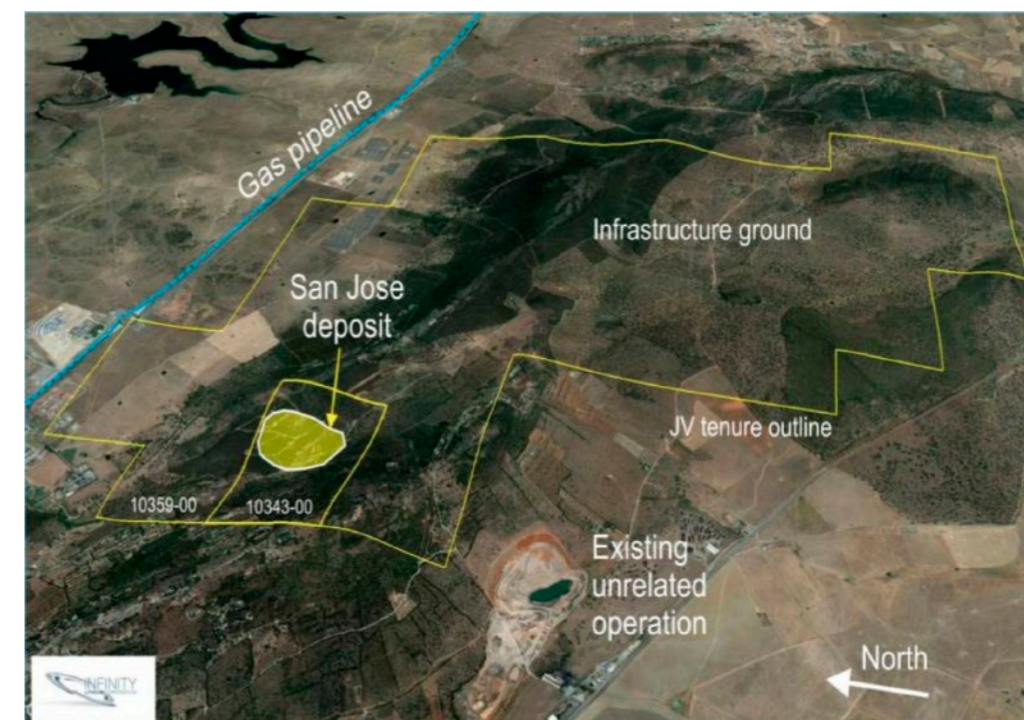
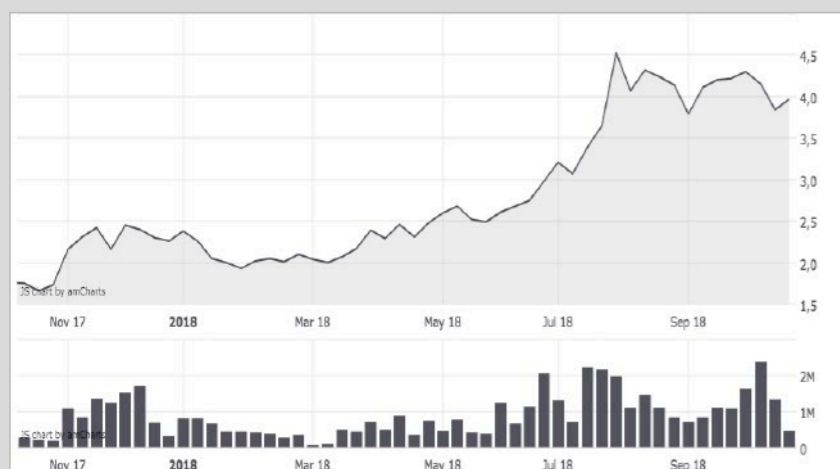
San Jose is considered one of the largest (mica)-lithium deposits in Europe and is also

Energy Fuels Inc.

ISIN: CA2926717083
WKN: A1W757
FRA: VO51
TSX: EFR
NYSE: UUUU

Shares outstanding: 89.0 million
Options: 2.3 million
Warrants: 6.7 million
Restricted: 1.6 million
Convertible debt: 5.3 million
Fully diluted: 104.9 million

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Lakewood, Colorado, 80228, USA
phone: +1-303-974-2140
fax: +1-303-974-2141
info@energyfuels.com
www.energyfuels.com



San Jose is planned as an open pit mine. (Source: Infinity Lithium)

home to significant deposits of tin. According to the latest resource estimate from May 2018, which was carried out according to the Australian JORC calculation standard (comparable to the Canadian resource calculation wheel NI43-101). The JORC mineral resource for San Jose reported above 01% Li cut-off:

- ▶ Indicated category – 59.0 million tonnes of ore with an average of 0.29% lithium or 0.63% lithium dioxide (Li₂O) and 217 parts per million (ppm) tin
- ▶ Inferred category – 52.2 million tonnes of ore with an average of 0.27% lithium or 0.59% Li₂O and 193 ppm tin in the category.

San Jose thus has a total resource of more than 1.6 million tons of LCE (lithium carbonate equivalent), a recognized conversion unit for better comparison of the various lithium compounds).

San Jose Lithium – Tin Project – Scoping and Feasibility Study

In October 2017, Infinity Lithium published an initial scoping study for the production of battery grade lithium carbonate (LC) and submitted a Mining Licence Application (MLA) under the terms of the joint venture (JV) agreement, facilitating an earn-in to 50% of the project.

The scoping study was based on mining up to 1.25 million tonnes of ore annually, of which about 500,000 tonnes remain post beneficiation through flotation as improved material for the processing plant feedstock. From this, up to 15,000 tonnes of 99.5% (battery grade) lithium carbonate (LC) are to be produced through the downstream processing facilities each year and testing completed by German based and world renowned Dorphner Anzoplan completed under the scoping study confirmed the ability to produce battery grade product.

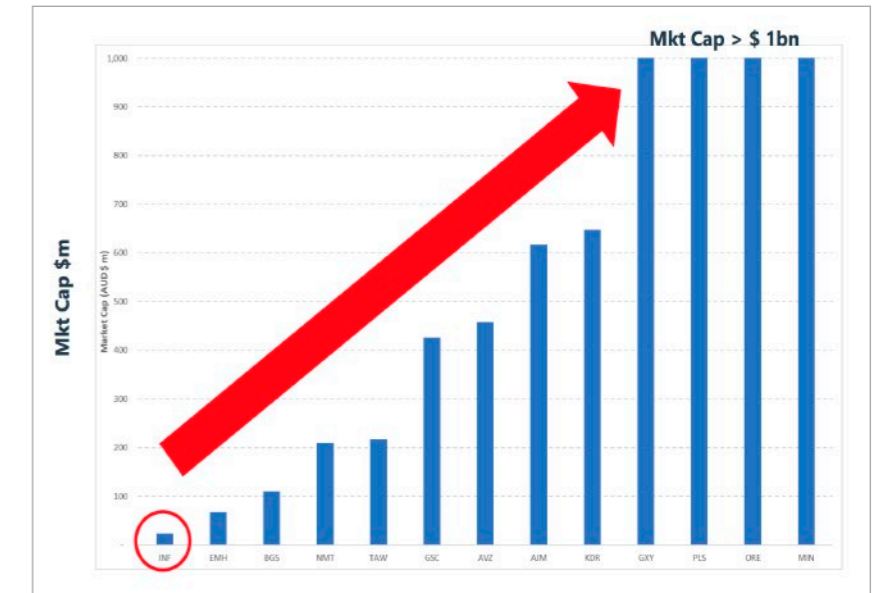
The initial mine life under the project was projected for 16 years however this represents less than 50% of the JORC. Material will be stockpiled, and production of battery grade lithium chemicals was projected for 24 years. The scoping study project economics detailed a robust economic outcome under conservative pricing assumptions of US\$10,000/t of battery grade LC, with a net present value (NPV8) of US\$401 million and an IRR of 28% (excluding tin credits or sale of other by-products). The Average C1 cost over the first 8 years of production of US\$4,763 places the project at the lower end of the cost curve (life of mine US\$5,000/t).

Infinity has the ability to complete a feasibility study to earn-in to 75% of the project. The evolution of battery technologies and market movement towards nickel rich lithium hydroxide-based cathodes used in the production of battery cells for electric vehicles has highlighted Infinity's ability to pivot in response to end users through the initial completion of a lithium hydroxide option study.

Additional lithium hydroxide promises better economy

In June 2018, Infinity Lithium announced the completion of lithium hydroxide scoping study which confirmed the ability to potentially produce lithium hydroxide from the San Jose ore. The scoping study operating costs for the production of lithium hydroxide under the option study were found to be materially comparable to those for lithium carbonate.

The movement of the project towards lithium hydroxide production would require additional capital investment however, the price to be paid per ton of lithium has been at a premium lithium carbonate, and more recently has maintained pricing strength in the spot market. The production of lithium hydroxide yields a greater volume and the option study detailed annual production of up to 16,000 tonnes each year over the 24-year project life.



In terms of market capitalization, Infinity Lithium still has a lot of room to go up. (Source: Infinity Lithium)

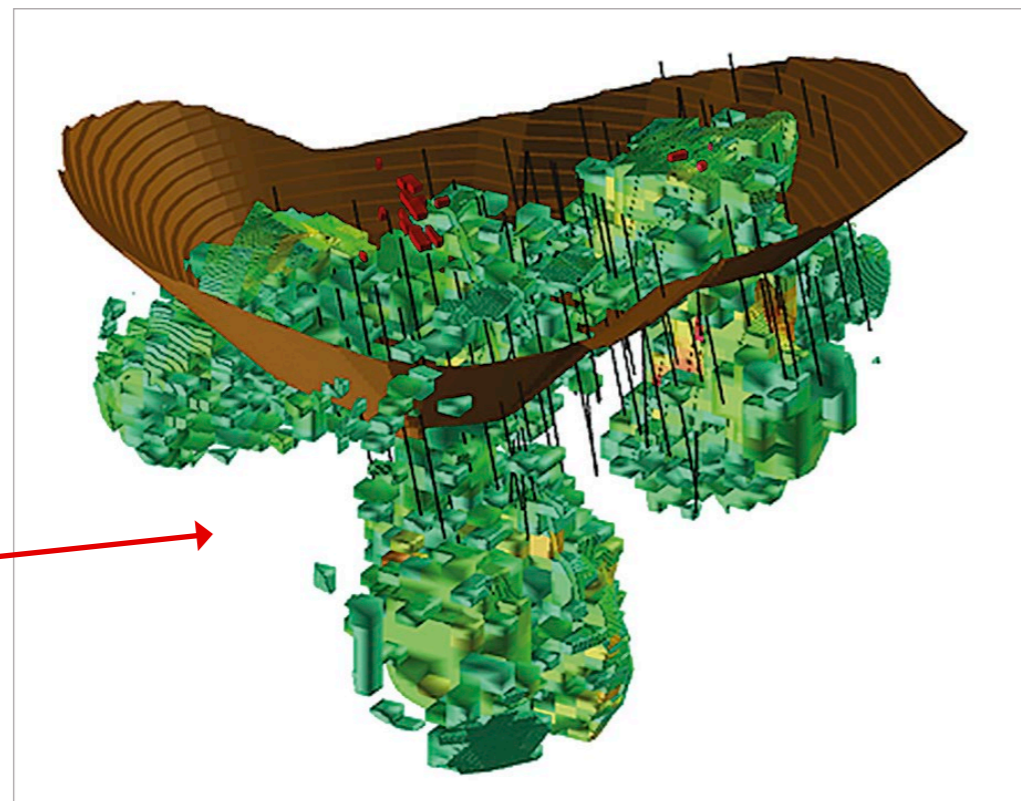
Additional scoping study in progress

In August 2018, Infinity Lithium commenced the scoping study for the production of battery grade lithium hydroxide after the positive outcomes detailed in the option study. The feasibility study will be in response to the decision to progress the end battery grade lithium chemical.

San Jose Lithium – Tin Project – strong partners on board

Infinity Lithium is developing the project in a joint venture with the Spanish company Valoria Mineraria, whereby the two partners currently each hold 50%, but Infinity Lithium can still increase this to its own 75% share through the delivery of the feasibility study. Valoria Minera received approval in 2017 for the Agua Blanca major nickel-copper project, also in Extremadura.

Infinity Lithium has brought Shandong Ruifu Lithium on board as a highly experienced and successful partner in the technical field, i.e. the processing of mica ore and above all the production of lithium carbonate. Shan-



After the open-pit operation, additional underground mining could take place. (Source: Infinity Lithium)

dong Ruifu already has many years of experience in the production of lithium carbonate and is developing the capabilities to produce lithium hydroxide.

Top Management Team

Infinity Lithium has a unique management team that is able to successfully bring San Jose to production status.

Chairman Kevin Tomlinson lives in London and is a specialist in both geology and finance, and the new Managing Director, Ryan Parkin, brings a wealth of experience in corporate development and finance. Other company Director Adrian Byass has been involved in the San Jose Project from its inception and has extensive experience in the acquisition and development of high-quality commodity projects including successes in Europe for more than 10 years.

Summary: Full throttle towards the mine

Infinity Lithium continues to progress the San Jose Project and the rapidly evolving battery technology space has led to the consideration of the pathway to production that provides the greatest value in terms of the demand for battery grade lithium chemical products. The Company continues to discuss opportunities with strategic partners including the implementation of technology in the specialised chemicals market.

The project itself seems to be highly economical based on the initial lithium carbonate scoping study, with results available imminently regarding the opportunities to adjust to the lithium hydroxide market. Infinity Lithium had approximately AU\$ 4 million in cash at the end of the financial year 30 June 2018. Taken together, a perfect storm that is brewing on the hitherto clammy European lithium card!

vances in lithium hydroxide battery related technologies, in conjunction with the already publicized lithium hydroxide geographical supply side considerations, have already created heightened interest. These show that the catalyst we see are not just the technical advancements as part of the feasibility study, but the corporate opportunities which can be acted upon based on a fully integrated battery-grade lithium production facility being developed.

What is your opinion about the current conditions of the battery metals market?

Our primary focus is on the lithium market and the evolution of battery technologies (eg movement from NMC111 towards NMC 811) creates an environment where a hard rock resource enables the ability to pivot to end user requirements. The lithium market has been well documented as driven by the requirement to fuel EVs and to a lesser extend grid storage, and the ability to bring world class

projects to market with certainty over quality and surety of supply remains a focal point. San Jose benefits through the availability of world class infrastructure adjacent to the project area and the ability to bring a fully integrated project. Europe is finally waking up to address the traditional domination of the lithium-ion battery industry by China, Japan and South Korea. There are a rising number of investments now taking place in Europe as evidenced more recently by the CATL investment in battery production facilities in Germany, and their alliance with BMW. Infinity's San Jose Project can provide battery grade lithium chemicals from within Europe. Infinity are well positioned to address the diversity issues of supply side risk and remain in close proximity to the rapidly expanding European battery production market.



Ryan Parkin, Managing Director

Exclusive interview with Ryan Parkin, Managing Director of Infinity Lithium

What did you and your company achieve within the last 12 months?

The past 12 months have transformed the company. People, focus, name, ownership, all of these reflect the increasing value and certainty surrounding the giant San Jose lithium project. We earned 50% and are on the way to 75% ownership of San Jose now. To achieve that first 50% we have drilled and successfully delivered a massive lithium resource, selected a proven process to make battery grade lithium products, lodged applications to earn a mining license and delivered economic studies which show a very strong investment return for a long-life project. To il-

lustrate how that has transformed the company we have changed the name from Plymouth Minerals Limited to Infinity Lithium Corporation and enhanced Board and management to better deliver success going forward.

What are the main catalysts for your company within the next 6 months?

I think the catalysts which sit in that time frame leverage off the interaction of end-users and possible strategic investment linked to the finalization of feasibility study work. The opportunities which come from the recent ad-

ISIN: AU0000007627
WKN: A2JH72
FRA: 3PM
ASX: INF

Shares outstanding: 189.9 million
 Options/warrants: 28.7 million
 Fully diluted: 218.6 million

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Infinity Lithium Corp.



Lithium Chile

15 Top Projects in the Hottest Lithium Region of the Planet



Steven Cochrane, CEO

Lithium Chile is a Canadian development company that focuses entirely on the development of lithium projects in Chile, currently the world's hottest lithium region. The company currently owns licenses with a total area of over 140,000 hectares, making it the largest license holder in Chile.

Chile – country with the highest lithium reserves and lowest mining costs worldwide

With its involvement in Chile, Lithium Chile has chosen the most important lithium hot spot of all. Chile offers several advantages to foreign mining companies. First, the country has the most lithium reserves in the world. More than 50% of the world's known reserves are hidden in the sometimes extremely high-grade salar and await their uplift. Although Bolivia possesses more lithium than

Chile, the deposits there have not yet managed to exceed the much higher risk status of resources. The second important point is the cost of the subsidies. These are currently around US\$ 1,800 per tonne in Chile. By way of comparison, in Australia you have to spend around US\$5,000 to produce one tonne of lithium. In Chile, two decisive factors play a decisive role here: the relatively high degrees of evaporation and a high evaporation rate, which accelerates the production process. A third important point is Chile's well-known straightforward approval procedure. The country is considered by mining companies to be one of the best jurisdictions in the world.

15 top-class projects – Largest land package in Chile

Lithium Chile currently holds exploration concessions on 15 lithium projects, all of which are located in the north of the country. These concessions cover a total of around 140,000 hectares, making Lithium Chile – apart from the Chilean state – the largest license package in Chile. The 4 most important projects are presented below.

Salar de Coipasa

The Salar de Coipasa is located in the very north of Chile, directly at the border to Bolivia. The project area covers 13,100 hectares and has extremely high near-surface lithium grades. For example, samples were taken and up to 1,410mg/L lithium could be detected, which is on the same level as the grades of the two processing sites of SQM and Albemarle in the Salar de Atacama. Chemically, Coipasa seems almost perfect, since the ratio of lithium to potassium is only 0.06 and the ratio of magnesium to lithium is only 3.9. In May 2018, a 58 square kilometer brine target zone with lithium contents of up to 1,410mg/L was identified in the license area. This has a thickness of between 100 and over 300 metres.

The aim is to prepare an initial resource estimate before the end of 2018. The smaller Norte Project is located in the immediate vicinity, northwest of Coipasa.

Salar de Helados

The Salar de Helados is located in the northeast of Chile, directly on the border to Argentina and Bolivia. The proximity to the Salar de Atacama (only 80 kilometres to the west) provides Helados with a very good year-round connection to the existing infrastructure. The project area covers 22,700 hectares and has extremely high near-surface lithium grades. For example, samples of up to 1,280mg/L lithium could be detected, which is on the same level as the grades of the two processing sites of SQM and Albemarle in the Salar de Atacama. From a chemical point of view, the situation on Helados is similar to that on Coipasa, since the ratio of lithium to potassium is only 0.1 and the ratio of magnesium to lithium is only 2.6. In the course of a gravitational and geophysical program, Lithium Chile was able to announce the discovery of a 60 square kilometer lithium brine target in February 2018.

Salar de Atacama

Probably the most famous Salar in Chile, the Salar de Atacama, where the two lithium giants SQM and Albemarle operate corresponding processing facilities, is located in northern Chile, about 40 kilometres from the Bolivian border and about 80 kilometres from the Helados project. Due to the activities of SQM and Albemarle, they have an excellent connection to the existing infrastructure. The project area, which is located in the very north of the Salar, covers 6,600 hectares and has extremely high near-surface lithium degrees. For example, lithium up to 1,330mg/L could be detected during sampling, which is on the same level as the grades of the two processing sites of SQM and Albemarle. From a chemical point of view, there is a very good

ratio of lithium to potassium of only 0.09 and a ratio of magnesium to lithium of only 2.6. In April 2018, several brine target zones with lithium contents of up to 1,330mg/L, each covering 20 to 25 square kilometers, were identified in the license area. These are located in the area of the northeast flank of the Salar and have a thickness of between 50 and over 75 meters.

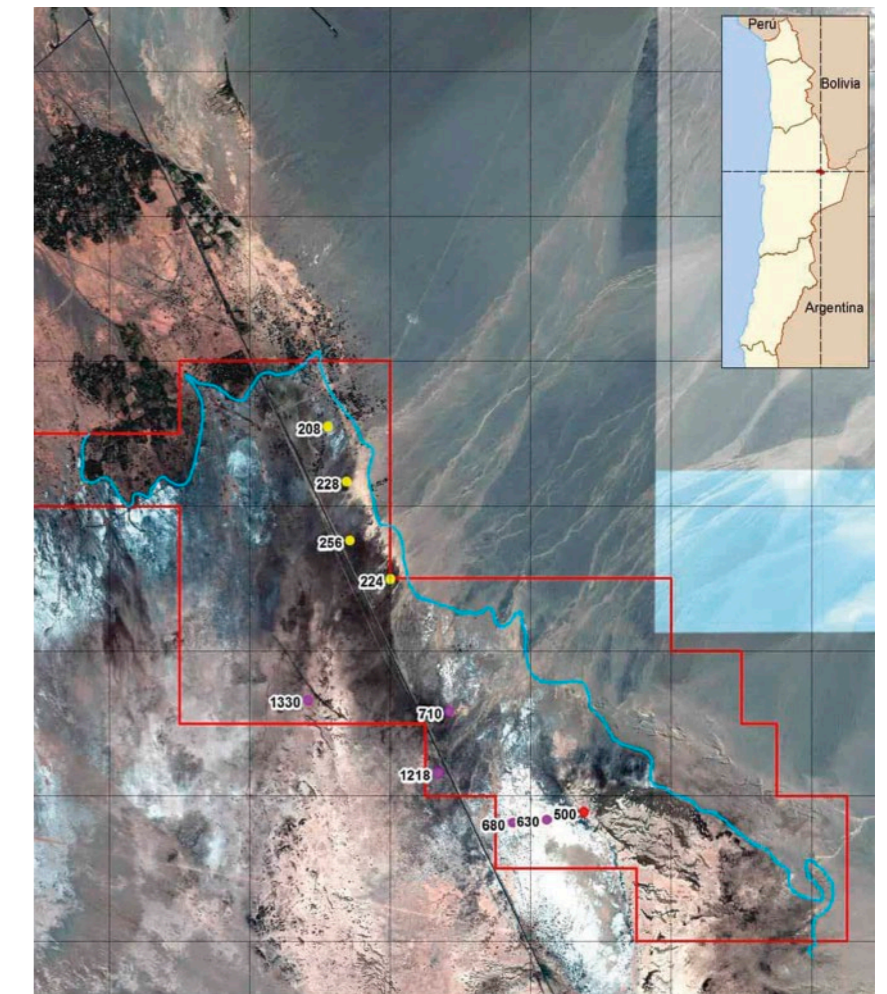
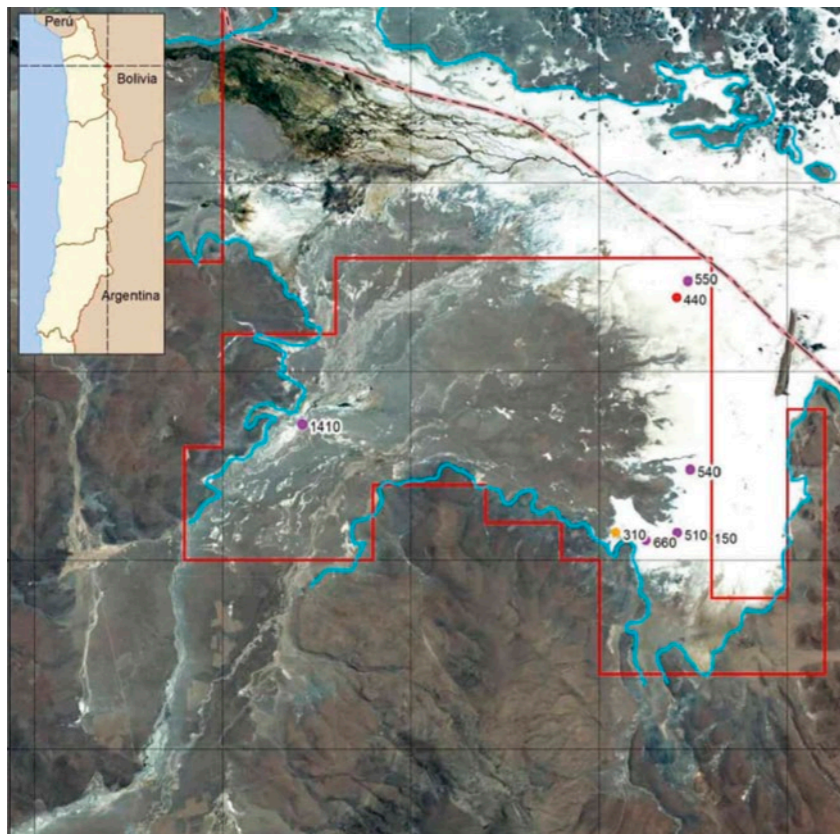
The aim is to prepare an initial resource estimate before the end of 2018.

Salar de Ollague

The Salar de Ollague is located in the north of Chile, directly on the border to Bolivia, with

Salar de Atacama covers 6,600 hectares and has extremely high near-surface lithium degrees. (Source: Lithium Chile)

At Salar de Coipasa samples were taken and up to 1,410mg/L lithium could be detected. (Source: Lithium Chile)





part of the project area even on Bolivian territory. The project area covers 2,200 hectares and has near-surface lithium grades of up to 1,140mg/L. Chemically, the ratio of lithium to potassium is only 0.1 and the ratio of magnesium to lithium is a good 7.1.

In April 2018, several brine target zones with lithium contents of up to 1,140mg/L, each covering 20 to 25 square kilometers, were identified in the license area. These are located in the area of the southwestern arm of the Salar and have a thickness of between 20 and over 200 metres.

As part of an extensive drilling program in August 2018, the company was able to demonstrate a lithium content of up to 480mg/L within a 180-metre-long section from the first

Salar de Turi

The Salar de Turi is also located in northern Chile, 30 kilometres from the Bolivian border and about 80 kilometres north of the Salar de Atacama. The project area covers 7,600 hectares and has near-surface lithium grades up to 525mg/L. Chemically, the ratio of lithium to potassium is only 0.05 and the ratio of magnesium to lithium is a good 7.8. The Company is currently working on an extensive geophysical study.

Salar de Talar

The Salar de Talar is located in the northeast of Chile, about 50 kilometers southeast of the Salar de Atacama. The project area, including the smaller Capur project, covers 3,500 hectares and has near-surface lithium grades of up to 740mg/L. Chemically, the ratio of lithium to potassium is only 0.1 and the ratio of magnesium to lithium is a good 4.5. The company is currently working on an extensive geophysical study.

More than 50% in the hands of insiders – Strongly financed

Lithium Chile has a truly exceptional portfolio of projects in the best salars in Chile. In order to protect this from external access, company insiders currently hold the majority of all outstanding shares. About 55% of the shares are held by management and other insiders. The company is excellently positioned financially. Since October 2017, a total of CA\$ 11.5 million has been generated in fresh capital.

Experienced and successful management team

Lithium Chile is led by a highly experienced and successful management team. CEO and President Steve Cochrane has more than 35 years of experience in the mining

sector. During this time, he was able to generate more than \$500 million in capital for his companies.

VP Exploration Terry Walker has nearly 50 years of experience as an exploration geologist. During the last 25 years he has worked in Chile and therefore has a very well branched network.

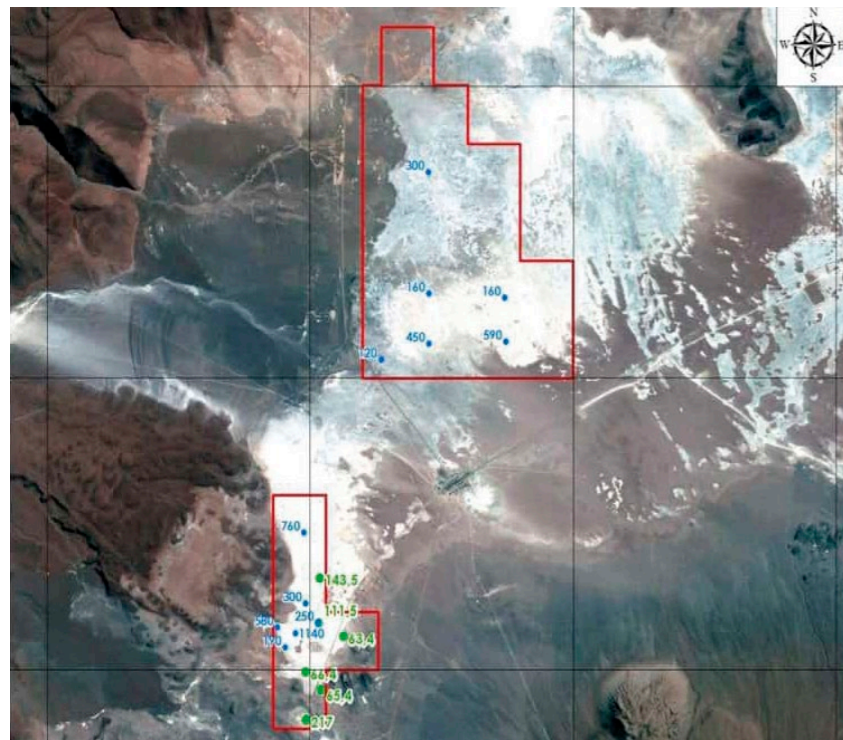
Director Andrew Bowering has generated more than CA\$200 million in capital during his career. Among other things, he is co-founder of Millennial Lithium.

Summary: First hit landed! – Several more chances available!

Lithium Chile is still at an early stage of development. After all, the company did not start acquiring potentially high-caliber lithium projects in Chile until 2016. The largest license areas were not even added until 2017. With the help of some top-class and experienced mining specialists, it was possible to secure the largest portfolio of lithium projects

in one of the best mining areas with extremely high-grade lithium results. The Company's objective is to initially sample all 15 projects, of which the most recent have not yet undergone major exploration activities. The already available results clearly show that you have bet on the right horse, after all, all the top values come from just below the surface, which makes excessively deep drilling superfluous and can therefore save a lot of money. The current focus is on the Ollague project, which has already delivered good drilling results. In addition, as a second step, it is also relatively easy to provide an initial resource estimate for several projects. This is planned shortly. The lithium-bearing brines, which seem to be only a few metres deep, and the extremely high evaporation rate in Chile at the same time mean that promisingly low figures can also be expected for possible mining costs. Investors can look forward to a whole series of potential top results in the coming months.

In April 2018, several brine target zones with lithium contents of up to 1,140mg/L, each covering 20 to 25 square kilometers, were identified in the license area. (Source: Lithium Chile)



drill hole. As a result of this drilling success, the current drilling program has been expanded to include a fifth hole that will increase the drilling depth from 250 meters to 500 meters.

ISIN: CA53681G1090
WKN: A2JAHX
FRA: KC3
TSX-V: LITH

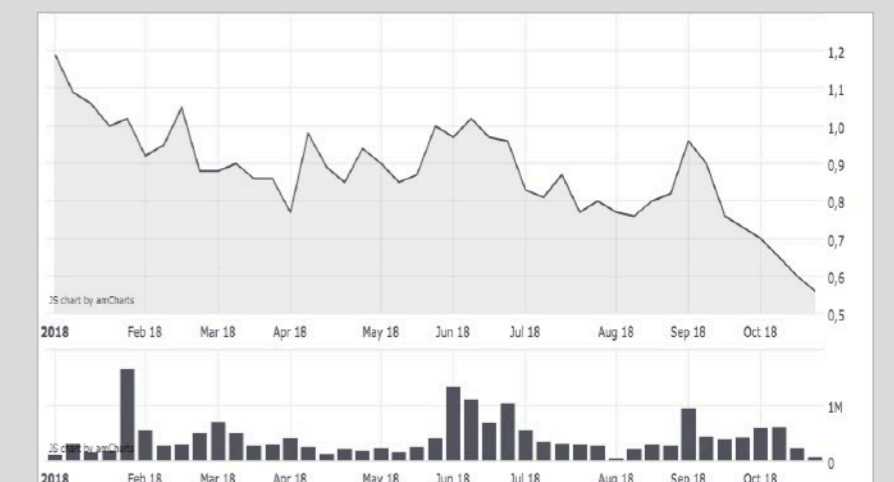
Shares outstanding: 100.9 million
Options: 4.1 million
Warrants: 5.7 million
Fully diluted: 110.8 million

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Lithium Chile Inc.





Lithium Energi Exploration

With huge lithium concession package in Argentina and revolutionary technology on the fast track to production

Lithium Energi Exploration Inc. (Lithium Energi) is a Canadian mining company specializing in the development of lithium projects. The company pursues the so-called Close-Ology strategy, which means that in the event of new commodity trends, it should always acquire as many concessions as necessary, as close as possible to known geology, at the lowest possible cost and as close as possible to existing raw material extraction.

Second largest lithium land package in Argentina

Although Lithium Energi was not founded until 2017, it already has the second-largest lithium brine land package in Argentina. Most of the more than 200,000 hectares of licensed land are located directly next to lithium brine projects by well-known producers and developers, all in the Argentine province of Catamarca, directly in the heart of the so-called lithium triangle in the border region of Chile, Bolivia and Argentina. These concessions comprise approximately 128,000 hectares in three different salars plus 100,000 hectares of pre-emption licenses.

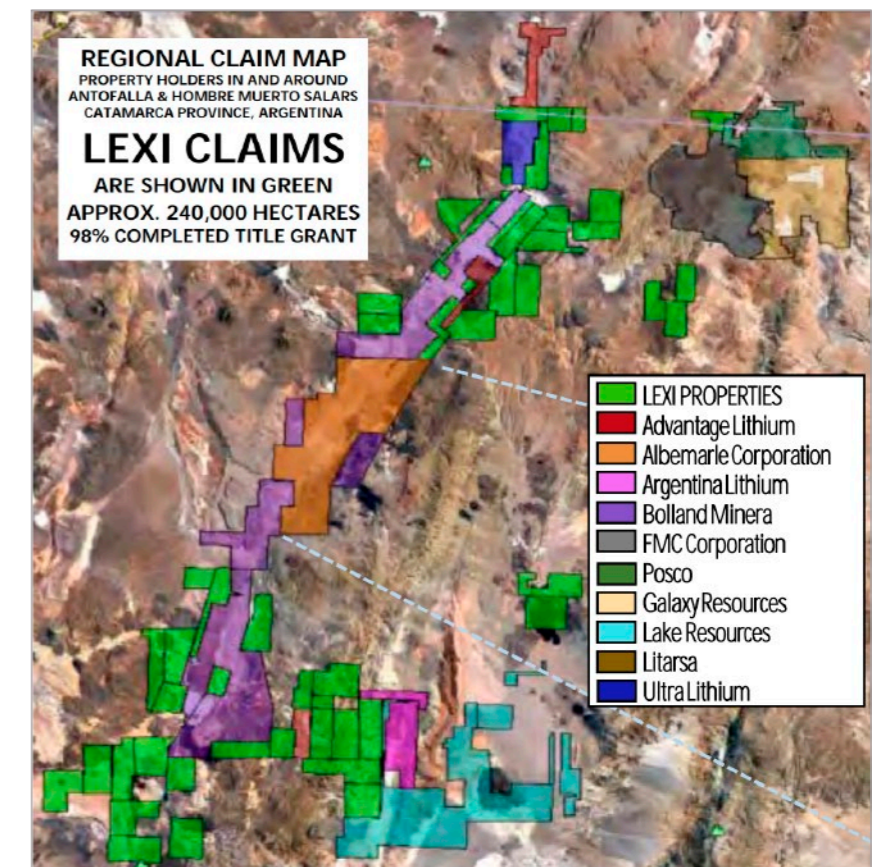
Flagship project Salar de Antofalla

Lithium Energi's flagship project is Salar de Antofalla, which due to its size is still divided into Salar de Antofalla North and South. Antofalla North is comprised of 13 partially contiguous concessions totaling 41,500 hectares. Antofalla South comprises 18 partially contiguous concessions with a total area of approximately 61,100 hectares. The Salar de Antofalla is about 130 kilometres long, between 5 and 10 kilometres wide and about 500 metres deep. In addition to lithium energy, the lithium giant Albemarle and Bolland Minera Holdings also hold significant concessions within the Salar de Antofalla. In the adjacent Salar de Hombre Muerto, FMC, Galaxy Lithium and Lithium One, among others, are active. 90% of Lithium Energi's concessions are con-

sidered „New Mines“, which excludes them from any mining fees for 3 years. In the north of the Salar de Antofalla alone, Lithium Energi could soon drill up to 10 holes on the borders of already known resources of other societies on an area of only 8 by 8 kilometres. These 2 kilometres apart wells could already host an economically exploitable lithium brine resource. In a slightly extended area of about 20 by 20 kilometres, even 25 drill holes could be drilled. Like most other concessions within the Salar de Antofalla, these northern areas are located in the direct vicinity of major geological faults.

In March 2018, Lithium Energi announced that it had encountered significant brine horizons extending from the surface to a depth of 400 metres. This on only 3 claims with an area of only 8,000 hectares, which suggested further zones on the much larger remaining area. In May 2018, the company was also

In the Salar de Antofalla, Lithium Energi owns a large number of promising concessions. (Source: Lithium Energi Exploration)



able to confirm the presence of potential lithium-containing brine horizons for another 12,000 hectares. Until September 2018 Lithium Energi was able to confirm corresponding positive geophysical results for a total of 36,000 hectares of the Salar de Antofalla.

Other potential top projects in the immediate vicinity

In addition to the concessions within the Salar de Antofalla, Lithium Energi holds further licenses within further potentially high-caliber salars in the immediate vicinity of the Salar de Antofalla. The Salar de Potreritos Diaz lies only about 5 kilometres east of the Salar de Antofalla and is still largely untouched. The same goes for the Laguna Caro project, which lies another 3 kilometers southeast. Southeast of the Salar de Antofalla, Lithium Energi also has a right of first refusal on concessions covering 85% of the Salar de Pipanaco.

Exploration work and 4-stage development plan up to production within a maximum of 3 years

An initial test program was already able to detect measurable traces of lithium, boron and potassium in several areas. All in all, Lithium Energi pursues a 4-fold strategy on the way to the fastest possible promotion within a maximum of only 3 years. Step 1 is the prospection phase. The company has already completed this with the acquisition. Step 2 is the confirmation that there are correspondingly degradable resources available. To this end, the Company is pursuing a three-phase plan that will allow an initial resource to be identified through exploration campaigns and drilling by mid-2019 at the latest. Step 3 is project financing including the conclusion of acceptance agreements. The final step is to generate a significant cash flow through the lowest possible capital and operating costs. The last point is to be achieved above all through the use of a unique technology.

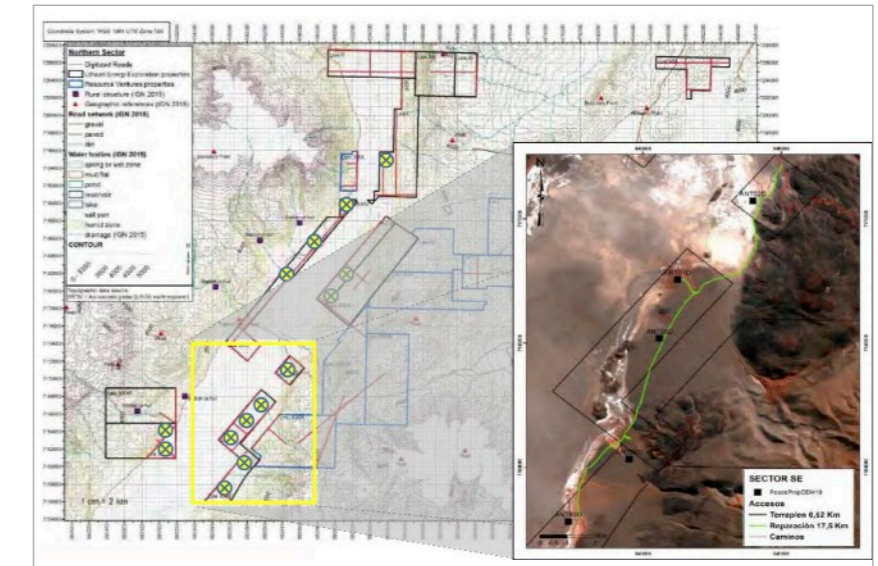
Revolutionary Molecular Recognition Technology accelerates and lowers the cost of funding

In August 2017, Lithium Energi signed an agreement with IBC Advanced Technologies, Inc. to use their Molecular Recognition Technology (MRT). The primary objective of this agreement is to save time and investment costs on the way to production. Based on the Nobel Prize-winning chemical process, Molecular Recognition Technology is a highly selective non-ion exchange process, known at IBC Advanced Technologies as SuperLig®. In very simplified terms, large MRI separation systems include SuperLig® solid particles (approx. 0.5mm) such as silica gel or polymer substrates. The SuperLig® balls are packed in fixed columns, which are mounted in a frame in modular form and are fully automatic for continuous operation. The feed solution (brine) flows through the column and the target species (lithium) is selectively removed from the solution. The IBC technology offers several advantages:

- ▶ SuperLig® products are designed to selectively combine with ions based on several parameters such as size, coordination chemistry and geometry. In contrast, separation techniques used in conventional technologies such as ion exchange, solvent extraction and precipitation generally recognise the differences between ions based on a single parameter.
- ▶ The exceptional selectivity of SuperLig® products for specific metal-containing or other species results in MRI separation systems that have high loading capacities of interest to the metal. This means that further expensive and time-consuming separation processes, which are necessary with conventional technologies, can be dispensed with. A significant advantage of the MRT system is its ability to handle high solution volumes at high flow rates continuously and automatically by switching between several columns as required. MRI systems can be designed and constructed for any

size, concentration and volume throughput requirement.

- ▶ MRT systems are compact. This factor makes their use for on-site separation, spreading and cleaning of target metals practicable and eliminates the need to seek locations for the disposal of unwanted metallic contaminants outside the production site.
- ▶ Time is a major concern in many industries involved in the recovery of metals from process solutions, recycled materials and waste. MRI procedures offer significant time advantages. First, the metal loading times are short. Charging rates from 0.2 to 0.4 L/kg resin per minute are achievable. Second, in combination with short elution times, the cycle time for successive passes is very short compared to conventional technologies. Thirdly, the inclusion of MRI systems in existing workflow diagrams of commercial operations can significantly reduce processing times and increase productivity.
- ▶ Significant economic advantages result from the use of MRT. First, the column system is not expensive, easy to install and can be conveniently operated in an automated mode. Relatively small quantities of SuperLig® products are required, resulting in a more compact installation than conventional technologies. Solution leaching and elution volumes are minimized due to the fast charging and discharging of target metal ions. SuperLig® products have long life expectancies and do not contaminate the separation process. Second, cost-effective reagents that are compatible with the method are used for elution. These reagents normally work effectively at room temperature and ambient pressure, although sometimes a higher temperature is required. Thirdly, the cheap SuperLig® elution processes are used. The elution process is fast and suitable for automated multi-circuit operations. The eluate normally contains a 99.99% pure metal product in a single pass.



Planned drilling locations, as determined from 2018 Geophysical Studies
(Source: Lithium Energi Exploration)

In summary, with IBC's SuperLig® elution process, it would be possible to produce ready-to-sell lithium within 24 hours instead of months waiting for the final product, as with conventional evaporation processes.

Planning for MRT processing plant(s) and possible toll milling services

Lithium Energi and IBC are working on plans for a modular processing plant in order to benefit from such a fast production process. A first step would be a plant with which, assuming an input of almost 220 million gallons of brine with realistic 355ppm lithium, about 1,000 tons of pure (99.99%) lithium hydroxide or alternatively 1,500 tons of pure lithium carbonate could be produced per year. At current lithium prices, this would generate gross revenues of US\$ 20 million per year. According to current estimates, such a plant costs less than US\$ 20 million, but could be expanded modularly, so that it would certainly be possible to act as a kind of toll milling partner for competitors who are undoubtedly abundant in the vicinity. At the same time, of course, several such plants could be erected at different locations. In March 2018 Lithium

Energi was able to announce that the engineering work for the construction of a commercial MRT processing plant had been started. The Company has the right to be the first to obtain a license to operate such a facility and remains in pole position with IBB's revolutionary technology.

Financing secured for extensive exploration activities

Since the company was founded in 2017, Lithium Energi has raised a total of CA\$ 3 million through two financings. In addition, in January 2018, the Company entered into a loan agreement with Arena Investors, LP, a major US investor, for a total of CA\$ 16 million, available in five installments within 12 months.

Summary: Full risk for full success!

Lithium energy takes full risk right from the start. Hardly founded, it secured one of the largest lithium land packages in the richest lithium region in the world, with well-known geology and some very successful companies operating in the immediate vicinity. The risk also includes the credit you receive from Arena Investors. Because this runs over a maximum of only 2 times 12 months. Usually a very short time, for the finished development of a lithium brine resource with economically degradable size. However, two details are particularly interesting. First, Arena Investors seem to be very convinced of Lithium Energi's concept, as the loan is unsecured. Secondly, MRI technology appears to be an absolute game changer that could provide lithium energy with a positive cash flow as early as 2020, much faster than if conventional production methods were used. Lithium Energi is therefore both an early stage and a rapid development opportunity right through to production.

The LOA isolated two SuperLig® resins with selectivity profiles and binding strengths for highly efficient Li-ion sequestration with (1) 99+% purity, (2) single pass recovery of 99+% of soluble Li, and (3) minimal weak acid to release captured Li-ions at 10+ gr/l and efficient synthesis into lithium carbonate or lithium hydroxide. The LOA confirmed suitable flow rates, low wash and elution volumes, energy needed only for fluid mixing, pumping, wash and elution phases, and transport to finishing, yielding very low overall energy use.

- d. Start geophysics on LEXI's southern claims cluster (south of Albemarle's claim block)
- e. Advance MRT engineering to the final stage, including full system design

What is your opinion about the current conditions of the battery metals market?

The markets are healthy but remain tepid at present. The demand side is growing faster than expected. End user reports show bearish analysts are likely wrong. Capital has been sluggish in responding to exploration budget needs (but this is improving). Overall, an international focus on the significance of battery metals market growth is receiving more attention and should aid in 2019 progress. The next 2-3 years will be marked by upticks in M&A, as smaller producers seek to become more attractive acquisition candidates and larger interests (end users, banks, etc.) seek to consolidate stronger positions to assure supply from new sources during 2020 to 2023.

What are the main catalysts for your company within the next 6 months?

- Over the next 6 months, LEXI expects to:
- a. Obtain new capital sources
 - b. Test drill a large portion of its northern Antofalla properties
 - c. Analyze drilling results with a view towards completion of a resource estimate in 2019



Steven C. Howard, CEO

Exclusive interview with Steven C. Howard, CEO of Lithium Energi

What did you and your company achieve within the last 12 months?

The past 12 months has been exciting for Lithium Energi Exploration Inc ("LEXI") with highlights including:

- ▶ LEXI secured gross proceeds from financings in excess of \$5,000,000 CAD.
- ▶ In addition to its TSXV listing, LEXI listed on the Frankfurt Exchange, opening awareness to investors in Europe.
- ▶ LEXI finished title on its properties, released less prospective claims, and now owns >70,000 ha. of prime claims and controls >140,000 ha. by right of first refusal.
- ▶ LEXI conducted geophysical studies on northern claims in the Antofalla Salar (north of Albemarle's claims) to study

sub-surface brines under approx. 366 km² of LEXI's claims. Results were impressive, delineating probable lithium-bearing strata from near surface to over 400 m deep, revealing conductive strata consistent with similar unconfined lithium brine aquifers.

- ▶ Thorough field work preceded LEXI's 500-page environmental impact study submitted to provincial mining authorities, prerequisite to drilling permits in Q4 of 2018. Test wells will identify mineral chemistry, lithology, porosity, pump rates, hydrogeological factors, and target a resource estimate in 2019.
- ▶ Successful bench tests for segregating Li-ions using the MRT process advanced LEXI to 2nd stage engineering after finishing a Level One Assessment ("LOA").

ISIN: CA53680T1021
WKN: A2H5MG
FRA: L09
TSX-V: LEXI

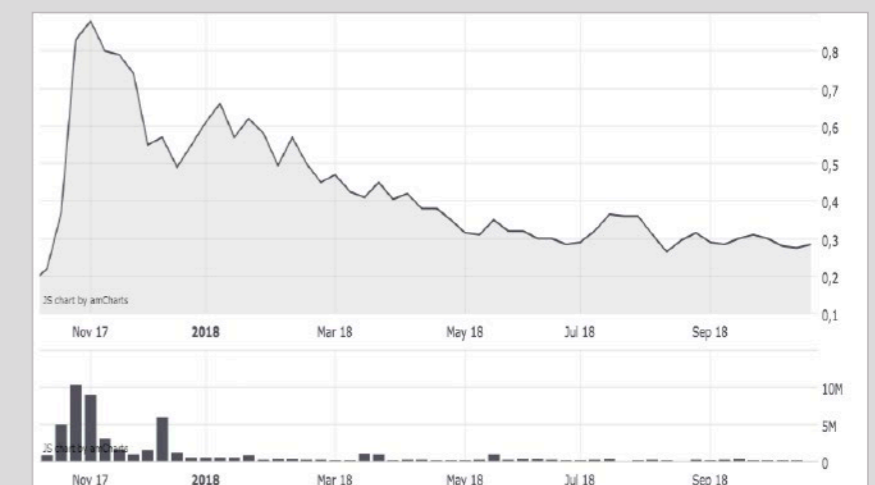
Shares outstanding: 66.4 million
Options/warrants: 4.6 million
Fully diluted: 71.0 million

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Lithium Energi Exploration Inc.



M2 Cobalt

Giant projects in the world's most productive cobalt region!



Simon Clarke, CEO

M2 Cobalt is a Canadian development company specializing in potential world-class cobalt projects. The two flagship projects are located in the most productive cobalt region on the planet.

Uganda – the exact opposite of the DRC

More than 60% of the cobalt produced worldwide comes from mines in the Democratic Republic of Congo. However, many of the mines there are not operated professionally, and the safety measures are questionable. The situation is different in neighbouring Uganda. Politically stable, with a legal system based on British law. The Mining Code is transparent and clearly regulates the conditions to be observed in operated mines. Uganda is also free of conflicts such as those in the Democratic Republic of Congo. Nevertheless, Uganda lies in the same geological region as the rich Congolese mines.

East African Trench System

Uganda is located directly between the right and left foothills of the East African Rift Valley, a geological formation that stretches from the Gulf of Aden in the north to Mozambique in the south of East Africa. Uganda is thus on the same commodity-rich trend as Southern Sudan, Congo, Tanzania and Rwanda. Typical of the East African trench system are so-called IOCG deposits, i.e. deposits containing iron, copper, uranium, gold, silver and rare earths. The world's largest and best-known IOCG deposit is Olympic Dam in Australia. Furthermore, the East African trench system is home to a large number of so-called VHMS deposits, which are of volcanic origin and often contain silver, gold, cadmium, bismuth and tin in addition to the main elements copper and zinc.

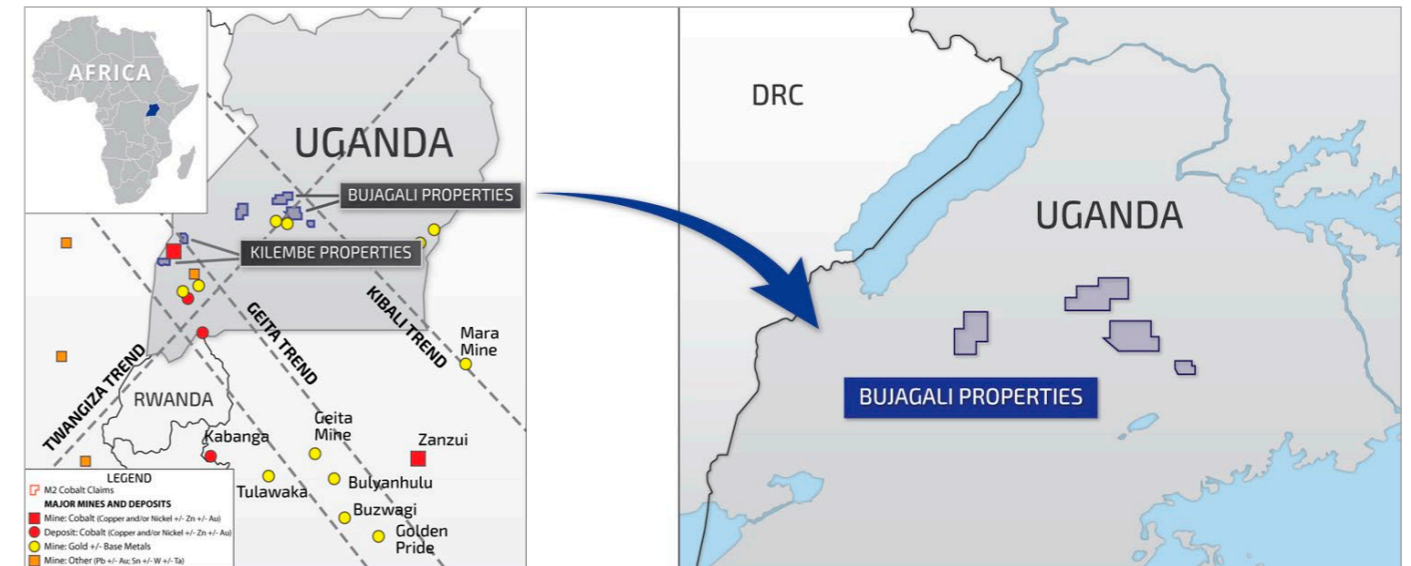
Flagship project Kilembe

One of two Ugandan flagship projects is called Kilembe. The two license areas together cover 193.3 square kilometres and lie within a radius of 25 kilometres around the successful Kilembe Mine, which is currently operated by the Tibet Hima Mining Company and mines copper and cobalt. Both project areas (Kilembe North and South) are located not far from the Congolese border and on the same geological trend as the Kilembe Mine. The entire region is the most important exploration hot spot for copper and cobalt in East Africa outside the Democratic Republic of Congo. Accordingly, the Kilembe Project also hosts a VHMS copper-cobalt mineralization.

In 2018, M2 Cobalt carried out airborne geophysical studies on the project that identified a total of over 700 zones of potential cobalt and copper occurrences. 80 of these were classified as high-priority and are currently being investigated by the teams. In addition, two areas could be identified which are suitable for initial drilling work.

Flagship project Bujagali

The second flagship project, which, like Kilembe, was only acquired in January 2018, is called Bujagali, is located in central Uganda and comprises 5 huge license areas with a total of 1,371.2 square kilometres. Bujagali is at the crossroads of two of the most important East African trends, the Kibali Trend and the Twangiza Trend. Bujagali hosts an IOCG-typical mineralization with copper, cobalt and traces of nickel. Sampling has already detected up to 0.31% cobalt, 0.17% copper and 3.5g/t silver. Geochemically, geophysically and geologically, Bujagali has the same indicators as Olympic Dam and the Congolese mines. GTK, Finland's government agency for soil research, rates the Bujagali region as one of the world's highest priority exploration targets. In the area of licensed areas, a gold rush of small private



Bujagali is located in central Uganda and comprises 5 huge license areas. (Source: M2Cobalt)

prospectors has already occurred several times. As a result, the area received increased attention and was therefore already examined superficially for traces of cobalt. In just one of the concessions alone, more than a hundred visible quartz vein sites were encountered that host both cobalt and copper and nickel.

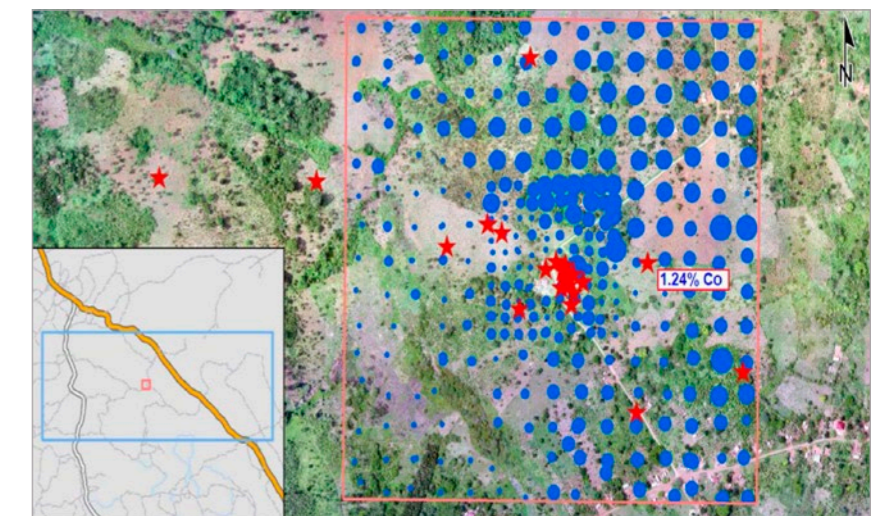
In April 2018, the company was able to report its first exploration successes from Bombo, one of the 5 license areas. Sampling encountered up to 0.65% cobalt, 0.4% copper and 0.15% nickel. In the Waragi target area, up to 1.24% cobalt and 0.4% copper were found. During trench digging, the Company encountered Bombo including 0.19% nickel over 95 metres including 0.91% copper over 1 metre. Digging trenches in the Waragi area yielded 0.27% cobalt and 0.13% copper over 3 metres, among others. There were also longer mineralized intervals with, among others, 0.012% cobalt over 33 metres. The whole on the surface with high potential in depth. The Bombo anomaly currently covers an area of 2.2 x 1 km, Waragi 1 km x 900 meters. The best sample so far showed a cobalt content of 1.75%!

Nevertheless, the entire area remains relatively under-explored, not to mention drilling with modern equipment.

Project Silverside

The third cobalt project is called Silverside and is located in the so-called Cobalt Camp in the Canadian province of Ontario. It covers approximately 2,800 hectares and has a number of anomalies and structures, as recent studies have shown. Historical exploration work has been able to demonstrate cobalt mineralization with grades ranging from 0.62% to 0.74% confirmed. In addition, a 6-centimeter-long soil sample contained an average of 25 ounces of silver per ton of rock.

In the Waragi target area, up to 1.24% cobalt and 0.4% copper were found. (Source: M2Cobalt)



Ontarios Cobalt Camp

Ontarios Cobalt Camp is located about 500 km northwest of Toronto and can be reached by car within 5 hours. There is a direct road connection via the Trans Canada Highway and a train connection via the Ontario Northland Railway Line. In the past, the district was the most productive region for cobalt, although the focus was more on the equally abundant silver deposits there. Over a period of about 60 years, mainly between 1919 and 1932, about 50 million pounds of cobalt and 600 million ounces of silver were mined there. This is also where today's Gold Major Agnico-Eagle has its origins.

In history, exploration for cobalt has been sporadic, partly due to a decline in production after the Second World War and partly due to the search for silver. A search for large quantities of cobalt-containing material was therefore completely omitted. This is one of the main reasons why the district has a high exploration potential, especially for cobalt.

Experienced and successful management team

M2 Cobalt is led by a highly experienced and successful management team.

CEO Simon Clarke is one of the co-founders of Osum Oil Sands, an 8,000-barrel oil producer per day.

Director VP Ops Thomas Lamb is co-founder of Goldgroup Mining. He was also a Director at Russia's third largest gold producer Uzhuralzoloto Group.

Dr. Jennifer Hinton is a world-renowned expert in local and private exploration, especially in East and Central Africa.

Graham Harris was formerly Senior Vice President of Canaccord Capital and is currently Chairman of Millennial Lithium.

Director Mahendra Naik, who joined M2 Cobalt in September 2018, is a chartered accountant and one of the founding directors and officers of IAMGOLD Corporation. As Chief Financial Officer of IMAGOLD from 1990 to 1999, he negotiated a number of mi-

ning joint ventures with Anglo American and was instrumental in arranging over \$550 million in debt and equity financing for IAMGOLD, including the IPO. Naik is also Chairman of the Board, Audit and Compensation Committee of Fortune Minerals Limited, which focuses on the NICO Cobalt Gold Bismuth Copper Project in the North West Territories. As CEO of Fortune, Naik was actively involved in raising more than \$100 million for Fortune and negotiating several joint ventures.

Summary: Potential world-class projects and strong experts

M2 Cobalt is an early-stage opportunity that really has it all! Two huge copper-cobalt projects were secured in a region with the world's most productive cobalt mines. This in politically stable, mine-friendly Uganda and thus in a region that is classified as one of the world's highest prioritized exploration targets. The exploration potential is almost gi-

gantic: countless near-surface finds and visible mineralizations suggest that M2 Cobalt could hit the mark in Uganda. It is certain that investors can look forward to countless results from the exploration program launched in the coming months. If the company only succeeds in hitting a single bull's eye, this should quickly raise the share price to a completely new level. M2 Cobalt is excellently equipped financially for the coming months, as a financing of 8.5 million CA\$ was successfully concluded at the end of 2017. Mahendra Naik is an absolute expert in the field of capital procurement and possible joint ventures with large companies.

(Source: M2Cobalt)



ISIN: CA55379T1030
WKN: A2H8WQ
FRA: A0K
TSX-V: MC

Shares outstanding: 63.0 million
 Options: 5.8 million
 Warrants: 12.5 million
 Fully diluted: 81.3 million

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M2 Cobalt Corp.



Millennial Lithium

With mega-management in production within three years

Millennial Lithium is a Canadian development company focusing on lithium projects in Argentina. The company is far better connected to the existing infrastructure than most of its competitors and intends to go into production within just three years.

Pastos Grandes Lithium Project – Situation and Acquisition

The flagship project is Pastos Grandes, a lithium project in the northwestern Argentine province of Salta. Pastos Grandes is a salt lake that is part of a series of similar lakes that run like a string of pearls through the provinces of Salta and Catamarca. The project is only about 50 to 60 kilometers away from other lithium projects from Lithium Americas, Galaxy Resources and Orocobre. Millennial Lithium's Pastos Grandes Project consists of several sub-areas, which currently cover 8,664 hectares and have been gradually acquired since around mid-2016. The latest piece of the puzzle was to acquire a total of 2,492 hectares of land from The Salta Provincial Energy and Mining Company (REMSA) in December 2017. The company had to pay almost US\$ 7.5 million in cash for this and must also invest around US\$ 15.54 million in the development of the subproject in an initial phase. In April 2018, the Company received the environmental permit to explore the REMSA area and immediately started various works. In order to meet the project development condition, geophysical work, a comprehensive drilling program, resource estimation and construction of large evaporation ponds, a mini-processing facility (capacity 3 tonnes of lithium carbonate per month) and a larger camp were planned. For this purpose, Peter Ehren was brought on board in May 2018. He is a specialist for evaporators when it comes to the production of lithium. He has already worked for several big names in the industry (SQM, BHP) and was jointly responsible for the design and construction of the evaporation ponds on Orocobres Salar de Olaroz project. Con-

struction of the pilot plant is scheduled to begin in the fourth quarter of 2018.

Pastos Grandes Lithium Project – Very good connection to the existing infrastructure

The biggest plus point is the relative proximity to the provincial capital Salta. While most of its competitors' projects are literally located in the Pampa, Millennial Lithium's project has a direct connection to the city of Salta, which is about 235 kilometres away by road and has about 350,000 inhabitants. At the same time, Salta is the capital of the province of the same name in the very northwest of Argentina. At the same time, there is a direct, approximately 490 km long road connection to the Chilean port of Antofagasta, which not only has a Pacific deep-sea port, but is also one of the leading mining cities in South America. About twelve kilometres north of the project area lies the small town of Los Pastos Grandes, which offers a fresh water connection and a 220-volt diesel engine-supported power supply. A 600-megawatt, 375 kilovolt high-voltage line connecting Salta and Mejillones in Chile runs 53 kilometers north of the project area. A natural gas pipeline runs about 26 kilometers northwest of the project.

Pastos Grandes Lithium Project – Historical Exploration Activities

Large-scale exploration work has been carried out on the individual sections in the past. For example, a former tenant of a 1,221-hectare portion of the total project has already invested more than US\$4 million in exploration in 2011 and 2012. Historical sampling showed mainly very high lithium contents of 400 to 600 milligrams per liter (mg/L), with samples of up to 3,000 mg/L being taken. A total of six exploration wells were then drilled to determine the brine size and water bearing layer. Pump tests were also carried out in this context. In addition, geophysical studies and

electrical acoustic irradiation tests were developed. In addition, evaporation tests were carried out on site in a separate pilot plant. The former tenant determined lithium contents of 602.2 to 665.9mg/L and 6,342 to 7,146mg/L potash from three own brine samples taken from the southwestern sector of the project area.

Pastos Grandes Lithium Project – Own Exploration Successes

In autumn 2016 Millennial Lithium started its first own drilling campaign on Pastos Grandes. The first well (up to 192 metres deep) already encountered three layers of water-bearing brine of different depths, with densities of 1.19 g/cm³ to 1.22 g/cm³. The second well (up to 352 metres deep) even encountered eight intervals, each about one metre long. These drilling successes led the company to drill a further third well. In total, lithium contents of up to 471mg/L could be detected by means of these boreholes. In June 2017, Millennial Lithium discovered an average lithium content of 535mg/L over 381.5 meters by drilling another well. A subsequent pump test carried out in another borehole yielded average lithium contents of around 430mg/L over a period of 60 hours. In addition, the lithium content was slightly reduced from only 439 to 431 mg/L over the entire test period. In August 2017, Millennial Lithium was able to demonstrate that the brine bearing layer also continues outside the Salar Centre. Among other things, a near-surface layer of 33 metres with an average of 523mg/L and a deeper layer of 545mg/L over 211.3 metres were encountered! In addition, all four new exploration wells completed in 2018 ended in thick lithium-containing brine zones with lithium contents of up to 500 mg/L, where the lithium horizon had a thickness of 236 meters. The exploration drilling thus confirmed the extension of the brine to the adjacent REMSA licence south of the original core licences of Pastos Grandes. The

first three holes are on a north-south line that extends the area of known mineralization by an additional 3,000 metres under the REMSA license.

Pastos Grandes Lithium Project – Resource Estimation and Production Plans

In November 2017, Millennial Lithium presented the first reliable resource estimate for Pastos Grandes based on the Canadian NI43-101 resource calculation standard. Accordingly, the project has at least 2.131 million tonnes of lithium carbonate equivalent (LCE) and 8.141 million tonnes of potash ash equivalent (KCI) measured and displayed in the categories and 878,000 tonnes of LCE



Millennial Lithium is well positioned in Argentina. (Source: Millennial Lithium)

and 3.263 million tonnes of KCl derived in the category.

The management around CEO Farhad Abasov expects a production start in about three years and an annual production of 10,000 to 15,000 tons of lithium due to the good infrastructural location as well as the simplicity of a possible mining.

Pastos Grandes Lithium Project – Preliminary Economic and Feasibility Study

In January 2018 Millennial Lithium for Pastos Grandes was able to present a first preliminary economic feasibility study (PEA) for Pastos Grandes. Accordingly, the project has a Net Present Value (NPV) of US\$824 million (discounted at 8%), assuming an average production of 25,000 tonnes of lithium carbonate per year. Operating costs were estimated at a low US\$ 3,218 per tonne of lithium carbonate over the 25-year mine life. The initial cost of capital including the 20% buffer amounts to US\$ 410.2 million. The repayment period is 4.5 years. On this basis, internal profitability is at a very solid 23.4% after tax. In July 2018, Millennial Lithium commissioned WorleyParsons Chile S.A. to prepare a feasibility study for Pastos Grandes based on the PEA data to be completed by the first quarter of 2019.

Cauchari East Lithium Project

At the end of September 2016, Millennial Lithium announced that it would acquire another lithium project called Cauchari East. This covers 2,990 hectares and is located on the eastern side of the Cauchari-Olaroz Salar, adjacent to Orocobre's producing Salar de Olaroz and Lithium Americas Corp.'s advanced Cauchari-Olaroz project. Millennial Lithium's new project has the same geological characteristics as the two producing or highly advanced projects of adjacent competitors and particularly high potential in the lower salar layers.

Studies carried out by Orocobre on their own project suggest that the corresponding lithium brine resources extend to the eastern part of the Salar and thus also to the Cauchari East project. Millennial Lithium has now been able to confirm this by means of geophysical studies.

In June 2017, Millennial Lithium expanded its Cauchari East project by a further 8,742 hectares.

In June 2018, the Company received the long-awaited environmental permit to drill up to 6 wells.

Top management for rapid project development

A top management team was put together for the rapid further development of the company's own projects.

During his career, CEO Farhad Abasov has led Allana Potash to a \$170 million acquisition by Israel Chemical Ltd. and Energy Metals to a \$1.8 billion acquisition by Uranium One, among others. In addition, he was co-founder of Potash One, which was taken over by the German K+S for 430 million dollars in 2010. Chairman Graham Harris was Senior Vice President and Director of the Canadian investment house Canaccord for five years. He raised more than \$250 million in capital for listed and private companies. Harris is also the owner of Sunrise Drilling, which is a decisive advantage for exploration.

Director Kyle Stevenson is the founder of High North Resources Ltd, an oil and gas producer based in Alberta, Canada. He also founded Waterproof Studios, an animation and visual effects studio that works with leading film companies. He is also the founder of RuralCom Networks, a leading Canadian telecom service provider.

Director Andrew Bowering is a co-founder of Sunrise Drilling and has raised over \$100 million in capital for several exploration and development companies and led several major acquisition programs.

At the end of July 2016, Millennial Lithium was

also able to win Iain Scarr as VP Exploration & Development. Scarr worked for Rio Tinto for 29 years, where he made numerous discoveries in North and South America and Africa. He was also responsible for the commercial direction of the Jadar lithium boron project in Serbia. At Lithium One Inc. he was responsible for leading the Sal de Vida Lithium Brine project in Argentina through the feasibility phase with Galaxy Resources. At Galaxy, he took the Rincon project to the final feasibility study. Scarr is a real asset to Millennial as he already has an immense wealth of experience and an extensive lithium network.

Summary: Full speed ahead towards production

Even though there is still a long way to go before the targeted start of production, it is clear to the management that they are absolutely pushing the pace. The excellent drilling and pumping results, which were presented in just

a few months, show that the potential for a high-grade lithium resource in Argentina is certainly there. The good infrastructural situation (in contrast to many competitors) could accelerate a possible production. With the help of further top exploration results and a resource estimate, Millennial Lithium's market value is likely to rise rapidly. This is also due to the fact that the company has sufficient financial resources. In March 2018, for example, the company was able to finance two projects worth CA\$ 24.15 million and CA\$ 7.7 million respectively. Upon closing, the Company had approximately CA\$65 million in cash.

The most recent PEA clearly showed that Pastos Grandes can be operated economically.

Exclusive interview with Farhad Abasov, CEO of Millennial Lithium

What did you and your company achieve within the last 12 months?

Millennial Lithium Corp. has had an exciting and impressive twelve months. An aggressive exploration program in 2017 led to a maiden resource for its flagship lithium project in Salta, Argentina. Announced late in 2017, the Measured and Indicated lithium carbonate equivalent (LCE) resource is estimated at 2.1M tonnes of LCE and the Inferred lithium carbonate resource is estimated at 900,000 tonnes of LCE. These resources formed the basis for a Preliminary Economic Assessment (PEA), completed by WorleyParsons Chile in Q1 2018, which indicated the

project has the potential to produce 25,000 tonnes per year of lithium carbonate and that such an operation would have robust economics including OPEX of approx. \$3,218/tonne of LCE, an NPV of \$824M. The successful PEA supported initiation of a Feasibility Study (FS) for the project under the direction of WorleyParsons Chile. To provide additional technical data for the FS Millennial is completing additional exploration drilling for a resource expansion, pilot ponds to concentrate brine to plant grade and a pilot plant to produce high purity lithium carbonate. The FS is scheduled for completion in Q1, 2019. In addition to the numerous technical achievements by Millennial in the past 12 months, the



Farhad Abasov, CEO

Company has been very successful on the corporate front. To fund ongoing activities at the project Millennial has raised over \$70M CDN in the past twelve months and secured a strategic investor, Golden Concord Group Ltd., a leading solar energy provider in China.

What are the main catalysts for your company within the next 6 months?

The main catalysts in the next 6 months follow the two main development paths by the Company. On the technical side, significant milestones are the completion of the pilot ponds, concentration of the lithium-rich brine, the successful commissioning of the pilot plant with the production of high purity lithium carbonate. All these studies will feed into the FS which will effectively be the summation of all the technical work to date making its completion the most important technical catalyst for Millennial.

On the corporate side, the Company will advance on seeking construction funding for the

development of the project as well as off-take agreements with potential partners for the lithium carbonate product. The main catalysts on the corporate path are the securing of project financing and an off-take agreement. We are well funded to achieve all these objectives.

What is your opinion about the current conditions of the battery metals market?

The lithium market continued its strength with demand forecast staying very robust. The demand growth has also led to a number of funding rounds for lithium development companies. At the same time lithium prices have come down a bit since their highs in early 2018 but still remain very strong allowing low-cost brine operations such as Pastos Grandes to get to construction financing and potentially produce very healthy profits. We believe the supply for key battery metals still remains quite tight.

Rock Tech Lithium With German manpower in big steps towards production as of 2021

Rock Tech Lithium is a Canadian mining development company with a clear focus on high-grade lithium projects. The corporate strategy is clearly designed to minimize the project risk as quickly as possible and start production within three years.

Georgia Lake Flagship Project – Location

Rock Tech Lithium's flagship project is called Georgia Lake and is located in the Canadian province of Ontario, about 145 kilometers northeast of the city of Thunder Bay. The spodumene-containing pegmatites of the Georgia Lake region were discovered in 1955, triggering a veritable claim staking frenzy that also saw excessive exploration activity until 1958. By the end of the 1950s, for example, 33,000 metres had been drilled. The Georgia Lake Project is very well served by Highway 11 which runs directly on the property. The project is divided into several blocks: Nama Creek, Conway, Jean Lake/Parole Lake, Aumacho, Newkirk, McVittie and MNW, all of which already have resource estimates.

Georgia Lake Flagship Project – Resources

In June 2018, RockTech Lithium released a further improved NI 43-101 compliant resource estimate. Accordingly, Georgia Lake has Measured Mineral Resources of 1.89 million tonnes at 1.04% lithium oxide (Li₂O), Indicated Resources of 4.68 million tonnes at 1.00% Li₂O and Inferred Resources of 6.72 million tonnes at 1.16% Li₂O. In a feasibility study, Rock Tech has shown that resources can be mined at a high profit.

Georgia Lake Flagship Project – Exploration Successes

Rock Tech Lithium initially stopped exploratory work in 2013. When it became clear from 2016 that the lithium sector would finally gain momentum, drilling work was resumed. Exactly this year, some of the best results to date were also achieved in the context of sampling. For example, high grade areas with up to 4.42% Li₂O were detected in corresponding samples. Not only could known pegmatites be expanded, but also the rediscovered

ISIN: CA60040W1059
WKN: A2AMUE
FRA: A3N1
OTCQX: ATWGF
TSXV: ML

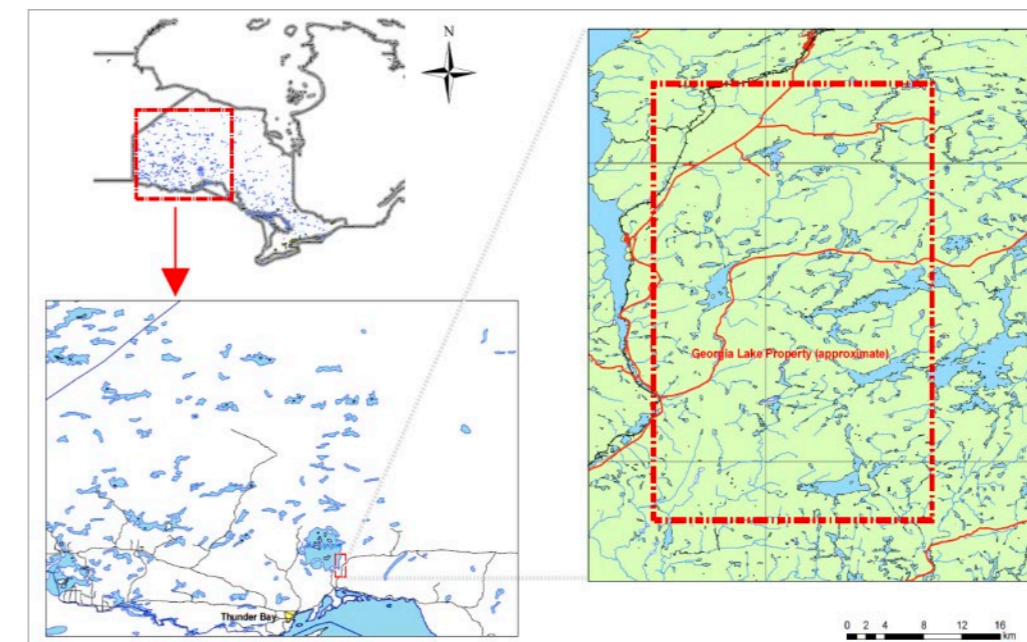
Shares outstanding: 82.5 million
Options/RSUs: 10.1 million
Warrants: 7.7 million
Fully diluted: 100.3 million

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Millennial Lithium Corp.



The Georgia Lake Project is very well served by Highway 11 which runs directly on the property.
(Source: Rock Tech Lithium)

very of a pegmatite rock vein near Nama Creek could be recorded.

In 2017, extensive drilling was carried out in the Parole Lake and Aumacho blocks where some of the best samples have been taken in the past. These results were confirmed by the drilling. Thus, one came across Parole Lake among other things with 11,65-meter-wide blocks with an average of 1,53 Li_2O . Things went even better in the area of Aumacho, where 5.03 meters with 2.76% Li_2O and 6.19 meters with 1.78% Li_2O could be proven. 5 out of 7 of the Aumacho wells revealed lithium degrees above 2%. Further sampling has returned up to 2.32% Li_2O on Parole Lake, up to 2.31% Li_2O on McVittie and up to 2.47% Li_2O in the Nama Creek area plus a 2.12% lithium sample in a completely newly discovered area. Further trenching also yielded 2.80% Li_2O over 2.50 metres.

German know-how for the development of Georgia Lake

In April 2018, RockTech engaged DMT GmbH & Co KG to support the next concrete steps in the development of Georgia Lake. DMT is a globally active group of companies operating across the board in the mining, oil & gas, infrastructure & construction and plant engineering sectors. DMT's customers include Anglo American, BHP Billiton, OMV, E.ON, Schlumberger, De Beers and leading institutions such as the World Bank and the Asian Development Bank.

Georgia Lake Flagship Project – Further Work and Initial Economic Assessment

In June 2018, Rock Tech Lithium commissioned an Initial Economic Assessment (PEA) which has since been completed by DMT and has produced very positive results for Rock Tech. The results of the PEA determined an NPV of US\$ 312 million at a discount rate of 8% and

an IRR of 62.2% before tax. The PEA is based on only a small portion of the Georgia Lake project, the Nama Creek Main Zone, with the exception of additional inferred resources that the Company has defined elsewhere on the property. Furthermore, it was assumed that a spodumene concentrate in basic chemical quality of 6.2% lithium oxide would be produced. This resulted in revenues of CA\$ 1,136 million over the entire mine life of 11 years. Accordingly, the annual EBITDA amounts to CA\$ 64.2 million. The initial cost of capital amounts to only CA\$ 65.3 million. The NPV after tax (8% discount rate) amounts to CA\$ 210 million with a strong IRR of 48.1%. A positive cash flow is already being generated in the third year of the project.

Georgia Lake Flagship Project – Metallurgy and Hydrometallurgical Test Successes

In metallurgical test runs, Rock Tech was able to achieve lithium recovery rates of 75.5% using highly liquid separation and 81.1% using a flotation process. In hydrometallurgical tests under laboratory conditions, lithium carbonate with a purity of 99.96% could be produced without any process optimization and with a purity of 99.98% by bicarbonate washing. This proved that it is possible to produce battery-compatible lithium carbonate. In the short term, the company also plans to commission a test run for the successful production of lithium hydroxide.

Nogalito Lithium Project

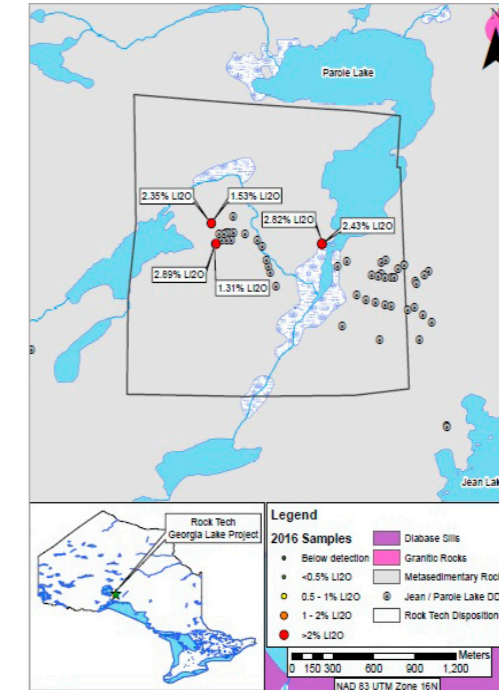
In February 2018, Rock Tech Lithium announced the signing of a letter of intent to acquire 100% of the Nogalito Lithium project in the Mexican state of Sonora. Nogalito is a lithium brine project located in a 16 by 5-kilometre basin with geological characteristics similar to those of Chile, Argentina and Neva-

da. US Borax Inc. was already able to prove lithium in the early 1990s, although they were originally looking for borate. US Borax Inc. encountered lithium degrees between 200 and 498 ppm in 108 samples, 523 to 968 ppm in 27 samples and 1,166 ppm lithium in one sample.

To fully acquire the Nogalito Project, Rock Tech Lithium must gradually pay a total of US\$130,000 in cash and 250,000 of its own shares to the previous rights holder over three years and invest US\$500,000 in the development of the project.

Cooperation with a top-class team of consultants

Rock Tech Lithium's primary goal is to bring the Georgia Lake Lithium Project into production as quickly as possible. This is done in cooperation with DMT, a subsidiary of TÜV in Germany. Together with Rock Tech Lithium, the renowned exploration and mine specialists have developed precise models of the mine in order to get production up and running as quickly as possible. Furthermore, a unique team of consultants was secured in 2017: Professor Heinz Riesenhuber, Carl-Peter Forster, Professor Jens Gutzmer and Norbert Steiner deserve special mention. Riesenhuber was Federal Minister for Research and Technology from 1982 to 1993. Carl-Peter Forster is a German car manager and sits on the boards of Geely Automobile Holdings, the Volvo Cars Group and is Chairman of Chemring Plc and the London Taxi Company. From 2010 to 2011 he worked as Chief Executive Officer for the Indian company Tata Motors. He previously held top positions at Opel and General Motors Europe. Professor Gutzmer is professor at the Technical University / Bergakademie Freiberg and founding director of the Helmholtz Institute Freiberg. Norbert Steiner was former CEO of K+S. The new advisory board is intended to assist Rock Tech Lithium in negotiations with potential future partners as well as in the development of Georgia Lake.



Some high-grade lithium finds were recorded in the Parole Lake area.
(Source: Rock Tech Lithium)

Few outstanding shares due to strong shareholder base

Rock Tech Lithium has a clear strategy: to rapidly but cost-effectively develop the main Georgia Lake project. To date, this has meant that the company has only issued around 34.7 million shares. Approximately 25% of all outstanding shares are held by management. A further 45% or so of the shares are in the hands of so-called Cornerstone shareholders, i.e. investors who are very close to the management and act accordingly loyal to the company. Only about 30% of the shares are considered free float, i.e. they are in free float.

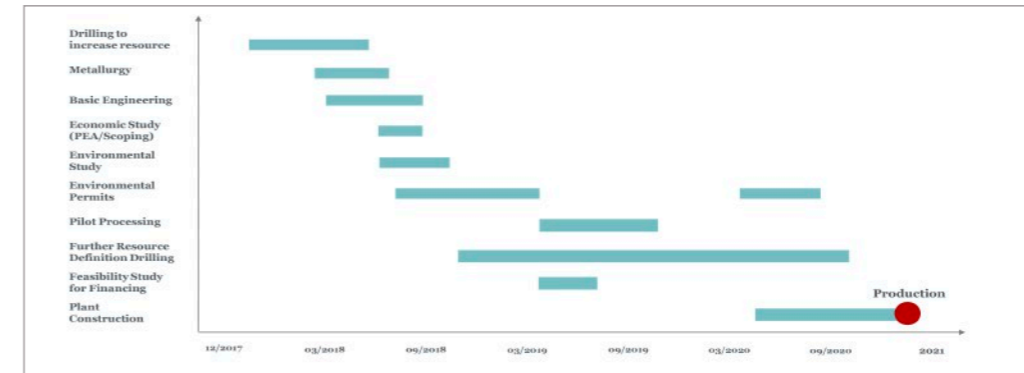
High cash position

Rock Tech Lithium had a cash balance of approximately CA\$1.9 million at the end of September 2018.

Summary: Expanded Resource and PEA Expected to Arouse Desire

Rock Tech Lithium is one of the few Battery Metals players with German manpower. Not only CEO Martin Stephan and Chairman Dirk Harbecke are Germans, but also part of the top-class team of consultants. The Georgia Lake flagship project is already well de-

veloped and has an attractive resource that was significantly expanded during 2018. Production is scheduled to start in 2021. The successfully completed PEA initially takes a lot of risk out of the project and makes Rock Tech interesting for possible joint ventures or even a takeover.



Planned timeline
(Source: Rock Tech Lithium)



Martin Stephan, CEO

Exclusive interview with Martin Stephan, CEO of Rock Tech Lithium

What have you and the company achieved in the last 12 months?

Over the past 12 months, we have significantly increased the volume of our known lithium deposits through exploration and drilling programs and presented a new technical resource estimate according to Canadian mine standard 43-101. In this context, we also succeeded for the first time in reaching the highest resource category „Measured“, thus creating additional confidence in our Georgia Lake project in Ontario. However, the absolute highlight of the past months was certainly the presentation of the first relevant study (PEA) on the profitability of the project at the start of production. The data obtained from the PEA indicate above-average profits for the production of lithium concentrate over a period of 11 years. Rock Tech’s production costs of around USD 335 per tonne are likely to account for only around one third of the current sales prices for concentrate with 6,2 % lithium content – resulting in a gross profit margin of a whopping USD 600 per tonne. The resulting EBITDA alone, at a value of around CAD 64 million per year, is twice the current market capitalization.

What are the most important catalysts for your company within the next 6 months?

Understandably, we will use the extremely positive PEA study to convince other investors, analysts and journalists of Rock Tech’s excellent earnings prospects and thus reduce the management’s disproportionately high undervaluation. Also pending is data from the current trenching program at the Georgia Lake Project. We expect that demand for hard rock lithium will continue to grow massively in the lithium triangle of Bolivia, Chile and Argentina due to future production problems in the Latin American Salar region – and it is precisely this lithium concentrate that Rock Tech will produce in a secure region with a first-class infrastructure in a few years’ time.

What is your opinion about the current situation on the Battery Metals market?

No question about it: the mood among investors and among many analysts is bad – but wrongly so. The demand for battery cells, from which the finished car batteries are then manufactured, is growing significantly faster and more strongly than analysts have ever estimated. Significantly more than 40 large

battery factories, the so-called „Gigafactories“, are currently being built around the globe to meet the demand for cells from the automotive industry. The demand for lithium will therefore again increase rapidly in six months at the latest. This development will be supported by new battery types that will have a higher energy density and also contain a small amount of cobalt. To achieve this, more nickel and lithium are needed on the cathode side of the battery. When analysts and inves-

tors come out of their muddle and look again at the facts on the battery market, they will very quickly realize that the fundamental situation has never been better than it is now. The next rally in both commodity and lithium equities is therefore imminent. Investors should therefore take up new positions in good time, i.e. now, before the broad mass of investors again becomes aware of this exceptional situation.

ISIN: CA77273P2017
WKN: A1XF0V
FRA: RJIB
TSX-V: RCK

Outstanding shares: 34.7 million
Options: 1.9 million
Warrants: 1.3 million
Fully diluted: 37.9 million

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Rock Tech Lithium Inc.



Sierra Metals

Future base metal supplier for lithium ion industry with profitable mines and mega partner



Sierra Metals is a Canadian raw material producer that operates three mines in Mexico and Peru. All three mines are highly profitable and have a balanced production ratio of almost a quarter each of silver, zinc, copper and lead/gold. That alone makes Sierra Metals an absolute low-cost junior. The company also plans to increase production in the current year and sees itself primarily as a future supplier to the lithium-ion industry. The greatest strength is the exploration potential, which seems almost gigantic.

Yauricocha Mine – Location and Production

The Yauricocha Mine is located in Peru, covers about 18,000 hectares and is 82% owned by Sierra Metals. Yauricocha has been in continuous operation since 1948! Yauricocha has several shafts, an underground ramp and a new underground tunnel that connects the current mining areas with the processing plant. The mine has a daily processing capacity of 3,000 tonnes and mines underground silver, gold, lead, zinc and cop-

per. During the first half of 2018, Sierra Metals recovered a total of 758,000 ounces of silver, 1,642 ounces of gold, 7.61 million pounds of copper, 12.88 million pounds of lead and 38.44 million pounds of zinc from the Yauricocha Mine. In October 2017, Sierra Metals released a new reserve and resource estimate, which increased reserves by 134%. Yauricocha had reserves of 13.9 million ounces of silver, 235.3 million pounds of copper, 477.2 million pounds of zinc, 151.1 million pounds of lead and 149,600 ounces of gold. Yauricocha also had resources (including reserves) of 35.6 million ounces of silver, 618.3 million pounds of copper, 1.1285 billion pounds of zinc, 337.1 million pounds of lead and 391,000 ounces of gold.

Yauricocha Mine – Exploration Potential

The exploration potential is much higher, as demonstrated by the discoveries of the Cuye-Mascota Extension, the Esperanza Zone and the Esperanza North Zone. In 2018, high grade mineralization of up to

7.78% zinc was also encountered between the Esperanza and Cuye zones.

In addition, the immediate vicinity of current mining activities has more than 15 other areas where the Company believes there are significant resources. Among them a quite large area within which the Yauricocha and Bolivar faults overlap. Sierra Metals is currently working aggressively to further expand the Esperanza Zone in particular. The area where the main mining activity currently takes place is only a small part of the total concession. About two kilometres southeast of this is La Fortuna, another area with superficial copper outcrops. Another three kilometres to the south is the former Kilkasca mine, which still has significant resources and is the target of future expansion strategies.

The 2017 drill program resulted in the reporting of a rediscovery at the Escondida Zone located within the Cachi-Cachi mine. The new discovery has a strike length of over 300 metres, the largest ore body found in the history of Cachi-Cachi to date.

In 2018 another high-profile zone called Contacto Oriental was encountered, which included 32 metres with an average of 11.75% nickel plus silver, copper and lead.

The newly discovered Contacto Sur Medio Zone, which is only 250 metres from the current mine action, also showed very high grades of up to 175g/T silver, 36% zinc and 9% lead.

Yauricocha Mine – Extension Plans

Due to the numerous new discoveries, the management was considering gradually expanding the current production capacity from 3,000tpd to 5,500tpd. A profitability assessment (PEA) published in June 2018 confirmed a return on investment of 486% for the company in the event of a corresponding expansion. Sierra Metals is planning an implementation by 2021.

Bolivar Mine – Location and Production

The Bolivar Mine is located in the Mexican state of Chihuahua, covers about 15,217 hectares and is 100% owned by Sierra Metals. It has a daily processing capacity of 3,000 tonnes and mines underground silver, gold and copper. During the first half of 2018, Sierra Metals recovered a total of 230,000 ounces of silver, 1,959 ounces of gold and 9.10 million pounds of copper from the Bolivar Mine. As of May 2018, Bolivar had reserves of 7.92 million tonnes at an average of 1.14% copper equivalent and resources of 13.267 million tonnes at an average of 1.37% copper equivalent in the category indicated and 8.012 million tonnes at an average of 1.35% copper equivalent in the category inferred.

Bolivar Mine – Exploration Potential

Starting from the current El Gallo mining area, there are two perpendiculars that move towards each other at depth. The Company suspects the source of the copper mineralization to be exactly where they meet. There you may encounter a high-grade copper porphyry. In addition, the property has a further 10 areas that could host significant resources. These include the La Sidra and Bolivar West zones, where Sierra Metals 2017 was able to identify high grade copper zones. In a 20,000-metre drill program, the Company encountered La Sidra including 3.5 metres at 9.22% copper equivalent and 9.7 metres at 10.63% copper equivalent. From the Bolivar West Zone, 9.2 metres of 4.05% copper equivalent and 10.5 metres of 4.26% copper equivalent were reported.

In September 2017, Sierra Metals announced analytical results from the completed definition drilling program in the West Bolivar Zone. This zone is located in the Bolivar Mine next to the current mines. The drilling program delivered very good copper, zinc and silver grades. The average grade was 2.55% copper



Sierra Metals Yauricocha Mine offers a variety of expansion possibilities. (Source: Sierra Metals)

equivalent with an average true thickness of 9.1 metres, which is significantly above the grade of the resource and the grades in the Bolivar mine's ore. It showed that Bolivar West has further potential for resource expansion and is still open to the northeast.

Bolivar Mine – Expansion plans

Due to the numerous new discoveries, the management was considering gradually expanding the current production capacity from 3,000tpd to 5,000tpd. A PEA published in June 2018 confirmed the company a return on capital of 550% in the event of a corresponding expansion. Sierra Metals is planning an implementation by 2020.

Bolivar Mine – Letter of Intent with Mega-Partner

In September 2017 Sierra Metals entered into a letter of intent with Jinchuan Group Co Ltd to develop its Bahuerachi copper project. This is located directly adjacent to Sierras Bolivar concessions. The Jinchuan Group is one of the world's largest base metal producers and North China's largest copper producer. Both companies expect synergy effects for both projects as a result of the cooperation.

Cusi Mine – Location and Production

The Cusi Mine is also located in the Mexican state of Chihuahua, covers about 11,671 hectares and is 100% owned by Sierra Metals. It has a daily processing capacity of 650 tonnes and mines silver, gold, lead and zinc underground. By 2019, production is to be expanded to 1,200 tpd, initially, and in a second step to 2,700 tpd by 2021. Corresponding expansion plans are extremely economical, as a PEA from June 2018 impressively demonstrated. It turned out that a plant with a daily processing

capacity of 2,700 tonnes would achieve an IRR of a staggering 75%.

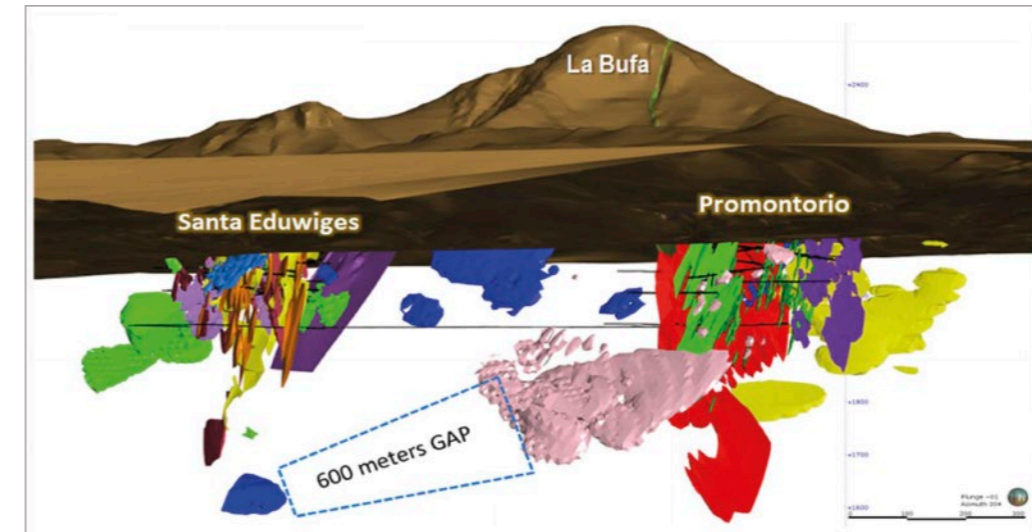
During the first half of 2018, Sierra Metals recovered a total of 298,000 ounces of silver, 165 ounces of gold, 530,000 pounds of lead and 71,000 pounds of zinc from the Cusi Mine. In December 2017, Sierra Metals released a new resource estimate for Cusi, increasing Calculated and Indicated resources by a total of 129% and Inferred resources by 36%.

Cusi Mine – Exploration Potential

Sierra Metals announced in February 2017 the discovery of a new high-grade silver intercept at the Santa Rosa de Lima complex within its current production area at the Cusi Mine. For example, 1.5 metres of 1,243g/t silver equivalent and 3.1 metres of 1,126g/t silver equivalent were encountered. The Santa Rosa de Lima complex is located within a regional structure that stretches for about 64 kilometres. The part of the complex on the Cusi property is expected to be 12 kilometres long. The discovery comes as part of a reinterpretation of the hydrothermal model and a 15,000-metre drilling campaign that began in December 2016. Mineralization of the Santa Rosa de Lima structure is only 100 metres below surface and can occasionally be observed at intersections of veins such as „Promontorio“ and „Santa Eduwiges“ on the surface.

In June 2017, the Company announced further results from a new high-grade zone. Accordingly, this zone has an extent of at least 1,000 by 400 metres. The average grade was 371g/t silver equivalent, the average thickness of the drilled mineralization was 4.1 metres. The peak values were 1,152g/t Ag, 2.12% Pb and 2.00% Zn.

In August 2017, the Company announced results from the expanded drill program completed at the Santa Rosa de Lima Zone within the Cusi Mine. The average grade of the infill drill intercepts was 343g/t silver equivalent with a peak of 580g/t silver equivalent.



Between the Cusi mineralizations Promontorio and Santa Eduwiges there is a 600 meter long gap that is currently being explored for additional resources.
(Source: Sierra Metals)

Summary: Increase in production and world-class exploration potential

From 2016, Sierra Metals was able to announce new record results month after month in its production on the flagship project Yauricocha. The discovery of several new zones at all three mines not only demonstrates that Sierra Metals has uncanny exploration potential but is also expected to provide improved production results. With rising production that will be realized at all three mines within 3 to 5

years, rising silver and base metal prices, and falling production costs, Sierra Metals should soon be bubbling with profits. This is particularly important in view of the fact that the company intends to establish itself in the future primarily as a supplier to the booming lithium-ion industry. Sierra Metal's big plus is certainly the exploration potential on all three project areas, which should provide a steady, positive news flow. Last but not least, the fresh agreement with the mega partner Jinchuan Group should offer a lot of potential for speculation.

Exclusive interview with Igor Gonzales, CEO of Sierra Metals

What did you and your company achieve within the last 12 months?

In the last 12 months, Sierra Metals updated and filed technical reports for all 3 Mines, with growth in reserves & resources at Yauricocha by 134% and Bolivar by 83% and growth in resources at Cusi by 130%. PEA studies have also been completed to examine output ex-

pansion at all 3 Mines by a potential 66%, 67% and 315%, respectively.

Through expanded drilling programs Sierra Metals has drilled its deepest hole to-date at Yauricocha, confirming the existence of continued mineralization at depth, identified and defined Cienequita, a new high-grade copper zone at Bolivar Mine and defined a 40-meter-wide high-grade silver stockwork zone wi-



Igor Gonzales, CEO



thin the Santa Rosa de Lima vein complex at Cusi. While development work continues at Cusi, throughput increases lead to a positive cash flow during Q2, 2018.

What are the main catalysts for your company within the next 6 months?

- ▶ Continued development with the goal of expediting the resource increases at Cusi, as well as the reserve and resource increases at the Yauricocha and Bolivar Mines into the mine plans.
- ▶ Completion of the Yauricocha tunnel
- ▶ Sinking of the Yauricocha shaft to the 1270 level
- ▶ Installation of another ball mill at Cusi which will increase capacity to 1,200 tonnes per day

What is your opinion about the current conditions of the battery metals market?

The battery metals market is on the precipus of change. Use of battery metals for use in electric vehicles, energy storage for green energy, and the use of batteries for a variety of other uses continues to grow. With that growth the demand for the battery metals will also grow and demand should facilitate increased battery metal prices.

ISIN: CA82639W1068
WKN: A1J9PT
FRA: DFXN
TSX: SMT

Outstanding shares: 163.4 million
 Options: -
 RSU: 1.4 million
 Fully diluted: 164.8 million

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 Toronto, Ontario, Canada M5K 1H1

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 www.sierrametals.com

Sierra Metals Inc.



Standard Lithium Already in pilot production status in the USA

Standard Lithium is a Canadian raw material developer specializing in lithium projects in the USA. New technologies are increasingly being used to extract lithium in a relatively environmentally friendly way, which shortens approval processes and gives the company an additional time advantage.

Bristol Lake Lithium Project – Location

Standard Lithium's current flagship project is called Bristol Lake and is located in the Mojave region of San Bernadino County, near the town of Amboy in southeastern California. Amboy is located on the old Route 66, near the current Interstate Highway 40. The distance to Las Vegas is 200, to the port of Los Angeles about 330 kilometers. In addition, an active railway line runs within 5 kilometres.

Bristol Lake Lithium Project – Production and Resources

Through several acquisitions, Standard Lithium secured a total of over 25,000 acres of license space within the Bristol Lake area by August 2017.

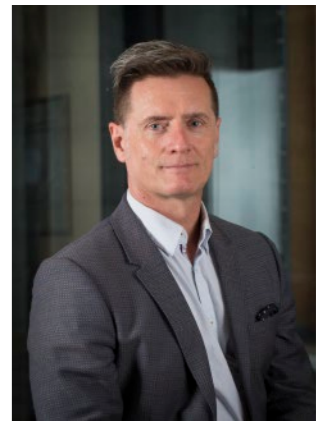
The majority of the licenses come from the National Chloride Company. This company and several others have been producing chloride from Bristol Lake Salt Lake, which covers approximately 155 square kilometers, for over 100 years. Bristol Lake is a classic salt lake with a significant lithium content, but has not been part of the production strategy to date. Historical Drilling of the USGS (The United States Geological Survey (USGS) is a scientific agency within the Department of the Interior of the United States. The USGS is the most important institute in the United States for official cartography.) found 110 mg/L lithium in corresponding brines.

Expansion of the Bristol Lake Lithium Project

In May 2018, Standard Lithium announced the signing of a license, exploration and option agreement with TETRA Technologies to acquire an additional 12,100 acres within Bristol Lake and an additional 11,840 acres of Cadiz Dry Lakes, located approximately 20 kilometers away in the Mojave Desert, California. The company now has the exclusive right to carry out exploration activities for lithium brines. Within the Cadiz Dry Lake, lithium contents between 112 and 139mg/L were detected during appropriate sampling.

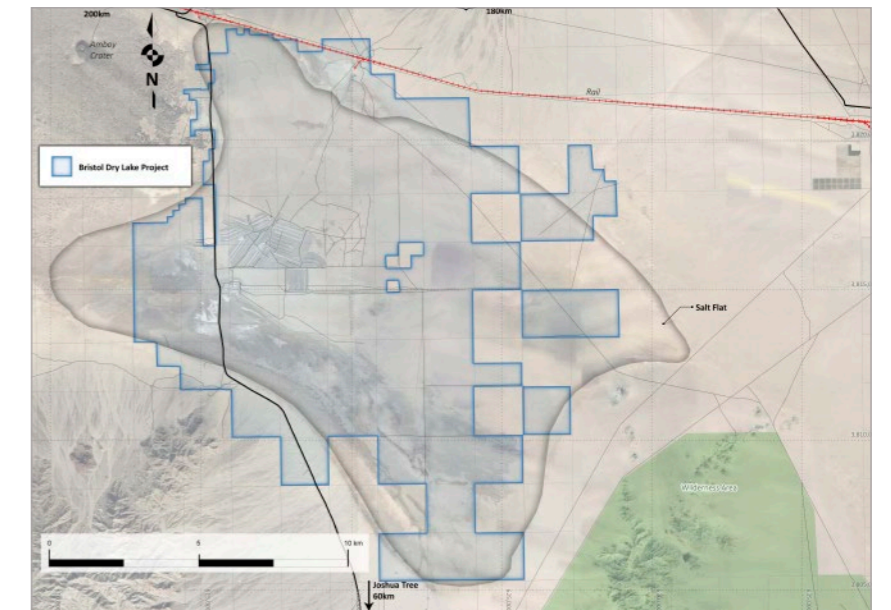
Bristol Lake Lithium Project – Exploration and Production Potential

The fact that chloride has been mined for over 100 years makes Bristol Lake one of the best developed salt lakes in North America in terms of infrastructure. At the same time, the project has a high exploration potential for the raw material lithium. After all, only chloride has been degraded by the previous conveyors to date, while the significant lithium



Robert Mintak, CEO

Standard Lithium's Licenses in Bristol Lake
 (Source: Standard Lithium)





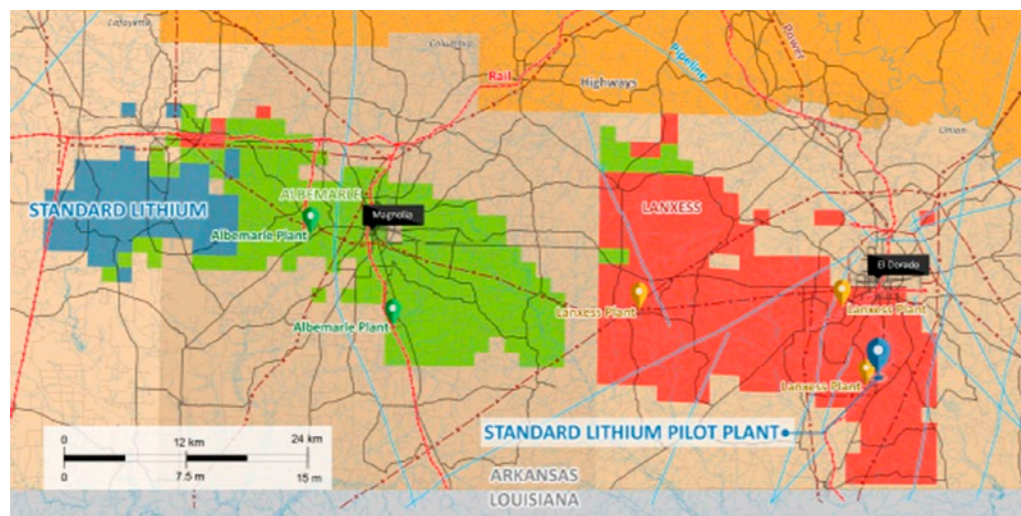
Pilot plant
(Source: Standard Lithium)

content has not been taken into account at all. This results not only in a high exploration potential but also in a high production potential for lithium and possible by-products. In October 2017, Standard Lithium launched a large-scale exploration and analysis program with the goal of establishing a resource definition. The depth and lateral course of the brines are to be determined first and foremost. Several samples have already been sent to various laboratories in the USA for testing purposes. In addition, the first evaporation tests were carried out. It turned out that the brine originally contained an average lithium content of 146mg/L. The brine was then used for the production of the first gas. After four weeks, the lithium content was concentrated to an average of 556mg/L only through passive evaporation by solar radiation, with a peak value of 717mg/L. The lithium content was only 556mg/L on average after

four weeks. Further tests showed that the lithium content of the brines can even be increased to an average of 686mg/L with an evaporation time of 7 weeks. Additional drilling confirmed the presence of appropriate brines throughout the tested area. In 2018, Standard Lithium carried out a large-scale geophysical gravity survey in the Cadiz Dry Lake area, which concluded that it was a backfilled basin with a maximum depth of 700 metres.

Arkansas Smackover Lithium Project – Acquisition, Location and Resource

In January 2018, Standard Lithium announced that it had entered into an option agreement with TETRA Technologies to acquire exploration rights in the Smackover Formation in Arkansas. These are 33,000 acres of brine licenses in one of the most productive brine production regions in southern Arkansas. The annual production of brine in Arkansas averaged 42.6 million cubic metres between 2010 and 2016. Albemarle's production license area is also located in the immediate vicinity of the new TETRA sites. Historical data on standard lithium area from 1992 report on lithium contents between 370



Standard lithium is in best company in the Smackover formation.
(Source: Standard Lithium)



Brine ditches and storage silos in Bristol Lake
(Source: Standard Lithium)

and 424mg/L. A well-developed infrastructure and a low-risk geology make the project a company maker. This can cost standard lithium quite a bit. Within 3 years, US\$ 2.55 million must be paid to TETRA. From the fourth year, US\$ 1 million per year will be added until the exploration license expires after 10 years or until Standard Lithium can establish its own production. In this case, 2.5% of royalty payments are due, but at least US\$1 million per year.

Arkansas Smackover Lithium Project – Development + Pilot Plant

With the help of a mini pilot plant, it has already been demonstrated that lithium can be extracted from so-called Smackover Brine. In March 2018, Standard Lithium also signed a readiness agreement with Zeton Inc. for the design, construction and operation of a large-scale pilot plant in South Arcana. In June 2018, the company commissioned Saltworks Technologies Inc. to design and build a novel, selective crystallization plant for the production of battery-compatible lithium carbonate in a continuous process. The starting material for the crystallization plant will be the high-purity lithium solution to be pro-

duced in the large-scale pilot plant for selective extraction. A Memorandum of Understanding was also signed with Lanxess Corporation to test and demonstrate the economic viability of the production of lithium from tail brine produced at Lanxess' three plants in South Arkansas as part of its bromine extraction business. Standard Lithium has paid LANXESS an initial reservation fee of US\$3 million to secure access to tail brine. LANXESS land operations in South Arkansas comprise more than 150,000 hectares, 10,000 brine leases and surface agreements, and 250 miles of pipeline. In June 2018, Standard Lithium finally started taking samples from existing wells and evaluating production data from the Arkansas Oil and Gas Commission. This led to first promising results from a total of 4 brine samples containing between 347 and 461 mg/L lithium.

Proven management team wants to rock the lithium sector!

Standard Lithium's most important asset is currently the two leading minds behind the company. CEO Robert Mintak was one of the co-founders of Pure Energy Minerals, the first com-



Brine Ponds Bristol Lake
(Source: Standard Lithium)

pany to announce a purchase agreement with Tesla Motors. Under Mintak's leadership Pure Energy became the „Top Mining Company 2016“ in Canada. Mintak is considered a lithium pioneer, which makes him one of the absolute top lithium experts worldwide. President and COO Dr. Andy Robinson was also COO of Pure Energy Minerals until recently. He was responsible for the first NI 43-101-supported lithium resource in North America. He introduced completely new methods for sampling, exploration and evaluation of lithium brine deposits. He also succeeded in developing completely new technologies and approaches for the production of lithium brine deposits.

Bateman Technology Leads to Extreme Efficiency Improvement

An important achievement brought by Mintak and Robinson of Pure Energy Minerals is the so-called Bateman technology. Alkaline elements (magnesium and calcium) are separated by means of membranes. In a second step, lithium is recovered in a high-purity lithium sulfate solution using solvent extraction. In a final third step, the lithium sulfate solution is converted by electrolysis into a concentrated, high-purity lithium hydroxide

solution. High-purity lithium hydroxide then crystallises out of this solution.

This new technology, tested by Pure Energy, has the potential to produce lithium with much lower environmental impact and greater economy than the conventional, relatively inefficient evaporation method. The large evaporation ponds that are so characteristic of the current brine producers consume enormous amounts of water, since after lithium application the groundwater is neither reused nor pumped back into the soil. In addition to the visible scars in the landscape, these ponds can have an impact on wildlife and air quality. The process of obtaining lithium by evaporation ponds can be quite slow and can sometimes take two years to obtain lithium. Ultimately, lithium production with this older method is relatively inefficient and is in the range of about 50%. In view of the predictions of a future supply shortage, slow and inefficient lithium processing could exert greater pressure on the supply chain.

The Tenova Bateman concept could achieve much higher lithium output rates and improved qualities up to battery grade material and the scale of production equipment required is much smaller than that of evaporation ponds. As is typical for a real-time industrial process, lithium output by solvent extraction should be much faster than with evaporation tech-

nology – hours instead of months. And: lithium hydroxide or lithium carbonate can be produced directly for the customer without the need for an additional refining step, as is the case with the old method. An enormous cost advantage compared to the evaporation method.

Summary: Full risk right from the start!

Standard Lithium's Bristol Lake project is characterized by an excellent infrastructure and a certain purity, which is related to the fact that the actually disturbing chloride has already been removed as far as possible. The second project in Arkansas is even more interesting. If you look at this smackover formation, you will quickly come to the conclusion that Standard Lithium is investigating a (former) oil project for lithium resources and wants to win the corresponding. From the very beginning, you take full risks, both financially and technically. Even though the Teno-

va Bateman concept is already quite well developed, there is always a small residual risk that is now to be reduced to zero by operating a pilot plant. All in all, Standard Lithium is an early-stage opportunity with a decisive advantage: the management is unique and far ahead of its time. With the help of Bateman technology, lithium brine deposits can be exploited at seemingly unrivalled prices. A fact that will cause some positive surprises for Standard Lithium in the coming months. By the way: Since February 2018 Standard Lithium has 21.6 million CA\$ more in its coffers, with which a pilot production can be easily financed and thus a lot of risk can be taken from the projects.

ISIN: CA8536061010
WKN: A2DJQP
FRA: S5L
TSXV: SLL

Outstanding shares: 73.5 million
Options/warrants: 8.7 million
Fully diluted: 82.2 million

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Standard Lithium Ltd.





Wealth Minerals

One of the largest land parcels of all lithium juniors in Chile's top-class Salars with the most important state-owned company on board

Wealth Minerals is a Canadian lithium development company based in Vancouver and Santiago de Chile. In Chile, the company has been able to secure one of the largest land packages of all lithium juniors operating in Chile since February 2016. And this mostly in salars, which were classified as the 15 highest grade of Chile.

Atacama Salar

The Wealth Minerals Atacama Project is located in the northern portion of the Atacama Salar, which is currently the world's highest grade and largest producing brine deposit. The Atacama Salar currently accounts for about one third of the total global lithium production, which is produced by two production plants operated by Sociedad Quimica y Minera (SQM) and Albemarle. The Atacama Salar has exceptionally high lithium (1,840mg/L) and potassium grades (22,630mg/L) and at the same time a high evaporation rate of 3,200mm per year with extremely low rainfall of about 15mm per year. The combination of these factors makes the production of Atacama's finished lithium carbonate simpler and cheaper than similar peer group projects. A key factor here is the evaporation time, which is very short within the Atacama Salar due to the extremely high evaporation rate. The Salar enjoys a special locational advantage due to its connection to Highway 23.

Wealth Minerals Atacama Project

Wealth Minerals signed an option agreement with Atacama Lithium SpA in November 2016 under which the Company has the right to acquire 100% of 144 royalty-free exploration concessions totaling 46,200 hectares in the northern area of Atacama Salar. To this end, Wealth Minerals had to pay a total of US\$ 14 million in several tranches and also transfer 15 million of its own shares to the seller. The property is directly adjacent to licenses from

BHP Billiton, SQM and CORFO, a state-owned Chilean company. On CORFO's territory, approximately 15 kilometers south of Wealth's concessions, are the two production facilities of SQM and Albemarle, which produce approximately 62,000 tons of lithium carbonate equivalent (including potassium) annually.

Although Wealth Minerals is still at the very beginning of its exploration activities with the Atacama project, the fact that two of the three least expensive lithium-producing mines are located right next door suggests an enormous potential. Geophysical surveys have already identified several drill targets within an area of 10 by 15 kilometres. In the southwest of this area, these drill targets are much more shallow (at a depth of 100 to 150 metres) than in the southeast where drilling is required to a depth of approximately 500 to 900 metres. One suspects there several water-bearing soils with significant lithium concentrations, possibly even relatively close to the surface. SQM and Albemarle currently extract their lithium from a depth of only 40 metres, with the salar itself reaching a depth of up to 975 metres. Wealth Minerals started an extensive geophysical study in September 2018 in the Salar de Atacama.

Laguna Verde Project

In December 2016, Wealth Minerals signed a letter of intent to acquire 100% of the royalty-free Laguna Verde project. This comprises 23 concessions with a total of 8,700 hectares and is located in northern Chile, close to Highway 60 and only 15 kilometres from the Argentine border. Wealth Minerals had to pay US\$ 4 million for the acquisition of Laguna Verde and also transfer 5 million of its own shares to the seller. Laguna Verde already has a historical NI43-101 compliant inferred resource of 512,960 tonnes of lithium carbonate equivalent and 4.223 million tonnes of chloride equivalent. Laguna Verde is a lake with water depths of only 0.5 to 6 metres. To date, a total of 78 samples have been taken

with average grades of 213mg/L lithium and 4,881mg/L chloride.

In April 2017, Wealth Minerals was able to demonstrate by means of isobaths (depth line) surveys that the lake has a maximum depth of 6 metres and an average depth of 3.5 metres. Radiometric and geophysical investigations have also shown that the lake basin is 400 to 1,000 metres deep. It also showed that a saline groundwater layer, which could be a potential brine, exists in 200 to 300 metres. Another brine layer could be present in the northeastern area at a depth of more than 400 metres. These discoveries have resulted in Wealth Minerals securing an additional 6,300 hectares of adjacent concessions. Laboratory tests have also shown that Laguna Verde is suitable for the use of the innovative Tenova Bateman technology, which greatly accelerates lithium extraction compared to the classic evaporation process.

In July 2018, the company started with an initial profitability assessment (PEA) to be prepared by several independent service companies. This PEA will initially be based on an annual production capacity of 6,000 metric tons of lithium carbonate.

Trinity Project

The Trinity Project consists of the three independent projects Aguas Calientes Norte, Pujasa and Quisquiro, all of which are located in the north of Chile within a radius of only 15

kilometres and have therefore been combined into one project. Trinity is located about 100 kilometers east of the Atacama Salar. In May 2018, Wealth Minerals began drilling the first 3 holes.

Salar de Aguas Calientes

In July 2016, Wealth Minerals signed an option agreement to acquire 100% of the royalty-free Puritama Concessions 1 to 8, totaling 2,000 hectares, located in the Salar de Aguas Calientes. Wealth Minerals had to pay a total of US\$ 2.65 million to complete the acquisition. Historical sampling in the 1990s indicated a lithium concentration of up to 169mg/L. Further investigations, which were completed in 2015, revealed lithium concentrations between 205 and 290 mg/L. The project area is easily accessible via Highway 27 and thus also has access to the port in Antofagasta.

Salar de Pujasa

Also, in July 2016, Wealth Minerals signed an option agreement to acquire 100% of the royalty-free Pujasa Concessions 1 to 7, totaling 1,600 hectares, located in the Salar de Pujasa of the same name. Wealth Minerals had to pay a total of US\$ 2.65 million to complete the acquisition. The state, Chilean authority Sernageomin (Servicio Nacional de Geología y Minería) classified the Salar de

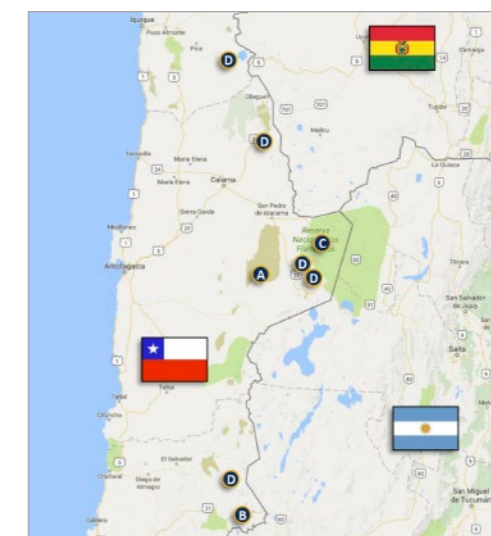
Pujasa as one of 15 high-grade salars in Chile. Independent studies concluded in 2015 that lithium concentrations between 220 and 620mg/L can be found there. The project can also be reached via Highway 27.

Salar de Quisquiro

In September 2016, Wealth Minerals signed an option agreement to acquire 100% of the royalty-free Quisco Concessions 1 to 9, totaling 2,400 hectares, located in the Salar de Quisquiro. Wealth Minerals had to pay a total of US\$ 2.6 million to complete the acquisition. The 15 best Salares of Chile are classified in the three levels Tier 1, 2 and 3, whereby Quisquiro is together with Atacama, Maricunga, Pedernales and La Islain in the highest category Tier 1. Salars in this top category have lithium concentrations between 423 and 1,080 mg/L. The project can also be reached via Highway 27. The northern part of the salar is also owned by SQM, suggesting that it might actually be a top lithium location. In January 2018, Wealth Minerals announced that it had secured further exploration concessions with a total area of 5,700 hectares per option to the southwest and northwest of the existing project area. For this purpose, the company must transfer 2 million of its own shares to the previous owner. The decisive factor for this additional acquisition was probably the electromagnetic studies that the company had previously carried out. Several anomalies have been identified that are interesting drill targets to be further investigated by drilling.

Five Salars Project

In April 2017, Wealth Minerals announced a letter of intent to acquire the Five Salars project. These are the five combined individual projects Ascotan, Piedra Parada, Huasco, Lejia and Siglia, which together cover 10,500 hectares and are all located in northern Chile. Wealth Minerals has staggered payments of



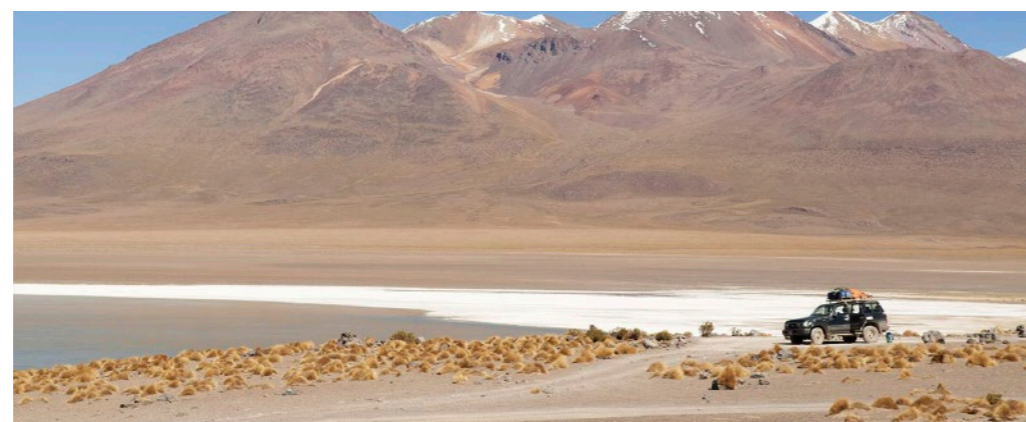
Wealth Minerals' main assets lie in Northern Chile:
A: Atacama
B: Laguna Verde
C: Trinity
D: Five Salars
(Source: Wealth Minerals)

US\$8 million and 8 million treasury shares for all five projects.

Of particular importance is the Piedra Parada project, which borders on the so-called „Seven Salars Project“ in the east.

Seven Salars Project

It was precisely this Seven Salars project that Wealth Minerals focused on in 2017. In August 2017, the Company announced that it had signed a binding letter agreement to acquire 49% of all outstanding shares of San Antonio Sociedad Contractual Minera. This in turn holds a 50% stake in the 7 Salares in northern Chile, which cover a total of 39,400 hectares. Talison Lithium, controlled by Albemarle and Tinanqui Lithium, holds the remaining 50% of Seven Salars. Even though Wealth Minerals only owns an indirect share of 24.5% of the Seven Salars, it is still a top deal! One of these salars, La Isla, is Chile's second largest lithium deposit. An average lithium grade of 863mg/L was found in 68 shallow holes. So, it could well be that La Isla will be put into production relatively quickly, especially with such strong companies as Albemarle in the background. In addition, synergies could arise for the development of Piedra Parada.



Laguna Verde Project
(Source: Wealth Minerals)

Strategic alliance with ENAMI

In March 2018, Wealth Minerals took an important step towards the development of its Chilean projects and a possible future lithium production. The Company entered into an agreement with the fully state-owned National Mining Company of Chile under which the parties have agreed to enter into a strategic alliance to develop and commercialize the Company's projects in Salar de Atacama and Laguna Verde. The agreement provides that the parties will have 24 months to study and evaluate the above properties and form a partnership to explore, develop and degrade these properties and to market the products from the projects. The agreement provides that the joint venture will take the form of a registered joint venture in which ENAMI will hold 10% of the joint venture while Wealth will own the remaining 90% of the joint venture.

The background to this is that lithium deposits in Chile, due to their strategic importance, can only be exploited with the participation of state enterprises.

Summary

Wealth Minerals is about to become one of the most important lithium players in South America – as long as you don't get adopted beforehand. The more than 110,000 hectares of licensed space in some of Chile's top salaries should arouse the desire of big players. The success story of Wealth Minerals is only just beginning. After all, the company has only been able to carry out sporadic exploration work to date. This will change in the coming months, so that an increased news flow can be expected. If you take a look at the individual projects, the majority of which are considered to be the best Chilean projects, you can rely on high-grade test results. Mastermind Henk van Alphen's absolutely clever move was the inclusion of ENAMI. Thus, there is now a real possibility to further develop the projects up to the production stage. Wealth Minerals has made the leap from being a pure acquirer to a development company and was able to generate CA\$ 14.3 million in fresh funds between the end of 2017 and March 2018, so that the current drilling campaigns are well financed. You can be curious about the first goal.

What are the main catalysts for your company within the next 6 months?

Operational results on our assets, chiefly Atacama and Laguna Verde. When "hard" data is out in the market place on our assets, we believe the market will move away from valuing Wealth on its optionality, to a more concrete asset-based peer-group valuation where our management sees significant upside from current valuation levels.

What is your opinion about the current conditions of the battery metals market?

Practically every day we see articles about the increase in lithium demand from consumers as the paradigm shift in how energy is used deepens. Despite this, there remains a disconnect between the views of investment bankers and the industry on supply dynamics. It seems self-evident to us that the recent slide in lithium developers' equity

valuations implies that less money, not more, is going to be available to increase lithium supply in the next 3 – 5 years. Our basic thesis, which shows no sign of faltering, is that despite there being plenty of lithium to fuel demand in the long term, in the short to medium term there is a serious lack of projects that can satisfy consumers' demand for the metal. Wealth remains exceptionally well placed to take advantage of this mismatch.



Henk van Alphen, CEO

Exclusive interview with Henk van Alphen, CEO of Wealth Minerals

What did you and your company achieve within the last 12 months?

Wealth has moved from being an asset acquirer to an asset developer. To do this we secured a partnership with Chile's State Mining Company (ENAMI) which puts Wealth at the top table for lithium asset development in a country that currently represents one third of global production and is poised to be the dominant player in the lithium space for decades to come. We have completed multiple

geophysical surveys on Atacama that are now leading to further field programs which we anticipate will define a resource and move this project closer to a feasibility study. We are advancing Laguna Verde through a PEA to process above-ground lithium brines. We have rationalized our asset portfolio to focus management time and capital in the best prospects and we have continued our intense outreach to portfolio, retail and strategic investors.

ISIN: CA9468852095
WKN: A12C3D
FRA: EJZN
TSXV: WML

Outstanding shares: 119.1 million
 Options: 10.0 million
 Warrants: 2.7 million
 Fully diluted: 131.8 million

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Wealth Minerals Ltd.



Overview of SRC's communication programs



Social Media Network

Access to over **60.000** followers and likers! •



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Commodity-TV & Rohstoff-TV – more than **2 Mio** views p.a. •

YouTube Channel – more than **1.1 Mio** views p.a. •

Partnership with Dukascopy-TV – worldwide **+20 Mio** views p.a. •



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