



Battery Metals Report 2023

Everything you need to know about the battery metals
lithium, nickel, cobalt, copper and tin!

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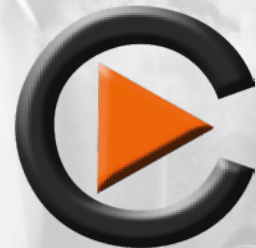
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Preface

Dear Readers,

It is with pleasure that we present to you the latest edition of our Battery Metal Report. Our special report series started in the fall of 2016 with lithium, as we see this metal, as well as cobalt, nickel and copper, as one of the major energy metals of the future and as a great opportunity with a lot of potential. E-mobility continues to grow, batteries and accumulators are finding their way into more and more areas of life (e-bikes, cargo bikes, crafts). The lithium price, which unlike gold and silver is not quoted on any futures exchange and therefore cannot be manipulated, shows a very nice picture with a still high price level around US\$40,000 per ton in China. The spot price is more prone to random market movements but has no meaningfulness really. Global lithium production must triple by 2030! Rio Tinto estimates that current supply and promised production expansions can only meet 15% of demand growth by 2050. 85% will have to be met from other sources, i.e. new mines. It also fits into the picture that one of our favorites is being taken over again at the moment, i.e. everyone has made money.

The longer-term supply situation for nickel continues to deteriorate. The market deficit is expected to grow further, and if the economy recovers in 2024 the nickel price should pick up noticeably. According to one study, we need 26 new nickel mines and at least 30-40 new lithium mines by 2035 to bring supply in line with demand. With construction and permitting times of 10 years and more, this will be very exciting. Because the electric car is established in the market and will continue to sell well. Anyone who wants a world that is as CO₂-free as possible will no longer be able to avoid electric and hydrogen-powered mobility.

Lithium, nickel and cobalt are the main components of all batteries and accumulators available in large series and thus the main link of the electric vehicle dream. The movements in Germany are interesting, where not only Tesla has opened a factory (Gigafactory), but several well-known battery manufacturers are now building new battery factories and Volkswagen itself is now building batteries in Germany.

All these factories will be enormous drivers of demand for lithium, cobalt and nickel, but also

for copper. Millions of tons of copper will be needed in the future not only for cars, but especially for the charging infrastructure. In copper in particular, no real major finds have been made in the last 10 years. That means the price future looks bright and we can easily imagine prices of \$15,000 or more per ton of copper in this decade. We will need more raw materials than ever before – the only question is where it will all come from. The fact is that prices will continue to rise, and you should participate in this with good companies. Because you will need profits and dividends, because inflation will increase much more. Whether we like it or not...

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My team and I hope you enjoy reading the Battery Metal Special Report 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 IP-TV-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 Rödel is Manager Newsletter, Threads & Special Reports at SRC AG. He has been active in the commodities sector for more than 16 years and accompanied several chief-editor positions, e.g. at Rohstoff-Spiegel, Rohstoff-Woche, Rohstoff-raketen, the publications Wahrer Wohlstand and First Mover. He owns an enormous commodity expertise and a wide-spread network within the whole resource sector.

Battery metals are in the fast lane! –

More and more automakers are securing direct stakes in the coveted raw materials

The amount of required metals has exploded recently and can only be covered with many new mines in the future

Despite all the prophecies of doom, the e-car is now firmly established. Although the complete transition from the combustion engine to the pure e-car will take some time, the e-car will clearly prevail over combustion engines. The fact that this is already in full swing can be seen from some impressive figures alone. For example, demand for nickel alone for battery production increased tenfold from 2017 to 2023! Lithium saw a nearly six-fold increase and cobalt a four-fold increase, despite the fact that cobalt is increasingly being displaced by nickel in the corresponding batteries. Leading industry experts – including Benchmark Minerals – expect the quantities required to double again by 2028.

This seems quite realistic, because instead of the 11 million e-cars produced last year in 2022, at least 23 million units per year are expected to leave global car factories by 2025. In addition to this, the capacities of the required batteries are increasing further and faster, from about 46 KWh in 2022 to about 54 KWh in 2025. Such a battery requires a large amount of corresponding materials, such as 24 kilograms of cobalt and nickel (with cobalt being increasingly substituted by nickel), 7 kilograms of lithium,

and a lot of steel, aluminum, manganese and graphite. Large quantities of copper and tin are also required for the connection between the battery and all electrical components within an e-vehicle.

For many of these materials, supply has been unable to keep up with demand for several years now, which is why the prices for lithium, cobalt, etc. have skyrocketed to unprecedented heights in the meantime.

The already existing, but in any case, expected shortage of many battery metals has already prompted e-car visionary and Tesla CEO Elon Musk, among others, to urgently ask leading mining companies to develop new nickel mines.

The International Energy Agency (IEA), even projected in one of its recent reports that the industry will need to bring 50 more lithium mines, 60 more nickel mines and 17 more cobalt mines online by 2030 to meet global net carbon emission targets.

Leading automakers have now recognized this and are increasingly securing direct stakes in mines in addition to purchase agreements. For example, the fourth-largest carmaker Stellantis, which owns the Peugeot, Citroen, Opel, Fiat, Alfa Romeo, Chrysler, Dodge and Jeep brands, recently acquired a stake in Argentina Lithium & Energy. BYD, China's largest automaker, with about 36% market share there, recently announced that it would buy any available and affordable resource as long as it was competitive. VW struck a deal to acquire lithium and nickel resources in Canada and, incidentally, is also building the country's largest battery factory there. The list could go on and on. The whole thing shows the explosiveness that is in the (future) supply of carmakers, but also other battery manufacturers worldwide with the corresponding metals.

For investors, therefore, there is an excellent entry opportunity into the world of battery metals right now, as we will explain in detail below.

Basic information about the lithium-ion battery

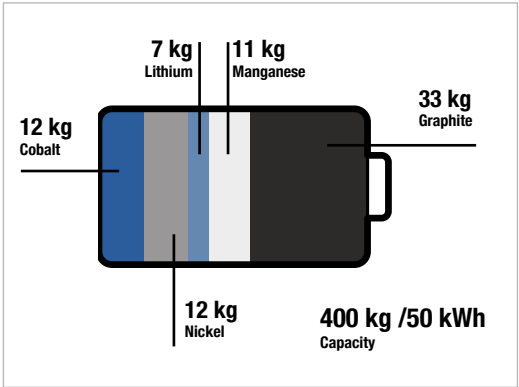
The lithium-ion battery is the heart of every electric vehicle

In addition to the engine, the heart of every electric vehicle is the energy storage unit, i.e. a rechargeable battery. In order to be operated economically in the long term, electric vehicles, but also increasingly emerging decentralized storage systems – such as for photovoltaic or wind power plants – require ever more powerful rechargeable batteries. The lithium-ion battery has emerged as the most efficient, mass-market type of energy storage currently available for vehicles. One of the reasons for this is that within a lithium-ion battery, the voltage is achieved by exchanging lithium ions. Because of their high energy density, lithium-ion batteries deliver constant power over the entire discharge period and do not exhibit any so-called memory effect, i.e. 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 range of possible chemical structures, such as the lithium-cobalt (dioxide) battery, the lithium-manganese (dioxide) battery, the lithium-iron phosphate battery (LFP) and – less commonly – the lithium-titanate battery and the tin-sulfur lith-

ium-ion battery. The most common is currently the lithium-nickel-manganese-cobalt (abbreviated NMC) battery.

Cobalt will be displaced by nickel

Although the basic principle of the lithium-ion battery has not changed much over the past few years, development is continuing steadily. The main focus is on efficiency and charging capacity (in the case of electric vehicles, this is often referred to as range), but also on the use of metals and elements. In this respect, a transformation is currently taking place away from high proportions of cobalt (NMC 111, where the numbers indicate the ratio of nickel, manganese and cobalt) to a higher proportion of nickel (NMC 811), although development is currently still at corresponding intermediate stages (NMC 622 / NMC 532). NMC 111 is considered the simplest battery version, based on an equal amount of atoms of the three elements, NMC 532/622 have a higher energy density and a lower price than NMC 111 due to a lower cobalt content, and NMC 811 is the newest and most advanced battery version with the highest theoretical lithium and cobalt performance.



Proportions of battery metals in a car battery (graphic: own representation)



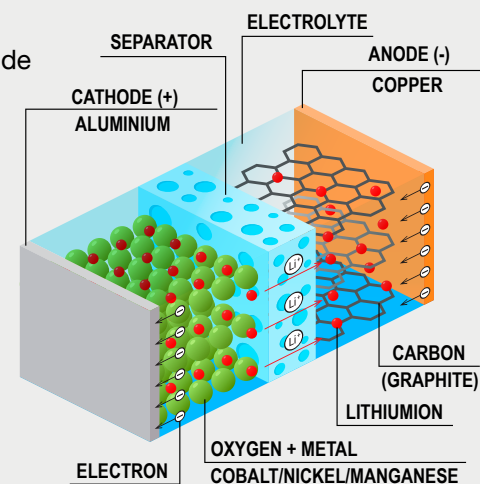
Source: shutterstock_744766768

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)**
- ▶ **Polymer membrane separator**



Functionality of a lithium-ion battery

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.

LFP batteries are on the rise, but have decisive disadvantages

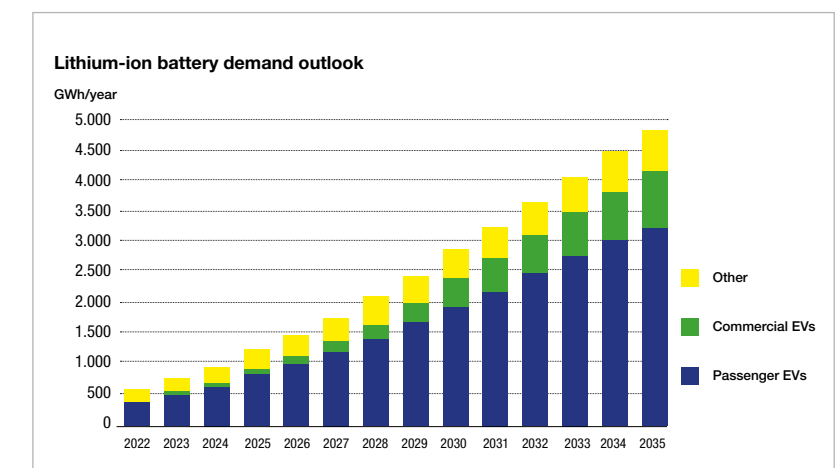
It currently appears that a serious competitor to lithium-ion batteries is gaining a foothold: The lithium iron phosphate battery, or LFP. This battery does not require nickel, cobalt or manganese, which makes it cheaper, and has an iron phosphate electrode instead of a cobalt oxide electrode. And indeed, Tesla and several Chinese automakers in particular have recently made headlines by increasingly relying on the somewhat more environmentally friendly battery type. In addition to its slightly better environmental compatibility, the LFP battery has another advantage: the electrode is fireproof. But that's the end of the story, because the disadvantages compared to the lithium-ion battery (still) out-

weigh the advantages. The LFP currently has only about half the energy density of a lithium-ion battery. This means that the LFP currently requires about twice the size of a lithium-ion battery for the same power capacity. Another disadvantage is its aversion to cold. It is virtually impossible to charge it below 0° Celsius, which means it has to be warmed up first – by whatever means. The LFP battery is more or less unusable for colder regions. It therefore remains to be seen whether the LFP battery will really be able to gain more market share in the coming years or whether it will simply „only“ find its niche. Without a massive improvement in power density, it will probably not be able to establish itself in the long term, because cheap alone is not enough, which Tesla has recently clearly felt.

The global battery sector: facts & figures

Many new gigafactories currently under construction

Gigafactories are generally considered to be large manufacturing facilities that produce lithium-ion batteries for electric vehicles. As it stands, about 270 of the world's approximately 400 gigafactories in the pipeline are in China, while Europe has about 60 and North America only about 25 gigafactories in the pipeline. Worldwide, about 160 gigafactories are already in operation, of which only about 15 are currently producing in the EU. Global production capacity of lithium-ion cells is expected to reach 1,250 GWh by the end of 2023 – a fourfold increase compared to 2018, with an additional expansion of production capacity to around 2,000 GWh in 2028 and 3,000 GWh in 2030. However, this would only cover the demand from the electric



(Graphic: own representation)

vehicle sector expected by then. Added to this is demand from the stationary storage sector and other industry (batteries for small appliances, etc.).

The Asians, and above all the Chinese, are clearly ahead of the pack.

Asians, and China in particular, provide a large share of the overall demand for lithium-ion batteries. China is expected to continue to see the strongest annual increase in battery metal demand of all major market players over the next 5 to 10 years, largely due to an expected multiplication in the number of units of rechargeable batteries. Other major suppliers of lithium-ion batteries, such as South Korea and Japan, will also guarantee a robust increase in battery metal demand. First and foremost, electronics giants Panasonic, Samsung, LG Chem, BYD, CATL, SK innovation and Great Wall should be mentioned here.

The EU is slowly getting into gear

The EU has recently been able to catch up strongly with China thanks to many government and private support programs and, not least, thanks to its strong industrial base.

Tesla's Gigafactory near Berlin and Northvolt's Gigafactory in Skellefteå in the north of Sweden are just two of a whole series of Gigafactories that are already in operation or are scheduled to come on stream in the coming years. By mid-2022, ten larger plants (capacity greater than 5 GWh) with a total capacity of around 100 GWh were online. By 2027, more than 30 corresponding manufacturing sites for batteries and/or cathode materials are planned with a total capacity of around 1,200 GWh. The established automakers in particular are driving European lithium-ion battery production.

North America steps on the gas

In North America, Tesla held the dominant position in lithium-ion battery production for years. The company has been operating the 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 are

built there. Gigafactory 5“ was opened in Austin/Texas in April 2022 and is by far the largest gigafactory in North America.

Tesla, however, is far from the only lithium and cobalt consumer planning major lithium-ion battery production. LG Chem already started production for Chevy in Michigan in October 2015 and is currently working with General Motors on a larger battery production. Foxconn, BYD (the world's largest producer of rechargeable batteries, especially for cell phones), Lishen, CATL and Boston Power are also working on the construction of their own gigafactories, including for so-called power banks, i.e. decentralized electricity storage systems, which are likely to become increasingly important in the future. VW is also currently building a facility in Canada.



Lithium-ion batteries are also needed in cell phones.
(Source: tyler-lastovich, unsplash.com)

The most important battery metals are lithium, nickel and cobalt – copper and tin provide the component linkage

In addition to the already mentioned raw materials lithium, cobalt, nickel and manganese, a lithium-ion battery essentially also consists of aluminum, graphite, zinc, tin 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, nickel and cobalt. We will also take a look at the increasingly important metals copper and tin.

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, naturally silvery white and relatively soft. Lithium is highly reactive, which is why it basically always occurs as a lithium compound in the wild. It tarnishes rapidly in air, 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 extraction is either lengthy or expensive

Global lithium production is divided into several different variants, producing 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 as well as for the production of aluminum-lithium alloys.

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

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

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: Mainly in salt lakes, lithium carbonate is extracted from lithium-containing salt solutions by evaporation of the water and addition of sodium carbonate. To extract metallic lithium, the lithium carbonate is first reacted with hydrochloric acid. This produces carbon dioxide, which escapes as a gas, and dissolved lithium chloride. This solution is concentrated in a vacuum evaporator until the chloride crystallizes out.
2. So-called „hard rock spodumene“, i.e. hard rock pegmatite deposits: Here, lithium compounds are not extracted from the salt of lakes, but from spodumene, a lithium-bearing aluminum silicate mineral. Mined by conventional mining technology, the concentrate obtained is often converted to lithium carbonate with a purity of more than 99.5%. The intensive thermal and hydrometallurgical process required for this is considered to be very costly. Such deposits are currently exploited almost exclusively in Australia, with further processing largely taking place in Chinese facilities.

Three quarters of the world's lithium deposits are located in just three countries, and four countries are mainly responsible for extraction

Lithium accounts for about 0.006% of the Earth's crust, making it slightly less abundant than zinc, copper and tungsten, and slightly more abundant than cobalt, tin and lead. Estimates from the U.S. Geological Survey (USGS) in 2022 suggest that about 26 million metric tons of lithium are recoverable as reserves and 98 million tons are recoverable as resources worldwide. Around 46% of the reserves are located in the South American countries of Chile and Argentina alone, and just under 24% in Australia. The largest lithium carbonate production currently takes place in the Salar de Atacama, a salt lake in the northern Chilean province of Antofagasta. In addition, significant lithium deposits are found mainly in North America and China, but also in Bolivia, Germany and the Democratic Republic of Congo.

Australia, Chile, China and Argentina recently accounted for around 96 percent of the world's total lithium production, which is shared among only a few companies. As a result of this supply oligopoly, lithium is currently not traded on the stock exchange, and the actual trading prices are kept strictly confidential. 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 exchange trading place.

Main applications have been alloys and lubricants and will be batteries in the future

Its above-mentioned special and versatile properties make lithium a sought-after material in very many different areas of application. It should therefore come as no surprise that the main area of application for lithium has changed constantly in the past. Initially used mainly in medicine, the element began its triumphant advance 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 in particular. In the past 20 years, this picture has changed once again. As the electric revolution got underway, it was quickly recognized that its low normal potential made it almost perfect for use as an anode in batteries. Lithium batteries are characterized by a very high energy density and can generate particularly high voltages. However, lithium batteries are not rechargeable. Lithium-ion batteries, on the other hand, have this property, with lithium metal oxides such as lithium cobalt oxide connected as the cathode. However, as a raw material for the production of accumulators and batteries, purity levels higher than 99.5% are required. Lithium hydroxide in the „Industrial“ grade is used, among other things, as a raw material for lubricants and coolants; with the higher „Technical“ grade, it is also used in accumulator and battery production. Lithium carbonate – crystalline, granulated or in powder form – is used, for example, in the electrolytic production of aluminum, in the ceramics and pharmaceutical industries, and in alloying technology. Special purity grades of lithium carbonate in the form of very fine powder (battery grade powder) are suitable as a raw material for the production of lithium-ion batteries. The extraction and processing of (especially high-grade) lithium is considered very costly.

The production of lithium-ion batteries requires a large amount of lithium

A large amount of lithium is required for the production and operation of lithium-ion batteries. Each smartphone contains between 5 and 7 grams of LCE (lithium carbonate equivalent; conversion factor LCE: pure lithium = 5.323:1). For a notebook or tablet, this is already 20 to 45 grams. Power tools such as cordless screwdrivers or electric saws require about 40 to 60 grams for their batteries. A 10 kWh storage unit for household use requires about 8 kilograms of LCE, while batteries for electric cars require an

average of 40 kilograms. An energy storage system with a capacity of 650 MWh needs about 1.5 tons of LCE.

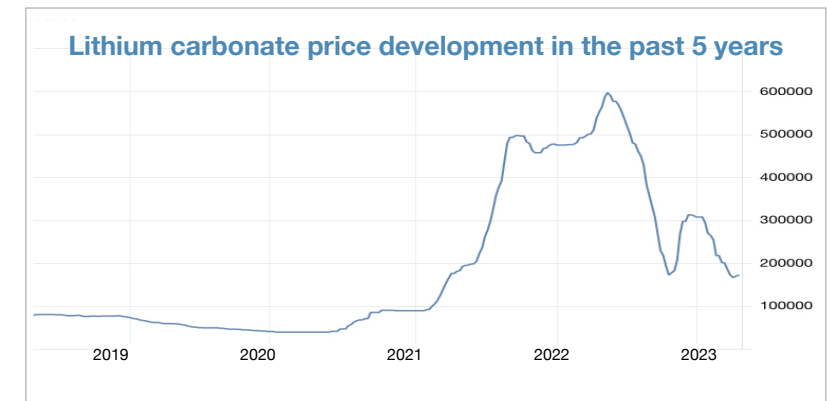
Lithium production already increased recently, but must multiply

In 2021, global lithium production was about 107,000 tons (equivalent to 570,000 tons of lithium carbonate (equivalent) (LCE)), rising to 130,000 tons (692,000 tons of LCE) in 2022. A substantial increase of about 21% but not nearly enough for the future. Projections suggest that with today's mining activity, this figure could still increase to around 750,000 tons LCE, with only limited efforts to date for concrete mine expansions or new mines, meaning that lithium is likely to run into a huge supply deficit for all practical purposes. In addition, recent reports about several postponed mine starts caused additional uncertainty on the supply side.

Interim price explosions for lithium made producers' coffers ring – lithium price almost irrelevant for battery production

Ultimately, the price alone determines the economic extractability of the existing lithium deposits. In mid-2015, the price was still around US\$6,000 per ton of lithium carbonate, but by November 2022 it had risen to almost 600,000 yuan. Currently, it stands at around 166,000 yuan (about US\$23,000). This is a lucrative business for the producers, as the pure extraction costs for the current projects are only around US\$2,500 (Chile) to US\$8,000 (China) per ton. This is similarly the case for lithium hydroxide.

Since lithium makes up a significant part of a battery in terms of volume but is only responsible for less than 10% of the costs of a battery, the lithium price is ultimately relatively insignificant for the production of lithium-ion batteries and should therefore be able to be maintained at an economic level for the lithium producers.

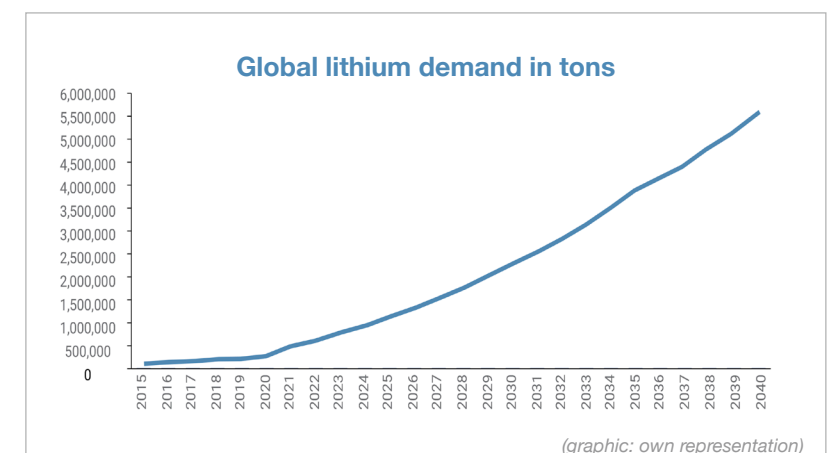


Lithium Carbonate Price in Yuan/Ton
(Graphic: own representation)

Demand for lithium is growing rapidly – high supply deficit already exists

The demand for lithium appears to be almost gigantic not only due to, but especially because of the new boom sector of electromobility! In 2022, lithium demand was around 134,000 tons (equivalent to 692,000 tons of LCE) and thus 4,000 tons (equivalent to around 21,000 tons of LCE) higher than mine production. By 2025, leading experts estimate that LCE demand will increase to about 1 million tons and to about 2.5 million tons per year by 2030.

The main driving factor will be demand from the battery sector and the associated automotive industry. Assuming that a maximum of 750,000 tons of LCE per year can be extracted from existing mines and that new mines cannot be commissioned in the short term, a supply deficit of around 250,000 tons is indicated for 2025 alone!



(graphic: own representation)

Nickel

The element nickel

Nickel is a metallic, silvery shiny transition metal. It is medium hard, malleable and easily polished. Like cobalt, nickel is ferromagnetic and also highly resistant to air, water, hydrochloric acid and alkalis at room temperature, which makes it ideal for use in lithium-ion batteries.



Extraction

Most of the nickel is extracted from nickel- and copper-bearing iron ores. A multi-layer process is used to produce copper-nickel fines, which consist of about 80% copper and nickel and about 20% sulfur. To obtain the crude nickel, the nickel must be separated from the copper. To obtain pure nickel, the crude nickel is electrolytically refined. The purity of electrolytic nickel is about 99.9%.

Occurrence and extraction

Nickel occurs in the earth's crust with a content of about 0.008%, i.e. with about twice the amount of cobalt and somewhat more frequently than lithium. Solid nickel, i.e., in elemental form, occurs only rarely. As of 2020, only about 50 occurrences of native nickel were known worldwide. The most important deposits are found in Canada, New Caledonia, Russia, Australia and Cuba.

The majority of nickel production comes from sulfide ores. In addition, lateritic nickel ores are also mined as raw materials for nickel production. Due to the exploitation of the classic sulfide deposits, mining is increasingly shifting to lateritic nickel ores, which, however, means more expensive extraction.

In 2022, around 3.3 million tons of nickel were mined worldwide. The largest producer was Indonesia with around 1.6 million tons. Other major producers are the Philippines (330,000 tons), Russia (220,000 tons) and New Caledonia (190,000 tons). These countries account for about 71% of total nickel production worldwide. According to USGS estimates, about 100 million tons of nickel in reserves and about 300 million tons of resources existed in 2022.

Main application: steels and nickel alloys

Most of the annual nickel production (around 85%) goes into the production of stainless steels and nickel alloys. Nickel is one of the most important alloying metals, used mainly for steel refining. It makes steel corrosion resistant and increases its hardness, toughness and ductility. Steels highly alloyed with nickel are used in particularly corrosive environments. Around 20% of the nickel mined is used to produce nickel alloys such as constantan, nickel silver and monel.

Other uses

Pure nickel metal is used in finely divided form as a catalyst in the hydrogenation of unsaturated fatty acids. Due to its chemical resistance, nickel is used for apparatus in chemical laboratories and the chemical industry, such as nickel crucibles for digestions. Nickel alloys, for example for coins, are produced from nickel metal. Nickel-based superalloys are alloys specially designed for use at high temperatures and under corrosive media. They are used, for example, in aircraft turbines and gas turbines in power plants.

High-purity nickel is needed for rechargeable batteries

So-called class 1 nickel with a purity of at least 99.98% is required for rechargeable batteries. Only about 45% of the total nickel production of about 3.3 million tons per year is suitable for the production of class 1 nickel. Of this, more than half is required for alloys and other applications. Less valuable Class 2 nickel is used exclusively in steel production.

Nickel with supply surplus in the short term – supply deficit likely to explode in the long term

The nickel market has been in a supply deficit since 2016. In 2021, the supply deficit amounted to 168,000 tons. In 2022, surprisingly, a supply surplus of around 112,000 tons was recorded, which was due to a strong expansion of Indonesian production by more than 500,000 tons. However, this production can no longer be expanded, with nickel demand rising sharply. According to industry experts, there will be a shortfall of 900,000 tons of nickel in 2030. In 2040 the supply shortfall is expected to increase to 2 million tons per year – and that includes new nickel projects. Estimates suggest that demand for nickel from the automotive sector alone will increase more than tenfold from 130,000 tons in 2020 to 1.5 million tons in 2030.

Indonesia opens its nickel market – but only for China

Indonesia, the world's largest nickel producer, has insisted since 2020 on exporting only refined nickel abroad. Continued weak investment activities by foreign players in Indonesia, however, prompted the country to open the nickel floodgates again somewhat in 2022, but only for China. Thus, 56,000 tons of nickel were exported in 2021, compared with 460,000 tons in 2022.



Nickel price development in the last 5 years
(graphic: own representation)

Nickel inventories at historically low level – Several different nickel prices

Since the middle of 2021, LME inventories have been heading in almost only one direction: down! Thus, since June 2021, LME inventories – after remaining at a level of around 250,000 tons for a good year and a half – have now fallen to less than 43,000 tons. In March 2022, one of the most spectacular short squeezes of all time took place. The nickel future, which had already risen by 66 percent the previous day, March 7, 2022, moved vertically early in the morning. In a few minutes, it went up by US\$30,000 until the price broke through the US\$100,000 per ton mark after a few minutes. Within less than 20 minutes, an entire commodity market was unhinged. The main player was the Chinese Tsingshan Group, which had built up a large short position of about 150,000 tons over months in order to hedge its own expected future production increase.

In general, there is currently no single nickel price, but the nickel prices on the LME, the Shanghai Futures Exchange and the Indonesian nickel prices show partly considerable deviations, which is partly due to different qualities and designs of the nickel products.

Cobalt

The element cobalt

Cobalt is a steel-gray, 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. In chemical behavior it is similar to iron and nickel, resistant to air by passivation; it is dissolved only 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, some of the iron sulfides present are converted into iron oxide by roasting and slagged with silicon dioxide as iron silicate. The result is the so-called crude stone, which contains nickel, copper and other iron as sulfide or arsenide in addition to cobalt. Further sulfur is removed by further roasting with sodium carbonate and sodium nitrate. In the process, sulfates and arsenates are formed from some of the sulfur and arsenic, which are leached out with water. The corresponding metal oxides remain, which are treated with sulfuric or hydrochloric acid. Only copper does not dissolve, while nickel, cobalt and iron go into solution. With chlorinated lime, cobalt can then be selectively precipitated as cobalt hydroxide and thus separated. This is converted to Co₃O₄ by heating and then reduced to cobalt with coke or aluminum powder.

The majority of global cobalt deposits lie beneath the seabed

Cobalt is a rare element with a frequency of 0.004 percent in the earth's crust. This puts it in thirtieth place in the list of elements ordered by frequency. Cobalt is found in many minerals, but usually occurs only in small amounts. The element is always associated with nickel, often also with copper, silver, iron or uranium.

The world's known cobalt resources are about 25 million tons, reserves 8.3 million tons, with the largest deposits located in the Democratic Republic of Congo, Indonesia, Canada, Cuba, Russia, Australia, Madagascar and the USA. Cobalt deposits of more than 120 million tons have been identified in polymetallic nodules and crusts on the floor of the Atlantic, Indian and Pacific Oceans.

The bulk of cobalt production comes from insecure states

The majority of the annual cobalt production of 190,000 tons in 2022 came from mines in the Democratic Republic of Congo. Accordingly, around 68% of the total production volume in 2022 came from the Central African country. Indonesia accounted for a further 5.3% at last count, Russia for 4.7%, the Philippines and Cuba for 2% each, and China for 1.2%. All countries that are not necessarily considered to inspire confidence. The remaining production was split between Canada (2.1%), Australia (3.1%) and several other countries with even lower production volumes.

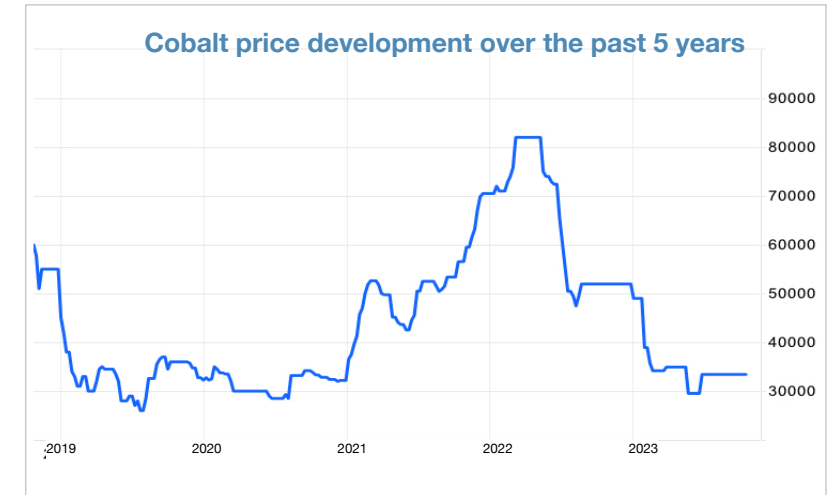
Future security of supply appears to be extremely critical on the basis of current producers, which is why more and more attempts have been made recently to develop new mines, especially in Canada, Australia, the USA and Finland, and to increase production accordingly.

Main applications are paints, alloys, medicine, magnets and rechargeable batteries

Historically, cobalt has been used in the form of oxides, sulfates, hydroxides or carbonates for heat-resistant paints and pigments. Probably the best-known decorative application is blue cobalt glass. Today, cobalt is used primarily as an alloying component to increase the high-temperature strength of alloyed and high-alloy steels, especially high-speed steel and superalloys, as a binder phase in hard metals and diamond tools, as a component of magnetic alloys, as a drier for paints and coatings, as a catalyst for desulfurization and hydrogenation, as a hydroxide or lithium cobalt dioxide (LiCoO₂) in batteries, in corrosion- or wear-resistant alloys, and as a trace element for medicine and agriculture. In addition, cobalt is used in the production of magnetic data media such as tape and video cassettes, where it improves magnetic properties through doping. Since the 1990s, cobalt has served as an anode material in the anode of lithium-ion batteries.

The e-car sector continues to require a lot of cobalt, which will not be changed much by the increasing substitution with nickel

As with lithium, the quantities of cobalt used in the corresponding batteries are similar. Depending on the model, between 5 and 10 grams of cobalt are used in a single smartphone. For a notebook or tablet, the figure is 30 to 100 grams. Power tools need about 50 grams for their batteries. A 10 kWh storage unit for home use (such as Tesla's Powerwall) requires about 7 kilograms of cobalt, while the batteries for hybrid vehicles need about 4 kilograms and for purely electric cars 10 kilograms of cobalt. Tesla's Model S even comes in at 22.5 kilograms. A passenger plane gobbles up about 4,000 kilograms of cobalt. The automotive sector will demand ever greater quantities of lithium-ion batteries in the coming years – even if the further de-



Cobalt price development (US\$/ton) over the last 5 years (Graphic: own representation)

velopment of batteries suggests that cobalt will increasingly be replaced by nickel – and thus also ever greater quantities of cobalt. Leading industry experts believe that it will be difficult to expand production above 200,000 tons per year with the current mines. The fact is that despite this, Congo will remain the absolute world market leader for the time being and will even expand its market share to over 75%. The two largest cobalt mines in the world, Kamoto and Kolwezi, which alone can produce about 50,000 tons of cobalt per year, have a large share in this. Outside Congo, several companies are working to expand their existing mines (including Glencore, Norilsk, Umicore, Sumitomo and Vale).

Cobalt price fluctuates strongly

Many market participants have already recognized that cobalt production cannot be expanded quite so easily from one moment to the next. For example, the price of a metric ton of cobalt exploded from US\$20,000 at the beginning of 2016 to US\$95,000 in March 2018. After an interim low of around US\$27,000 in July 2019, it fell back to around US\$80,000 in March 2022. Currently, the price of cobalt has leveled off at just under US\$34,000 per metric ton. A further increase can be expected as soon as the leading automakers drastically expand their model range.

Cobalt with balanced supply/demand in the short term – Supply deficit in the long term

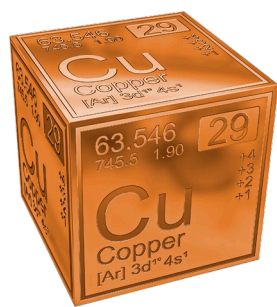
The demand for cobalt will almost certainly continue to rise sharply in the coming years! While this was still around 60,000 tons in 2008, in 2017 it was already 125,000 tons that were demanded per year. In 2021, demand for cobalt was around 173,500 tons, of which around 34% came from the automotive sector. In 2022, cobalt demand rose to about 190,000 tons, roughly balancing

supply and demand. Experts expect cobalt demand to rise to over 270,000 tons per year by 2025.

The main driving factor will be demand from the battery sector. Although supply and demand are currently more or less in balance and a small supply surplus is even forecast for 2023, a high supply deficit is likely in the long term, as the existing production capacities can no longer be significantly expanded.

Copper

Although copper is not a classic battery metal, nothing works without the red metal in the implementation of the electric revolution. After all, copper has the property of being the most conductive of all known metals after silver. And without reliable interconnection of the individual electrical components, a world of electromobility and electrical storage cannot function.



The element copper

Copper is a chemical element with the element symbol Cu and the atomic number 29. Like silver and gold, it is one of the transition metals that occur naturally as doped elements. The name copper comes from the Latin cuprum, which is derived from Cyprus, where the most important copper mines were located in ancient times. It is

the 26th most common element in the earth's crust (share of about 0.006%) and has been mined for about 7,000 years. Copper has a reddish luster and, as a relatively soft metal, is easily malleable and ductile. It has a very high thermal and electrical conductivity.

The deposits are concentrated in a few areas worldwide; extraction is simple

There are several thousand sites around the globe. Significant copper production, however, exists in only a few regions. By far the most recent leader in copper production was Chile, with an annual production of 5.2 million tons in 2022. This was followed by Peru and the Democratic Republic of Congo with 2.2 million tons each, China with 1.9 million tons, and the USA (1.3 million tons). Together, these five countries account for around 58% of world production of around 22 million tons per year. In terms of smelting, China (11 million tons) leads by a wide margin. In addition, there is recycled copper of about 830,000 tons per year.

Copper is extracted by smelting and refining. The corresponding processes have long been perfected, and processing is cor-

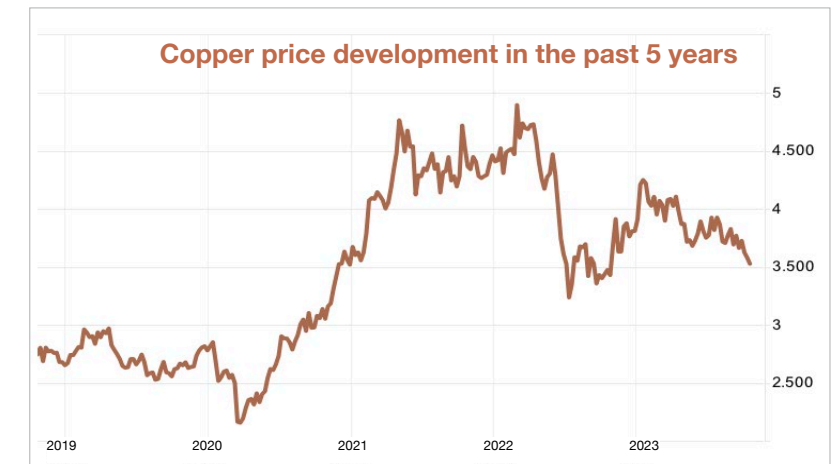
respondingly simple and relatively inexpensive. The USGS estimates that around 5.6 billion tons of copper are available worldwide as resources and 890 million tons of copper are mineable as reserves.

Main features: High thermal and electrical conductivity, soft, antibacterial, red.

By far the most important ability of copper is its high electrical conductivity. Its conductivity is only slightly worse than that of silver and significantly better than that of gold, but copper is far less expensive than the other two metals. Since all admixtures dissolved in copper, especially impurities such as phosphorus and iron, greatly reduce its conductivity, the highest degrees of purity are often sought for conductor materials. Its softness and red color also make it interesting for the jewelry and art industries, among others in the form of alloys (brass, bronze, nickel silver, red gold). In addition, it has an antibacterial and partially antiviral effect and can render bacteria, viruses and fungi harmless within a few hours.

Main fields of application: Electrical engineering, piping, art, construction

By far the largest area of application for copper is electronics and electrical engineering as well as piping, i.e. infrastructure. It is used, among other things, for electrical lines, switching wires, power cables, overhead lines, conductors on printed circuit boards, wire windings in transformers, chokes/coils and in electric motors. Furthermore, as cable connection between electrical components like accumulators, motors and applications. Other applications include water piping, roofing, glass coatings, tableware, as well as in the arts and crafts sector for the production of printing plates for copper engravings and etchings and in the jewelry sector for alloys.



Copper price development
(US\$/ton) over the last 5 years
(Graphic: own representation)

In the future, there will be less copper than is needed

The International Copper Study Group has already calculated a supply deficit of around 300,000 tons for 2020. Glencore CEO Gary Nagle recently predicted a supply deficit that could reach a cumulative 50 million tons between 2022 and 2030, which is why several U.S. senators are now calling for copper to be added to the list of critical metals. Due to the fact that in the future more and more copper will be used in electromobility (an electric car requires about 90 to 100 kilograms of copper, while a combustion vehicle often gets by with 20 kilograms), but also in the connection of regenerative power generators to the power grid (an onshore wind power plant requires about 5.4 tons of copper per megawatt, an offshore wind power plant even 15.3 tons of copper per megawatt), experts reckon that by 2035 there will be a gap of no less than 15 million tons per year, i.e. about 75% of current production. Furthermore, infrastructure and electric vehicle support programs of many governments are likely to lead to a further boom in demand for copper. Experts predict that copper demand from the automotive sector alone will increase to over 4 million tons per year by 2030. The International Copper Study Group, meanwhile, forecasts a copper supply deficit of 27,000 tons for 2023, which is expected to widen to up to 467,000 tons in 2024.

Major producing nations have massive production problems

In addition to an expected increase in demand from the current level of around 21 million tons of copper per year to 25 million tons in 2030 and 28 million tons by 2035, copper production with the current mines is expected to fall to less than 15 million tons at the same time. This is because at present it is mainly the expansion of existing mines that accounts for the bulk of new copper production, which is expected to come on stream by 2025. After that, new projects will be needed to close the growing gap expected by analysts. However, this will require significant investment. Goldman Sachs estimates that over US\$150 billion will have to be invested in mining projects worldwide by 2030 alone in order to be able to handle the expected increase in demand. Many copper projects benefit from the production of valuable by-products such as gold, silver, cobalt and molybdenum, without which copper mining would often not even be possible, i.e. profitable. Another aspect is the lack of exploration for large copper projects, which has been extremely sparse over the past ten years. In addition,

massive production problems have recently occurred in Chile and Peru, the two largest copper producing countries in the world. While several mines in Chile had to accept production and refining losses due to technical reasons, in Peru production losses were mainly politically motivated.

Many copper mines do not operate economically

The fact is that there is currently a shortage of high-quality development projects. As the quality of many new copper projects is far inferior to that of current mines, an increase in production, i.e. exploitation of poorer quality mines, can only be achieved by adjusting prices. At the current copper price level of around US\$3.70 per pound, a large proportion of the world's copper mines cannot be operated economically. According to Goldman Sachs, the current incentive price to build a new copper mine is around US\$5 per pound. If the expected wave of demand from the automotive industry, renewable energies and the power infrastructure comes soon, the copper price could make unprecedented price jumps.

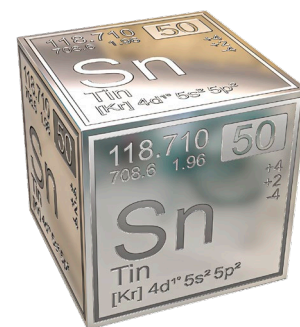
Tin

Although, like copper, not a classic battery metal, tin is irreplaceable for the connection of important electronic components. As an electrical solder in semiconductors or in the form of solder ribbons in photovoltaic panels, the critical metal is of vital importance.

The element tin

Tin is a chemical element with the element symbol Sn and the atomic number 50, and belongs to the heavy metals that occur in nature as doped elements. The name tin comes from the Latin stannum. It is the 30th most abundant element in the earth's crust (proportion of about 35ppm) and has been-

mined since about 5,000 BC. Tin is silvery-white shiny and very soft, so that it can be scratched with a fingernail. Its most important property is that it has a very low melting point for metals.



Largest deposits in Asia and South America, extraction and processing simple

Although tin is found in its raw form all over the world, the largest or most deposits are in Asia and South America. China, Indonesia and Myanmar stand out in terms of both reserves and production capacity. All three countries together hold about 48% of the global known reserves of 4.6 million tons and produce about 64.5% of the total annual mine supply of 310,000 tons. Because the most economically important tin mineral, cassiterite SnO₂, also known as tinstone, is a very stable heavy mineral, much of the tin production also comes from secondary placer deposits. Within primary tin deposits, the element often occurs associated with arsenic, tungsten, bismuth, silver, zinc, copper and lithium. The extraction of tin is quite simple. First, the ore is crushed and then enriched by various processes (slurry, electrical/magnetic separation). After reduction with carbon, the tin is heated just above its melting temperature so that it can flow off without higher melting impurities. Today, much of it is recovered by recycling and by electrolysis.

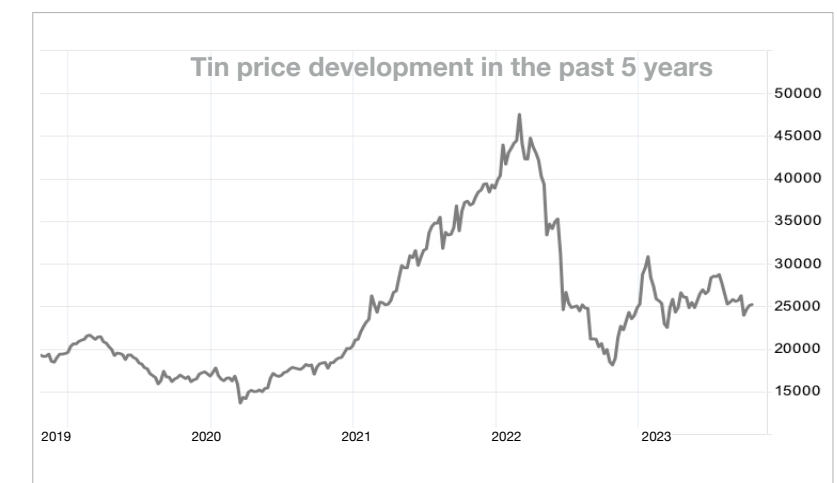
Main properties: Very soft, low melting point.

By far the most important properties of tin are its softness and the very low melting point of just 231.93° Celsius. This makes for easy, low-energy processing and forming, which is why tin is used wherever soldered joints are required.

Main fields of application: Semiconductor, electronics, chemistry, medicine, art

The main use of tin in the past was in the manufacture of tableware, utensils and ornaments, organ building and, of course, bronze. In organ building, tin is an indispensable component in the manufacture of metal pipes. Modern use is in the field of

electric soldering as well as in the tinning of food-safe canned goods or even in medicine. Historically, man first used tin as an admixture to copper as an alloying agent for the production of bronze. Nowadays tin is mainly used in semiconductors. Over 50% of the world's tin production is used as electronic solder to connect circuit boards. Furthermore, tin plays an increasingly important role in the field of photovoltaics, as solder ribbons are used to connect solar cells. Tin is additionally used as a chemical in the manufacture of flat glass panels, stabilizes PVC and plastics, coats steel cans, and is present in both lead-acid and lithium-ion batteries. Tin is essentially a turbocharger for lithium. The current best technologies for lithium-ion batteries use tin anodes, which provide much faster recharging than any other technology.

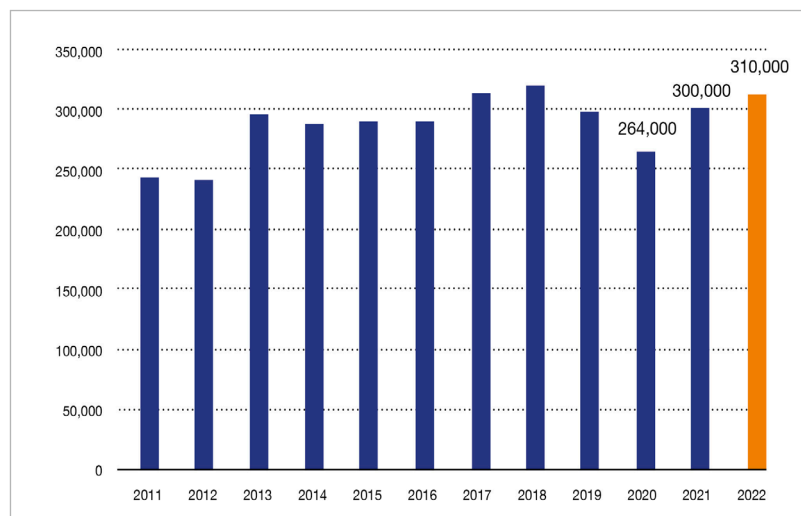


Tin price development over the past 5 years (Chart: own presentation)

Rapid rise in tin demand - supply can no longer keep pace

Worldwide, about 310,000 tons of tin were mined and refined in 2022 and slightly more than 70,000 tons of tin were recycled. As a result, there was a demand for about 376,900 tons of tin in 2022, which is why there was a slight oversupply of about 3,000 tons in 2022. However, leading industry experts expect tin demand to increase to up to 430,000 tons per year in the years up to 2030.

Demand for semiconductors has already been growing rapidly recently, and the global semiconductor market is forecast to double in the next five years (from around US\$400 billion in 2021 to around US\$800 billion in 2028). Strong growth will be driven by demand for emerging technologies such as electric and autonomous vehicles (sales in this segment alone are growing at a five-



year CAGR of 21%), artificial intelligence, 5G, Internet of Things, and consumer electronics. Similarly, the market for photovoltaics will double by 2030 as the use of renewable solar energy increases. The world desperately needs new tin deposits, but there are few projects in operation and even fewer sustainable projects. As demand for tin is fueled by the increasing use of electronics, the rise of the Internet of Things, and the green energy revolution, the tin deficit has caused the tin supply chain to be more depleted than at any time in history and to reach critical levels. Increasing demand combined with shortages are expected to result in tin experiencing sustained deficit markets for the foreseeable future.

Worldwide tin production in tons per year
(Graphic: own representation)

Conclusion: Almost all battery metals are already in a supply deficit – But the (mobile) electrification of the world is only just beginning

Demand for lithium, cobalt and nickel as well as copper and tin will be determined by three sectors in the future:

1. By the (Asian) electronics companies, which are mainly targeting the mass production of powerful lithium-ion batteries and accumulators for everyday use, in multimedia devices, etc.
2. From all established car manufacturers worldwide.
3. From the manufacturers of decentralized energy storage systems, which are

used wherever electricity is generated by means of photovoltaic or wind power plants and is to be used later by means of storage.

This constellation will cause demand for lithium, cobalt and nickel to increase many times over in the coming years in some cases, and for copper and tin it will also increase sharply, with decentralized storage in particular generating the greatest growth in demand and likely to dwarf even the other two areas.

Large quantities of battery metals come from uncertain sources, much depends on China's goodwill in the refining process

In the EU, lithium and cobalt belong to the so-called „red group“, i.e. materials with a very high supply risk. In the USA, lithium is also considered a „critical mineral“. Currently and in the future, however, many of these metals (in the case of copper and cobalt, over 50% of the most advanced projects) will come from countries with dubious mining methods or high political risk, such as the Democratic Republic of the Congo, Russia or Indonesia. Moreover, in addition to the actual procurement risk, issues such as lack of environmental compatibility or lack of social acceptance also play a role here, which is why many Western companies will restrict themselves to Western projects with corresponding standards. Another crucial point is that China currently controls a large part of the lithium, but also of the tin refining. A circumstance that will and must lead to either more projects outside China's sphere of influence or to higher prices in the future.

Supply deficits for all battery metals will lead to revaluations especially for producers and far advanced development projects companies

Overall, there is a supply deficit in the lithium, cobalt, nickel, copper and tin markets, or these markets are on the verge of one, as the increase in demand exceeds the expansion in supply or will do so in the coming years. The gap between supply and demand will initially widen further. This is strongly indicated by recent reports of projects stalling, production being curtailed and expansion plans being delayed. As demand growth will continue to increase strongly beyond 2025 and, in addition, there are still no significant large production projects in the pipeline, this situation is likely to continue for the foreseeable future. Especially producers and development companies, which have already advanced their respective projects, should offer the greatest share price opportunities in the coming months and years, also with regard to a possible consolidation, i.e. through takeover scenarios. Some of these dedicated development companies, as well as prospective producers, are presented below.



Expert-Interview with Alina Islam – Equity Research Analyst at Red Cloud Securities Inc.



Alina Islam is an Equity Research Analyst at Red Cloud Securities Inc., a mining-only investment bank. During her time at Red Cloud, she has written on over 100 companies across various stages of development and a wide range of commodities, but over the last six months has been focused on the lithium sector. Prior to Red Cloud, she worked for Kinross Gold Corp., a senior gold producer for over five years, as well as TD Bank. She holds a Bachelor of Commerce degree from the University of Toronto, and an MBA from INSEAD Business School in France.

Alina, the prices for battery metals have been very volatile over the last year. Lithium in particular has seen massive price fluctuations. What do you think was the reason for this?

Prices of lithium chemicals (hydroxide and carbonate) and feedstock material (spodumene) saw new highs at the end of 2022/early 2023 (Figure 1). In our opinion, this increase in pricing was driven by several factors including:

- 1) a projected shortfall in lithium chemical supply in 2022
- 2) the anticipated growth in long-term demand from both, the battery storage and electric vehicle (EV) industries, and
- 3) policies implemented by various governments across the globe to secure energy transition materials in the aftermath of the Russia-Ukraine war.

Spodumene price (Li₂O 6%) hit US\$6,400/t in December 2022, while carbonate (Li₂CO₃ Min 99.0%) and hydroxide (LiOH Min 55.0%) prices hit its highs in January 2023, touching US\$70,957/t and US\$76,389/t, respectively, as reported by Benchmark Mineral Intelligence. We always maintained that prices at these levels were unsustainable and had anticipated a decline in pricing in 2023.

We have since seen a drop in both chemical and feedstock prices, and as of October 4th, hydroxide was down by almost 67%, carbonate by 62% and spodumene by approximately 51% from its highest point. Lithium prices have certainly seen a fall from grace, however we believe that a lot of the current pricing sentiment is being driven by a short-term outlook on China. With China dominating the midstream and downstream sectors of the EV battery supply chain (Figure 2), the state and outlook of the Chinese economy has a significant

impact on the price of both lithium feedstock and chemicals (as it does on the price of multiple other base and specialty metals). Uncertainty regarding the Chinese economy (specifically regarding property sales and consumer spending) in Q4/23, as demonstrated by the recent deceleration in PEV sales growth (Figure 3), has dampened pricing sentiment. This has been compounded by a build up in inventory levels at many cathode manufacturers enabling them to delay spot purchases of lith-

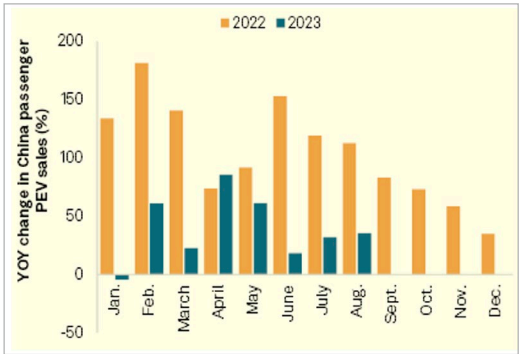


Figure 3: Annual change in sales of electric vehicles in China (source: S&P Global Market Intelligence).

ium chemicals. Economic stimulus measures announced by the government in Aug/23 have also not impacted the sector as expected. As a result, alarm bells have been sounding regarding lower-than-expected Q4/23 EV sales, which has historically been the highest quarter for sales, and this has lithium prices on a downward trend. We believe these are short term shocks to the system and remind our readers to take a longer-term view on the space; our long-term outlook on lithium continues to remain positive.

In addition to special effects such as the Russia-Ukraine crisis, the expected demand forecasts will certainly play an important role. What do you expect in this respect in the coming months and years?

Demand for lithium in our opinion will continue to stay strong and driven by the green energy transition and decarbonization goals set to be achieved by 2030. S&P Global Market Intelligence is forecasting a surplus in the market till 2026, with a deficit anticipated to begin in 2027 (Figure 4). While S&P is forecasting a lithium carbonate price of US\$47,317/t for the end of the year, spot prices are currently well below this level, and in our opinion are unlikely to bounce back up to over \$40,000/t for the remainder of the year. For 2027, a forecast price of US\$34,240/t is anticipated. We note that at Red Cloud Securities, we currently forecast a long-term spodumene concentrate price of US\$2,500/t, carbonate price of US\$26,000/t and hydroxide price of US\$28,000/t. We maintain conservative prices given the volatility surrounding lithium and to demonstrate that even with lower than consensus pricing, projects coming down the pipeline are showing positive economics.

While most forecasts are anticipating a deficit by the end of the decade, we could also see a change in demand forecasts as revisions are made to net zero policies set by various governments. Recently, the ban on sale of petrol and diesel cars in the United Kingdom was pushed back from 2030 to 2035. The move comes amid growing concern about the potential financial cost of the government's net zero pledge. In our opinion, it is not out of the realm of possibility to see other nations also following suit and pushing out their goals, albeit to fierce public opposition. On the supply side, delays to any of the large-scale projects forecast to come online i.e. Thacker Pass in Nevada or the Greenbushes expansion in Australia, could positively impact the price of lithium.

Is a move away from lithium-based batteries to other storage technologies expected in the foreseeable future, and if so, what impact would this have?

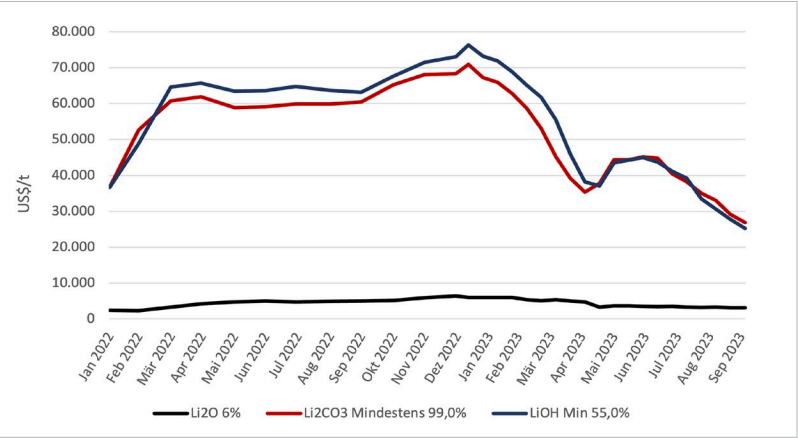


Figure 1: Lithium chemical and commodity prices since 2022 (Source: Benchmark Mineral Intelligence)

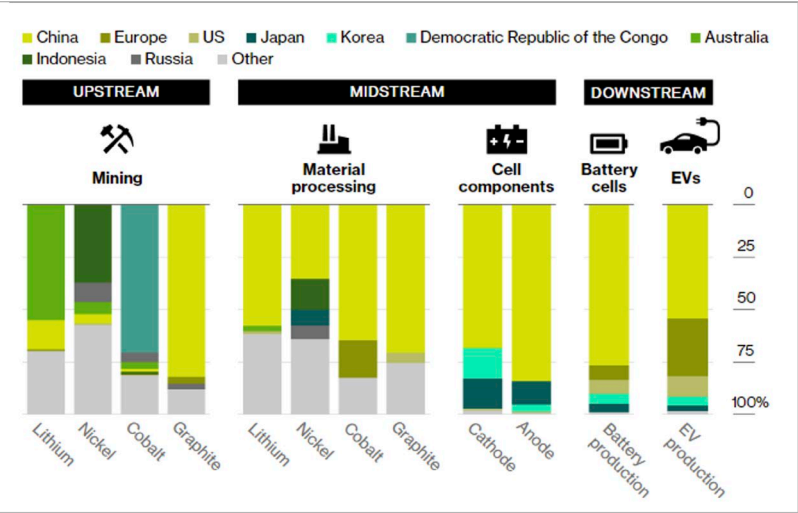


Figure 2: Percentage share of the global EV supply chain (Source: International Energy Agency)

Many companies are working to build cheaper alternatives to lithium-ion batteries. One such alternative includes the use of sodium instead of lithium in cells, given that sodium is chemically similar and can generate similar reactions in a cell. In Figure 5, we can see the energy density of sodium-ion batteries was comparable to its lithium counterparts almost a decade ago.

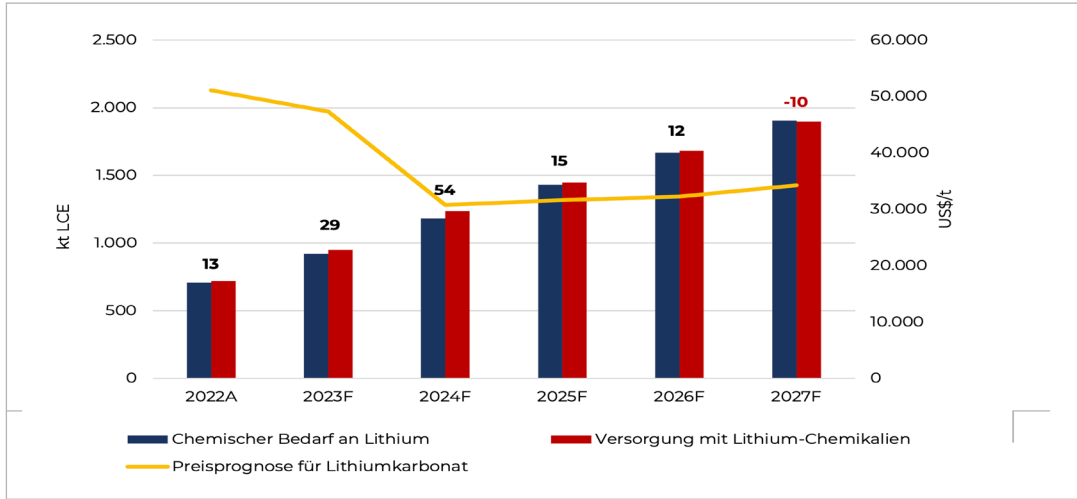


Figure 4: Lithium supply, demand and price forecast(Source: S&P Global Market Intelligence).

However, having lower energy density also means that sodium ion batteries will have to be bigger than its lithium-based counterparts, posing a slight disadvantage. We would expect advancements in the technology to continue, and down the line could potentially see sodium ion batteries competing with lower-cost, lithium-ion batteries, however we do not see it as a perfect substitute.

Many investors still see battery metals as a hot potato. What advice do you have for investors who want to get involved in this sector? What should they pay attention to?

In our opinion, it really depends on which stage of development a company is at and where its assets are located geographically. For early-stage lithium companies, we encourage investors to look at the pedigree of the management teams. Technical expertise is vital, as is prior experience, as explorers seek to make a big discovery. Other factors to consider are jurisdiction, and while this applies to explorers it is probably more relevant to development stage and producing companies, especially given the geopolitical issues surrounding battery materials. Last year, Mexico nationalized its lithium reserves and Bolivia, which forms part of the Lithium Triangle, has called for the creation of a so-called

“lithium OPEC”. With the Lithium Triangle holding ~53% of global lithium reserves, investors should pay close attention to how these conversations regarding nationalization play out. Another important factor to consider within jurisdiction is access to key infrastructure, as these are vital for development of a project and eventual operations. This includes availability of transport facilities such as access to roads, rail, airports, as well as other factors such as the presence of power, water and skilled labour nearby. Accessibility could result in lower operating/transportation costs once the project is up and running.

Which battery metals companies are Red Cloud Securities’ current favorites?

We look at companies across the full spectrum of lithium deposits. When it comes to hard rock or pegmatite assets, our top picks include companies in the pre-resource stage where we see plenty of exploration upside and re-rating potential: **Brunswick Exploration** (TSXV:BRW, BUY (S), Alina Islam) and **Azure Minerals** (ASX:AZS, Not Rated, Alina Islam). Brunswick holds a portfolio of pegmatite projects across Canada, however recent discoveries at its projects in Quebec have made its assets highly prospective, while **Azure Minerals** discovered lithium at its nickel project in Western Australia in 2022, and

drill results to date (including 1.42 Li₂O over ~210m) are showing the makings of a world-class lithium deposit. We also note that **Sigma Lithium** (TSXV:SGML, BUY, C\$75.00 target, David A. Talbot) is emerging as an industry leader as it continues to ramp up its high grade, Grota do Cirilo mine in Brazil. Moving on to brine projects, we favour companies that are considering employing DLE technology and these include **Lake Resources** (ASX:LKE, BUY, A\$2.50 target, David A. Talbot), **E3 Lithium** (TSXV:ETL, BUY, C\$13.00 target, Alina Islam and David A. Talbot) and **Grounded Lithium** (TSXV:GRD, BUY, C\$1.75 target, Alina Islam and David A. Talbot). Lastly on the clays, we like the **Noram Lithium** (TSXV:NRM, BUY, C\$5.50 target, Alina Islam and David A. Talbot) story as optimization of the Zeus mine plan is currently underway to enhance project economics.

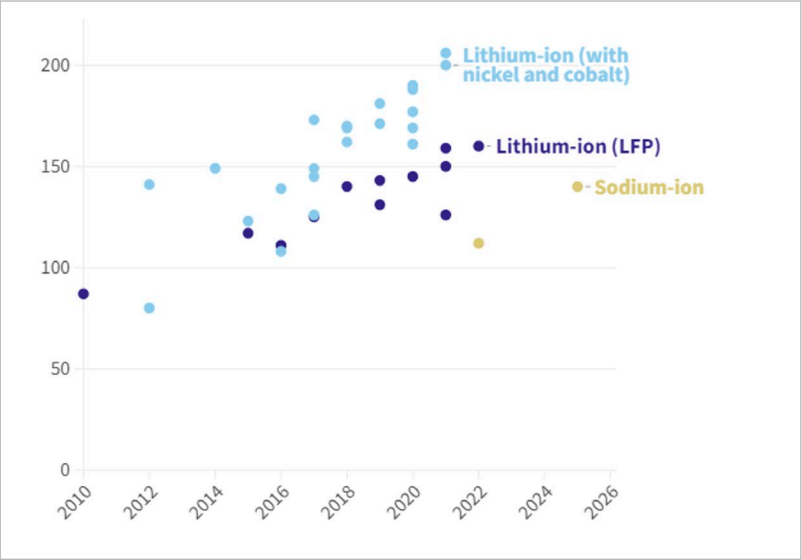
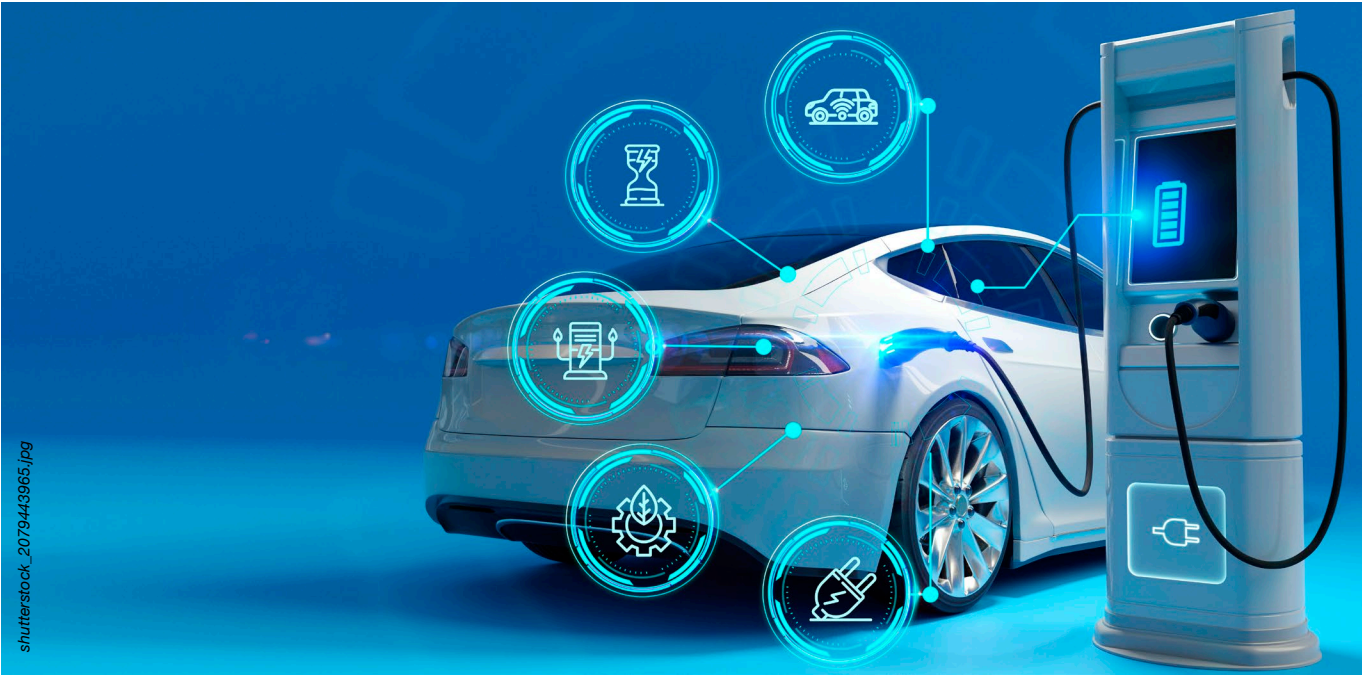


Figure 5: Gravimetric energy density of the battery pack (Wh/kg) (Source: MIT Technology Review, Bloomberg NEF).

Company	Ticker	RCSI Recommendation		Analyst	Stock Holding			Banking Client
		Rating	Target		Analyst	Household	RCS	
Brunswick Exploration Inc.	TSXV:BRW	BUY (S)	NA	Alina Islam	N	N	Y	Y
Azure Minerals Ltd.	ASX:AZS	NA	NA	Alina Islam	N	N	N	N
Sigma Lithium Corp.	TSXV:SGML	BUY	C\$75.00	David A. Talbot	N	N	N	N
Lake Resources NL	ASX:LKE	BUY	A\$2.50	David A. Talbot	N	N	N	N
E3 Lithium Ltd.	TSXV:ETL	BUY	C\$13.00	Alina Islam and David A. Talbot	N	N	N	Y
Grounded Lithium Corp.	TSXV:GRD	BUY	C\$1.75	Alina Islam and David A. Talbot	N	N	Y	Y
Noram Lithium Corp.	TSXV:NRM	BUY	C\$5.50	Alina Islam and David A. Talbot	N	N	N	N

Please refer to www.redcloudsecurities.com for full disclosures



American Lithium

World-class lithium projects plus uranium



American Lithium is a Canadian mining development company focused on the discovery and development of high-profile lithium and uranium projects in Nevada and Peru. This gives the company the advantage of geographic and geological diversity in developing scalable world-class projects. In south-central Nevada, the company owns the TLC mudstone lithium deposit, which is in close proximity to the Tesla gigafactory in Nevada. In southeastern Peru, American Lithium is developing the advanced Falchani hard rock lithium deposit and the Macusani uranium deposit. American Lithium is ideally positioned and currently owns the largest combined lithium resource base and the fifth largest undeveloped uranium deposit on the planet. Currently, American Lithium is working on a Pre-Feasibility Study (PFS) that is expected to be released shortly.

TLC Lithium Project – Location and Resources

The TLC project is a near-surface lithium deposit suitable for low-cost, sustainable mining methods. Studies show that no protected plant or wildlife species will be affected by operations. The project itself is also located near the regional center and county seat of Tonopah, Nevada. Logistics (paved roads, power, etc.) are excellent for development, and water resources are not constrained as they are at Clayton Valley. In December 2022, the Company announced an updated mineral resource estimate that significantly increased the contained lithium resources for the TLC project. According to the estimate, TLC currently hosts 4.2 million tonnes of lithium carbonate equivalent (LCE) measured resources, 4.63 million tonnes of LCE indicated resources and 1.86 million tonnes of LCE inferred resources. The estimate was completed as part of the process to prepare the first Preliminary Economic Assessment and included in the mine plan for the first PEA released on February 1, 2023.

Lithium Project TLC – PEA + Battery Grade Lithium Concentration

This independent PEA demonstrated that the TLC project has the potential to become a significant, long-life producer of low-cost lithium carbonate, with the potential to produce either battery-grade LCE or lithium hydroxide. The PEA base case calls for an initial processing throughput of 4.4 million tons per year, to be expanded to 8.8 million tons per year. Based on a recoverable LCE price of a conservative US\$20,000 per tonne, a pre-tax NPV8% of US\$3.64 billion, and an after-tax NPV of US\$3.26 billion were calculated. The internal rate of return (IRR) was 28.8% before tax and 27.5% after tax. According to the mine and processing plan, produce 1.46 million tonnes of LCE over 40 years of mine life. The payback period of the initial capital before tax is 3.6 years and 3.8 years after tax. Initial capital costs were estimated at US\$819 million, and operating costs over the mine life at US\$7,443 per tonne of LCE.

The alternative PEA case is identical, but with an additional production of about 1.68 million tons of high-purity magnesium sulfate per year as a by-product over the 40-year operating life (a total of about 64.9 million tons of MgSO_4). This calculated a pre-tax NPV of US\$6.06 billion, and an after-tax NPV of US\$5.16 billion. The internal rate of return was 38.6% before tax and 36.0% after tax. The payback period of the initial capital before tax was 3.5 years, and 3.7 years after tax. Initial capital costs were estimated at US\$827 million and operating costs over the mine life were estimated at US\$817 per tonne of LCE including MgSO_4 .

Recently, the company announced that it had succeeded in increasing the lithium carbonate concentration for lithium from TLC to 99.59%. Thus, the company has successfully demonstrated that battery-grade lithium carbonate (above 99.5%) can be produced from material from TLC.

Falchani Lithium Project – Location, Resource and Recent Drilling Successes

The advanced-stage Falchani project is the sixth largest lithium deposit in the world. It benefits from a highly sustainable business model in the geopolitically friendly country of Peru. Falchani has 60.9 million tonnes averaging 2,954ppm lithium for 1.0 million tonnes Li_2CO_3 in indicated resources and 260.1 million tonnes averaging 2,706ppm lithium for 3.8 million tonnes Li_2CO_3 in the inferred category. The existing resource estimate is based on only about 30% of the identified target areas. Further exploration potential is offered by the Quelcaya area, among others. Mapping and sampling in the outlying area about 6 kilometers west of the Falchani deposit showed a lithium extension of about 1.5 kilometers at an average sample grade of 2,986ppm lithium. Tres Hermanas represents another target area. There, three ridges of lithium-rich tuff, interpreted as upright dipping compared to the relatively horizontal ridges of Falchani East and West, were identified. Each of these ridges is estimated to be 80 meters high and 750 meters long. Surface sampling returned up to 4,452ppm lithium and prospecting is currently underway. Furthermore, a 6 kilometer by 5 kilometer interpreted collapsed caldera setting exists on the project property as a target for future exploration activities. Approximately 20 kilometers west of Falchani, several surface samples containing up to 5,100ppm lithium have been extracted from a large lithium-rich tuff outcrop. Recent drilling has delivered some further spectacular results. Among other things, CEO Simon Clarke's team was able to extract 120 meters averaging 2,186ppm lithium, 841ppm cesium, 1,215ppm rubidium and 2.62% potassium, with the highest lithium concentration at 5,645 ppm and the highest cesium concentration at 12,610 ppm. Additional drilling returned 95 meters averaging 2,345 ppm lithium, 829 ppm cesium, 1,265 ppm rubidium and 2.57% potassium, among other assays. In September

2023, American Lithium announced a new discovery 6 kilometers west of Falchani. There, a large-scale lithium mineralized zone was encountered with a thickness of 222.5 meters and an average value of 1,560 ppm lithium, with the highest concentration being 2,668 ppm lithium.

Falchani Lithium Project – PEA and Pre-Feasibility Study

A PEA also already exists for Falchani. For example, for an annual production of 23,000 tons of Li_2CO_3 per year in the first 7 years, 44,000 tons of Li_2CO_3 per year in years 8 to 12, and 85,000 tons of Li_2CO_3 per year in years 13 to 33 of the mine life, an NPV of US\$1.5 billion and an IRR of 19.7% after taxes were calculated. The initial capital cost of US\$587 million would be amortized after 4.7 years. Operating costs were approximately US\$3,958 per ton of LCE. The company expects a scalable 33-year mine life producing battery-grade lithium carbonate.

Currently, American Lithium is working on a pre-feasibility study with a focus on the inclusion of potassium sulfate and cesium by-products, which should provide a valuable contribution to the economics of the project. Finally, the PFS will be prepared to reflect the significant increase in lithium carbonate prices since the original report released in early 2020, which used a price of US\$12,000 per tonne LCE. Recent studies of other lithium projects around the world have assumed a price of up to US\$24,000 per tonne of LCE, reflecting the significant price increase in the commodity over the past two years and expected long-term prices.

Macusani Uranium Project – Location and Resources

At Macusani, American Lithium is developing one of the largest and lowest-cost uranium deposits in the world to meet the demand for clean and efficient energy –

with strategic focus on the Americas. Macusani is also located in Peru and has several uranium deposits that to date host at least 124 million pounds of U_3O_8 in the indicated and inferred categories. Although already one of the largest undeveloped uranium deposits in the world, Macusani has additional high exploration potential. For example, on the Tantamaco South East targets between the Tantamaco and Quebrada Blanca deposits. In total, Macusani has 47 additional targets across the property. 85% of the exploration areas have not yet been drilled, although the Company plans to address some of these in the near future. Surface sampling contained up to 2.15% U_3O_8 .

Macusani Uranium Project – PEA

A PEA based on annual production of about 6.1 million pounds of U_3O_8 , a mine life of 10 years and a uranium price of US\$50 per pound of U_3O_8 identified an NPV of US\$603 million, an after-tax IRR of 40.6%, an initial capital cost of US\$299.8

million and an operating cost of US\$17.27 per tonne of U_3O_8 . The payback period was given as 1.76 years.

Summary: Milestone follows milestone + strategic investment

American Lithium is an already very advanced battery metals company that not only owns the largest combined lithium resource in the world, but also one of the largest uranium projects on the planet. The pre-feasibility study for the mega-project TLC will be published shortly, which should provide improved figures than the PEA simply due to the fact that a much higher sales price can be set for LCE. American Lithium will thus continue to be in the focus of the very big names, which are desperately looking for advanced lithium projects. However, the company itself is also looking for suitable investments and therefore took a 9.7% stake in Surge Battery Metals in June 2023, which is currently developing the high-profile Nevada North Lithium Project.



Simon Clarke, CEO

Exclusive interview with Simon Clarke, CEO of American Lithium

What have you and your company achieved in the past 12 months?

We achieved significant milestones corporately and on the ground. The commencement of trading on the Nasdaq and filing of our Maiden ESG report marked important steps in our growth. At TLC Lithium Project in Nevada, we completed exploration drilling, filed a New Mineral Resource Estimate increasing measured and indicated and inferred resources by 25% and 129% respectively and published a maiden PEA with robust economics (after tax NPV of US\$3.36 billion and 27.5% IRR).

We launched pre-feasibility work and continued flow sheet refinement which to date has yielded higher lithium purity and further improvements to the project. We completed a 1% Royalty Buyback on the project ensuring its complete ownership by the Company and made a strategic investment in Surge Battery Metals of \$5.36 million (9.7% interest) to support development of their Northern Nevada claystone project. In Peru we obtained the first exploration drill permit awarded in two years to commence additional development and discovery around the Falchani Lithium Project. As a result, a new discovery was

made at Qulecaya, 6 kilometres west of Falchani with a potential formation of a new lithium district.

Additionally, we extended mineralization at Falchani with some of highest-grade lithium grades reported to date, up to 5465 ppm lithium and 12,670 ppm cesium during drilling under the Environmental Impact Assessment.

What are the most important company catalysts for the next 6 to 12 months?

Over the coming 6-12 months, we anticipate several developments as we advance both lithium projects simultaneously.

In Nevada we continue to work on flow sheet refinement as we move through pre-feasibility for completion in 2024 with piloting and launching mine permitting work thereafter.

In Peru, we wait for additional drill permits and the resolution of an ongoing court case concerning our 32 disputed concessions where we anticipate a favorable outcome. We are working on updating our resources to include completed drilling and addition of important by-products cesium and potassium followed by an updated PEA. This will pave the way for advancing the pre-feasibility, a process which began with our Environmental Impact Assessment work.

Lastly, we are pursuing the strategic initiatives to spin out the Macusani Uranium Project into a distinct, standalone entity.

How do you see the current situation on the market for battery metals?

We can answer this focusing on three main points:

1. Domestic Supply in the Western World: Propelled by the growth of electric vehicles (EVs), Western Nations are focussed on domesticating their battery metals supply chain. Historically dependent on foreign imports, there is growing pressure to develop local resource supply chains including extraction, refining and manufacturing. Incentive programs such the Inflation Reduc-

tion Act and funding support from the US Departments of Defence and Energy are a great start.

2. Rising Demand for Battery Metals: The global shift towards cleaner energy has intensified the demand for battery metals. EVs are at the forefront of this demand, with sales trajectory suggesting a dominant future in transportation.
3. Price Consolidation of Lithium: Lithium has seen prices swing in recent years but expected to stabilize shortly. Factors like new mining ventures, enhanced recycling methods, and technological breakthroughs refining lithium utilization contribute to this consolidation.

Battery metals market is undergoing major evolution. As the West aims for energy independence, the strategic value of battery metals grows, warranting robust investments, innovations, and supportive policies.

American Lithium Corp.



ISIN:

CA0272592092

WKN:

A2DWUX

FRA:

5LA1

TSX-V:

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Fully diluted:

259.0 million

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Argentina Lithium & Energy

In best position in the lithium triangle with first very good results + breakthrough investment from Stellantis



Argentina Lithium & Energy is a Canadian mining development company specializing in the discovery and development of high-caliber lithium projects in Argentina. The company was able to secure four potentially high-caliber projects in the South American lithium triangle, an area with a large number of high-caliber lithium deposits on the border of the three countries Argentina, Chile and Bolivia. Argentina Lithium & Energy has been particularly successful in this regard in the current year 2023 at its flagship Rincon West project, where drilling has proven lithium concentrations of up to over 400 mg/l. Most recently, Argentina Lithium announced a groundbreaking US\$90 million investment from Stellantis plus an Offtake Agreement.

Rincon West

In total, Argentina Lithium holds 64,000 hectares of claims in four salars in the mining-friendly provinces of Salta and Catamarca. All properties are strategically located near major infrastructure and towns. Therefore, there is year-round access to all properties via the existing road network. At the Rincon West project, Argentina Lithium holds a 100% interest in 460.5 hectares and has the option to earn a 100% interest in an additional 3,282 hectares of claims in the Rincon Salar of the same name in Salta Province, Argentina. Rincon West is located near a railroad line and just 17 kilometers south of Provincial Route 51, which leads to Chile's coastal ports. The property is located approximately 150 kilometers from the town of San Antonio de los Cobres. The InterAndes power corridor runs within one kilometer of the Salar. The project has not been explored to any significant extent by previous licensees in the past and thus represents a new opportunity to identify lithium in a salar known to host lithium-bearing brines with production potential. The geological setting of the Rincon salar, located at an elevation of ap-

proximately 3,760 meters above sea level, is similar to other salars where lithium and potash have been found. Within the salar, there are two significant lithium resource development projects owned by Rincon Ltd. and Argosy Minerals, both of which have undertaken demonstration-scale lithium carbonate production. Rincon West is adjacent to Rincon Ltd.'s claims on the west side of the salar. No detailed exploration work has been carried out on Argentina Lithium's claims to date, although vertical electrical sounding has identified a conductive unit potentially associated with brines less than 100 metres below most of the property surface. The Company is currently undertaking further detailed work to identify and delineate brine concentrations. This includes a drilling campaign that produced good initial results in 2022. For example, one of the drill holes confirmed, among other things, that the lithium brines start at 38 meters depth and contained lithium values ranging from 334 to 382 mg/liter over a continuous range of 132 meters from 95 meters to 227 meters depth. In January 2023, Argentina Lithium reported additional positive lithium brine values, including a 153-metre interval grading 329 to 393 mg/liter from the sixth diamond drill hole. These recent drill results extended the zone of concentrated lithium brine to the west and southwest. The sixth hole was the best intercept to date and represents a step-out of 960 metres from the previously reported best intercept of the fourth hole. These large step-outs demonstrate that the concentrated lithium brine deposits largely extend through the core of the property. During 2023, Argentina Lithium has been able to demonstrate additional very good lithium concentrations. For example, a 178-meter intercept with results between 241 and 340 mg/l lithium and 258 meters with lithium concentrations between 287 and 402 mg/l. The final, ninth exploration hole had thus returned the highest lithium peak and the longest concentrated brine intercept reported to date

on the Rincon West project. The rich brine zone remains open to the north, clearly indicating the need to expand drilling in this direction in a future campaign. Overall, the nine drill holes have produced the results expected when exploration began and show that concentrated brines from the adjacent salt dome extend through the western basin.

Antofalla North

Antofalla North comprises 15,800 hectares of mining leases in the north of the Salar de Antofalla, spread across the adjacent provinces of Salta and Catamarca. 9,080 hectares are 100% owned with options on the remaining lease areas. The project is located approximately 25 kilometers west of Argentina's largest lithium producing operation, Salar de Hombre Muerto. Salar de Antofalla is approximately 150 kilometers long and 5-7 kilometers wide and is located at an elevation of 3,900 meters. Access to the salar is by provincial road 43 and dirt roads. The small town of Antofalla is about 50 kilometers to the south and the city of Salta is about 500 kilometers away. The southern boundary of the Antofalla North project is approximately 500 meters north of the properties controlled by global lithium producer Albemarle Inc. Albemarle has stated that it believes the lithium resource on its property has the potential to be among the largest in Argentina. The company has conducted a geophysical survey and identified high conductivity targets for drilling on the project. In 2023, Argentina Lithium plans to conduct 110 line kilometers of transient electromagnetic sounding to delineate brine deposits and up to 6 diamond drill holes.

Pocitos

Argentina Lithium holds an option to earn a 100% interest in approximately 15,857

hectares in eleven contiguous mining concessions on the west side of the Pocitos Salar and an additional 10,364 hectares in three blocks to the east and south. Pocitos is located approximately 38 kilometers from the Rincon West project, at an elevation of over 3,600 metres and has an area of approximately 425 square kilometers extending from north to south for 57 kilometers and from east to west for 6 to 9 kilometers. Provincial Route 17 and the industrial park fed by a natural gas pipeline in the settlement of Pocitos are located 17 kilometers east of the project. The rail line that runs through the middle of the Pocitos property connects Salta to the port of Antofagasta on Chile's Pacific coast. The InterAndes power corridor runs 35 kilometers to the north. The Pocitos Salar is in close proximity to other lithium-bearing salars and the project has been explored on a limited basis by previous operators, presenting an opportunity for new discoveries. Only modest lithium exploration has been conducted on the property in the past, including geophysical surveys, surface sampling and limited drilling. Argentina Lithium is undertaking additional detailed work to identify and delineate brine concentrations to be tested. This will involve 121 line kilometers of transient electromagnetic sounding and up to 4 drill holes in the first phase.

Incahuasi

Argentina Lithium holds a 100% interest in over 25,000 hectares of the Incahuasi salar and basin in the province of Catamarca. This is located in northwestern Argentina at an elevation of approximately 3,300 meters above sea level, in a hyper-dry region where rainfall averages less than 30 millimeters per year, a necessary condition for the formation of evaporative brine. Access to the salar is via a dirt road from the town of Antofagasta de la Sierra, located about 34 kilometers to the northeast. The Salar of

Incahuasi extends 17 kilometers in a north-south direction and 2.5 kilometers in an east-west direction, being divided into a northern and a southern part. The northern part is a flat zone partially covered with surface water, while the southern part is a terrigenous salar with sand and clay. The topography of this part is not as flat as that of the northern part. The company believes that Incahuasi has not been sufficiently explored and, in particular, supports conditions for high-grade lithium brines at depth. Argentina Lithium started its initial exploration program on the Incahuasi project in 2017 and completed initial geophysical surveys, surface sampling and drill programs. The maximum values obtained were 409 mg/L lithium and 1.56% potassium and were obtained from near surface sampling to depths of only 8 meters. A total of 4 drill holes confirmed lithium-bearing brines with average grades of 109 mg/L lithium and 6,718 mg/L potassium. The Company now plans to conduct 77 line kilometers of transient electromagnetic soundings.

Stellantis investment

Argentina Lithium announced in late September 2023 that it has entered into a definitive agreement for the ARS\$ equivalent of a US\$90 million investment in Argentina Litio y Energia S. A. ("ALE"), through Stellantis, one of the world's leading automotive manufacturers and mobility providers with iconic brands such as Abarth, Alfa Romeo, Chrysler, Citroën, Dodge, DS Automobiles, Fiat, Jeep®, Lancia, Maserati, Opel, Peugeot, RAM, Vauxhall, Free2Move and Leasys. As part of the transaction, Peugeot Citroen Argentina S.A., a subsidiary of Stellantis N.V., has agreed to invest the ARS\$ equivalent of \$90 million in Argentina to acquire shares of ALE. In addition, the Company has granted Stellantis the exchange right to exchange all ALE shares for up to 19.9% of Argentina Lithium's outstanding common shares in the future, subject to certain conditions. The proceeds of the transaction will be used for

the development of the Company's lithium projects held by its wholly owned subsidiary in Argentina and for general corporate purposes. As a result of the transaction, Stellantis will own 19.9% of the issued and outstanding ALE shares and Argentina Lithium will own 80.1%.

Argentina Lithium and Stellantis will additionally enter into a lithium offtake agreement. Under the off-take agreement, Stellantis has agreed to purchase from ALE up to 15,000 tonnes per year of lithium produced by ALE over a seven-year period. After the initial term of seven years, the off-take agreement may be extended by mutual agreement for an additional number of years.

Summary: Newsflow guaranteed through multiple exploration programs + Financing secured for years through Stellantis deal

Argentina Lithium & Energy has secured and is aggressively advancing potentially high-caliber claims in four Argentine salars. This is particularly evidenced by the fact that the company has conducted and will continue to conduct exploration programs on all four projects in 2023. In the case of Rincon West, an initial resource estimate is also expected to be released shortly. Previous exploration campaigns have already shown that the projects have significant lithium grades. Now the focus is on delineating the deposits. This will provide an increased newsflow with all kinds of results in the coming months. All current and planned exploration activities are funded through the Stellantis deal for years. The additional offtake agreement takes additional risk away from an expected feasibility study and future production.

Exclusive interview with Brian McEwen VP Exploration & Development of Argentina Lithium & Energy

What have you and your company achieved in the past 12 months?

It's been a pivotal year for us both on the exploration and corporate development sides, which crystallized with our recent US\$90M investment and offtake announcement. Peugeot Citroen Argentina S.A., a subsidiary of Stellantis N.V., one of the world's leading automakers and mobility providers, has taking a 19.9% interest in our Argentine subsidiary and agreed to a 7-year renewable offtake agreement for up to 15,000 tonnes per year of future lithium production. This transaction is a game changer for us as we now have the capital to advance and possibly even fast-track our exploration projects, plus we have a recognized global partner to move forward with us.

In terms of exploration, we completed the first drill program at our Rincon West project, with nine exploration wells drilled on the main property block. The program demonstrated that the brines from the neighboring salt flat extend through the western basin, with good lithium values, such as a 258 m interval in hole 9, starting at 83 m depth, with lithium grades ranging from 287 to 402 mg/l (with 2 internal intervals not sampled, 42m & 33m). Following on the heels of this successful program, we initiated drilling at our second property block, Rinconcita II, immediately adjacent to the east. We also added to our property position at the Rincon salar late last year, with a third option for the Paso de Sico property to the north which we potentially will drill following the Rinconcita program.

In addition to Rincon West, we are excited to move forward with work at our Antofalla project. We added to our property holdings there last year and we now awaiting drill permits.

What are the most important company catalysts for the next 6 to 12 months?

We expect that results from additional drilling at Rincon West will be highlights in the

next six months, and we are currently permitting the project to begin pump testing in that time frame. We anticipate drill permits for Antofalla at any time, so there is potential for new drilling and results there also. In addition, we may also initiate geophysical basin evaluation and drill targeting programs at our Pocitos and Incahuasi projects.

How do you see the current situation on the market for battery metals?

We are encouraged not only by the outlook for the renewable energy market, and in particular the lithium battery market, but by the resulting strong investor interest in our work. With automotive companies and battery producers aggressively pursuing deals with lithium companies ranging from exploration to production stages, we foresee a robust future for battery metals.



Brian McEwen, VP Exploration & Development

Argentina Lithium & Energy Corp.



ISIN: CA04016E2024
WKN: A2N7AW
FRA: OAY3
TSX-V: LIT

Fully diluted: 213.2 million
(before Stellantis deal)

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CDN Maverick Capital

On track to become one of the lithium major players in the Americas



CDN Maverick is a Canadian mining development company focused on the discovery and development of high-profile lithium projects in North and South America. The company is led by an experienced team of industry leaders with a proven track record in financing and advancing mineral projects from grassroots to feasibility stage. CDN Maverick has a clear growth strategy, with an ambition to establish CDN Maverick as a key player in the lithium sector. The company is focused on identifying and capitalizing on strategic opportunities throughout the Americas and beyond.

Chabinoche Lithium Project

The Chabinoche Lithium Project comprises 711 claims totaling approximately 40,000 hectares and two main targets: the Chabinoche target with 266 claims covering approximately 14,630 hectares and the Poncheville target with 445 claims covering approximately 25,000 hectares. The two claim blocks were staked to cover some of the highest lithium lake sediment anomalies in central Quebec, with most values above the 97% percentile (28.5 ppm lithium) and 40% above the 99%+ range (37.3 ppm + lithium) and 27% above 99.5% (42.6 ppm). Lake sediments are also extremely anomal-

ous in other known LCT indicator elements, such as cesium (95-99% range, 2.2 to 4.5 ppm) and rubidium, also in the 95-99% range (40-80 ppm). From a structural perspective, both claim blocks span a large regional northwest to southeast trending shear zone known locally as the Nottaway shear zone, and the claims have many locally cross-cutting structures that can be seen on the regional magnetic inclination derivative map. The project straddles Lake Poncheville, on the shore of which over 100 pegmatite dykes have been mapped by the Quebec Geological Survey. Essentially, this property has all the makings of very prospective terrain for new lithium discoveries. The Company is working with Shawn Ryan, one of Canada's best known and most successful prospectors. Chabinoche is located approximately 60 kilometers north of Matagami in the James Bay Mining District of Quebec. CDN Maverick has contracted Ground Truth Exploration for Phase I exploration work on Maverick's Poncheville and Chabinoche hard rock lithium properties in mid-2023. The highly experienced team is known for its exceptional track record of precious metal discoveries in Canada. The focus of the program is to capture and understand the potential of previously identified lithium pegmatite deposits through desktop studies based on public



information. This includes, but is not limited to, a province-wide systematic analysis of lake sediment data and statistics. In the field, the team will systematically traverse the properties, visually record samples indicative of lithium, and conduct immediate LIBS and/or XRF analyses.

the abundant critical minerals present. The Northwind Lake project consists of a series of mineral claims covering approximately 7,040 hectares.

Zeus project is on its way to prefeasibility stage
(Source: CDN Maverick Capital)

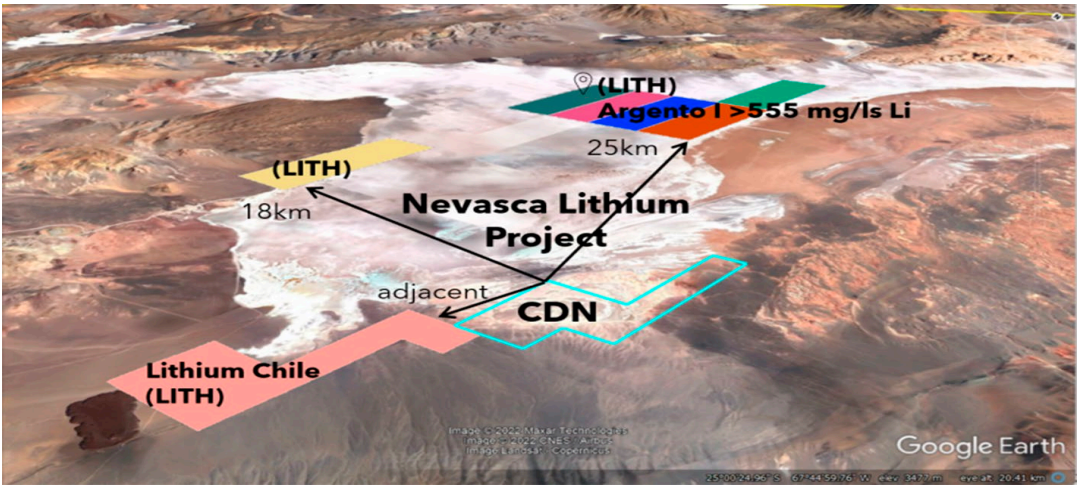
Clayton Valley Lithium Project – Investment in Noram Lithium Corp.

In 2017, Maverick funded the drilling program that defined the first clay lithium resource on the Zeus property under a joint venture agreement with Noram Lithium Corp. Having achieved a significant milestone by creating life-cycle value through exploration, the company secured a significant equity interest in Noram in line with its business model. The project is on track for pre-feasibility stage with a very large, high-grade lithium deposit. As such, Zeus hosts minimum Measured and Indicated resources of 5.17 million tonnes LCE (1,034 million tonnes at 941 ppm lithium) and Inferred resources of 1.09 million tonnes LCE (235 million tonnes at 871 ppm lithium). Maverick believes that it is only a matter of time before lithium clay mining becomes a reality

Northwind Lake Lithium Project

In June 2023, CDN Maverick announced that it will acquire the Northwind Lake property, a lithium pegmatite exploration project in what is known as the Electric Avenue Lithium District, approximately 10 kilometers north-northwest of the PAK lithium deposit from Frontier Lithium Inc. The PAK deposit contains some of the highest-grade lithium-bearing pegmatites in North America and has a mineral resource of 7.23 million tonnes at 1.87% Li₂O Measured + Indicated resource and 2.76 million tonnes at 2.22% Li₂O Indicated resource and hosts rare low iron (below 0.1% Fe₂O₃) technical/ceramic spodumene. The entire area has been designated “Electric Avenue” due to

The Nevasca lithium project is located in close proximity to major lithium companies.
(Source: CDN Maverick Capital)



in Nevada and helps the U.S. on its path to mineral resource independence. Currently, the company holds approximately 1.6 million common shares of Noram.

Rainbow Canyon Gold Project

The Rainbow Canyon Gold Project is a precious metals exploration property located in the Olinghouse Mining District, approximately 24 miles east of Reno in Washoe County, Nevada. Gold mineralization has been identified in numerous locations on the property, primarily in the form of quartz veins up to 20 centimeters wide grading up to 79 g/t gold in grab samples. The veins occur in zones up to 30 meters wide with strong argillic alteration over a northeast strike length of more than one kilometer. Most veins dip steeply to the southeast. A ground magnetic survey was conducted that showed magnetic lows coincident with many of the areas of quartz veining and strong alteration. Maverick completed a six-hole reverse circulation drill program in April 2017 that included a notable high-grade intercept: Hole RCR-03 contained 1.5 meters of 19.6 g/t gold.

Nevasca Lithium Project – Sale to NOA Lithium Brines Inc.

The Nevasca Lithium Project covers 2,842 hectares and is located in the Salar de Arizaro Basin, within the provincial boundaries of Salta in the Puna region of north-western Argentina. Salta is one of the best exploration areas in Latin America and an emerging mining region due to its strong and diverse mineral resources, stable tenure, straightforward permitting and geopolitical landscape. The Nevasca Lithium Project is accessible year-round via Pocitos and Tolar Grande through the Arizaro Salar on a well-maintained salt road to the Lindero Mine located east of the project area. The nearest village is Tolar Grande (population 250), which is about a 2.5-hour drive north and is a hub for mining-related rail traffic between Salta Province and Chile.

CDN Maverick decided to sell the project to NOA Lithium Brines Inc. in May 2023. The Company will receive CA\$2 million in cash and NOAL shares and will continue to indirectly participate in the success of the project through a 3% net smelter return.

Top management team

CDN Maverick has a highly successful and experienced management team. CEO Adam Cegielski has more than 20 years of venture capital experience in mineral exploration, technology, healthcare and education. He began his career developing an industrial mineral project in Uganda, which he later sold to Rio Tinto. Mr. Cegielski was a founding director of Cayden Resources, which was sold to Agnico Eagle Mines for \$205 million.

Executive Chairman Sandy MacDougall holds a degree in economics from the University of British Columbia and has more than 30 years of experience in investment banking and finance. He was formerly an investment advisor with Canaccord Capital Corp. and has been involved in numerous significant financings in Canada and abroad for a wide range of companies. He has extensive experience in precious and base metal projects throughout North and South America. MacDougall is the founder and current CEO and director of Noram Lithium Corp. which is advancing one of the largest undeveloped lithium deposits in North America.

Mr. MacDougall holds a Bachelor of Science and a Master of Science from the University of Victoria and has more than 25 years of experience leading and managing large organizations, primarily in the British Columbia government. As Associate Deputy Minister and Chief Operating Officer of the Ministry of Health, he oversaw the ministry's multi-billion-dollar annual operating and capital budgets. He also served as CEO of Shared Services BC and as Executive Financial Officer of the Ministry of Environment. Mr. MacDougall is currently senior vice president for health services at Maximus Canada.

Summary: Exploration campaigns will lead the way

CDN Maverick is an early-stage opportunity, although there are indications that it hosts corresponding deposits on its own projects. In the immediate vicinity of CDN Maverick's projects, some major lithium discoveries have already been made, which could continue in Maverick's area. By means of the investment in Noram, one is also indirectly involved in the success of an undoubtedly very large lithium resource in Clayton Valley. Another indirect interest is

in NOAL and the Nevasca project. In addition, the highly successful and experienced management is working on further lithium deals that should increase the value of the company in the future. With a CA\$3 million financing from February 2023, CDN Maverick is adequately funded for the work ahead.

Exclusive interview with Adam Cegielski, CEO of CDN Maverick Capital

What have you and your company achieved in the past 12 months?

In the last 12 months we have acquired 44,000 ha of prolific lithium exploration ground in the heard of James Bay Quebec. This was followed by systematic exploration work over the summer months with results expected later this year. We also successfully joint-ventured out Arizaro project in Argentina with Noa Lithium for \$2m in cash and shares. This significantly improved our balance sheet and allowed us to focus on hard rock discoveries in Canada.

What are the most important company catalysts for the next 6 to 12 months?

We are looking to confirm lithium bearing spodumene on our James Bay project as well as acquire further exciting ground in Quebec.

How do you see the current situation on the market for battery metals?

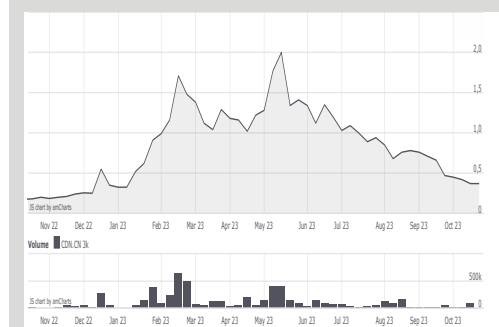
Battery metals market has softened due to lithium prices in China. We expect this to

change towards the end of the year. The drop in price is not impacting profits in the battery metals business but it has softened the market a little.



Adam Cegielski, CEO

CDN Maverick Capital Corp.



ISIN: CA12510R1082
WKN: A2QH96
FRA: 338B
CSE: CDN

Fully diluted: 13.8 million

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Century Lithium

Bankable Feasibility Study Coming Soon + Important Patent Received for Proprietary Extraction Technology

Century Lithium (formerly Cypress Development) is a Canadian mining development company specializing in the mining of lithium in the United States. In this regard, the Company is focused on the development of its 100% owned Clayton Valley Lithium Project in Nevada. The Company has been able to report a world-class resource of lithium-bearing mudstone at its project site, which is adjacent to several other advanced lithium projects. A 2021 enhanced prefeasibility study certified excellent economics for the project. Currently, the company is working on optimizing its proprietary processing with the help of its own pilot plant, resulting in the production of battery-grade lithium carbonate. Together with Koch Technology Solutions, the company is collaborating on the application of the Li-Pro™ process for direct lithium extraction at Century Lithium's lithium extraction plant. A bankable feasibility study is expected to be presented shortly.

Clayton Valley Lithium Project – Location and Infrastructure

The Clayton Valley Lithium Project is located in the Clayton Valley of the same name, in the southeastern U.S. state of Nevada, east of Albemarle's Silver Peak lithium mine, which has been in operation since 1966. Century Lithium's project covers ap-

proximately 6,558 acres and is located amidst very well-developed infrastructure. Several state highways connect Silver Peak to the main road network in Nevada. Gravel roads connect Silver Peak to the southern half of Clayton Valley. Connection to the electric grid is available at the substation in Silver Peak. In February 2022 Century Lithium announced that it had expanded the Clayton Valley Project. They were able to acquire Enertopia Corporation's Clayton Valley Lithium Claystone Project from their immediate neighbor. Enertopia's project includes 17 unpatented mining claims totaling 160 contiguous acres.

Clayton Valley Lithium Project – Exploration, Geology and Resource

Century Lithium acquired the first project claims in 2016 and conducted extensive drilling campaigns and metallurgical testing over the next three years. The Company's exploration and development work quickly led to the discovery of a world-class resource of lithium-bearing mudstone near the brine field east and south of Angel Island, an outcrop of Paleozoic carbonates that outcrop from lake-bottom sediments. Lithium mineralization occurs within the montmorillonite clays in the sediments to a depth of at least 150 metres. Metallurgical tests have shown that low-cost processing is possible by leaching with low acid consumption and high lithium recovery of over 85% lithium. These high extractions prove that the predominant lithium-bearing minerals are not hectorite, a refractory clay mineral that requires roasting and/or high acid consumption to release the lithium. The flat-lying deposit allows mining with a low overburden ratio. Open pit mining does not require drilling or blasting during excavation. Currently, Clayton Valley has a resource of 1,304 million tonnes of rock averaging 905 ppm lithium (6.28 million tonnes LCE – lithium carbonate equivalent) based

on a cutoff grade of 400 ppm lithium. Reserves total 213 million tonnes averaging 1,129 ppm lithium (1.28 million tonnes LCE). Recent drilling encountered exceptionally high-grade lithium intercepts of 70.1 meters with 1,336ppm lithium, among others.

Clayton Valley Lithium Project – Positive PEA and Pre-Feasibility Studies

2021 Century Lithium published the most recent pre-feasibility study to date. It showed very good economics, even for a moderate base case lithium carbonate price of only US\$9,500 per ton. Based on an average production rate of 15,000 tonnes per day, the pre-feasibility study calculated an annual production of 27,400 tonnes of lithium carbonate equivalent over a 40-year mine life. The estimated capital cost of this is US\$493 million, with estimated pre-production and operating costs averaging US\$3,387 per tonne of LCE. An after-tax NPV-8% of US\$1.03 billion and an after-tax IRR of 25.8% were also determined. For a, 50% higher lithium carbonate price of US\$14,250, the NPV would be US\$2.142 billion and the IRR would be 41.3%. A further bankable feasibility study is currently underway and is expected to be completed before the end of 2023.

Clayton Valley Lithium Project – Metallurgical Studies

The lithium in the deposit is associated with illite and smectite clays and can be leached with dilute sulfuric acid, followed by filtration, solution purification, concentration and electrolysis to recover high purity lithium. Extensive metallurgical work determined optimal conditions for leaching, including time, acid concentration and temperature. Testing showed that there was little difference in sample depth, oxidation,

or weathering state of the clays. Extensive leaching tests were performed on samples to obtain slurries for rheology, filtration, and lithium recovery tests. The tests gave average results of 86.5% recovery of lithium with only 126.5 kg/ton of acid consumption. Tests were conducted to identify a commercial means of solid-liquid separation, with specific conditions and equipment identified. Solids from filtration tests simulating the final cycle were generated. Solids after single-stage washing are suitable for transport via conveyor belt to a conventional dry tailings storage facility. NORAM Engineering & Constructors Ltd. and CMS designed and tested the flow-sheet for recovering the lithium from solution. A very successful test program that delivered a purified, concentrated lithium solution suitable for the production of high purity lithium hydroxide (LiOH).

Clayton Valley Lithium Project – Pilot plant delivers first very good results + Development of proprietary lithium extraction technology + Patent granted

With the knowledge gained from the extensive metallurgical testing, Century Lithium was able to design its own pilot plant. This utilizes an existing metallurgical facility near Beatty, Nevada. The plant could be commissioned in November 2021. This will operate at a rate of 1 ton per day and is designed to properly interact and test the major components within the extraction process and evaluate the resulting lithium products. Then, in September 2022, a breakthrough was achieved when Century Lithium was able to announce that a major milestone had been reached with the production of 99.94% lithium carbonate from lithium-bearing mudstone from its Clayton Valley Lithium Project. The Li_2CO_3 was recovered from an intermediate concentrated lithium solution produced at Century's lith-

Pilot Plant
(Source: Century Lithium)



ium extraction plant. In 2023, the company again demonstrated battery-grade lithium carbonate production in new tests. In October 2022, Century Lithium contracted thyssenkrupp nucera USA, Inc. to provide design and engineering for the chlor-alkali plant as part of the ongoing feasibility study. The chlor-alkali plant is an essential component that will allow the project to self-produce two key reagents required to process lithium-bearing claystone into a Li_2CO_3 (lithium carbonate) product. Century Lithium has been working with Koch Technology Solutions since February 2023, a Koch Engineered Solutions company, for the application of the Li-Pro™ process for direct lithium extraction at Century Lithium's lithium extraction plant. Koch will provide the engineering for a large-scale application of the Li-Pro™ process for Century Lithium. The related equipment has been installed and is operational at Century Lithium's lithium extraction plant. Since the installation of the equipment, Century Lithium has focused on improvements related to the operational aspects of the pilot plant and adjustments to the final flowsheet. These improvements were well supported by the design and installation of the equipment at the pilot plant. The plant achieved

steady state using Century Lithium's chloride leach process. This allowed the company to achieve the production of intermediate solutions with lithium contents of 7 to 8 g/l at average lithium/sodium ratios of 0.9 to 1.1. No degradation of the media or accumulation of deleterious elements was observed.

In September 2023, the Company filed a provisional patent entitled "System and process for extracting lithium from clay and other materials in a chloride solution using individual pretreatments" obtained. The patent-pending process includes the company's flow chart, which is described in its lithium extraction plant was developed, and protects the Company's intellectual property related to the handling of solutions derived from the treatment of solid materials, including clays from the Company's Clayton Valley Lithium Project.

Summary: Feasibility study should mean final breakthrough

Century Lithium has a very advanced lithium project in one of the best mining and lithium jurisdictions in the world. The company is already in the definitive feasibility

phase. A bankable feasibility study has been commissioned and is expected to be released shortly. Furthermore, a pilot plant capable of producing battery-grade lithium carbonate is already in operation. The corresponding patents were recently secured.

The important water rights have also been secured. The next important milestone will be the feasibility study, which should remove a lot of risk from the project and lead to a reassessment of Century Lithium.

Exclusive interview with William Willoughby, CEO of Century Lithium

What have you and your company achieved in the past 12 months?

In the last year, our Company has changed its name from Cypress Development to Century Lithium and began trading under the symbol LCE on the TSXV. We began collaborating with Koch Technology Solutions, a Koch Engineered Solutions company, in the application of the Li-Pro™ process for Direct Lithium Extraction ("DLE") at our Lithium's Lithium Extraction Facility in Amargosa Valley, Nevada.

Collaborating with Koch has been very productive and has generated many improvements that have resulted in the complete removal of impurities such as calcium and magnesium and marked reduction of sodium and potassium in the product solutions.

In addition, we produced our 3rd batch of battery grade lithium carbonate (99.87% purity) through collaboration with Saltwork Technologies.

What are the most important company catalysts for the next 6 to 12 months?

We plan to complete our Feasibility Study before year end (2023) and plan to pursue financial opportunities such as: Strategic Partnerships & formally apply for US Federal Funding through grants & loans. In addition, we plan to complete Plan of Operations and initiate NEPA permitting process. After that, we plan to pursue on-site production of lithium carbonate.

How do you see the current situation on the market for battery metals?

According to many studies, in 2030, the global demand for lithium is expected to surpass 2.4 million tons, doubling the demand forecast for 2025. These increases in demand for electric vehicles will be a strong driver in the decades to come.



William Willoughby, CEO



(Source: Century Lithium)

Century Lithium Corp.



ISIN: CA2327492005
WKN: A14L95
FRA: C1Z1
TSX-V: LCE

Fully diluted: 177.1 million

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First Tin

Huge tin deposits in Australia and Germany – feasibility study coming soon



Thomas Buenger, CEO

First Tin is a UK mining development company specializing in the development of high-profile tin projects in Australia and Germany. The company’s goal is to bring two tin mines on stream within three years, using the best environmental standards, to provide a secure supply to support the current global clean energy and technology revolutions. Currently, the company is at a stage where it has commissioned feasibility studies for each of the two projects. Previous economic feasibility studies have already certified excellent economics for both projects. Both projects are among the largest tin deposits in the world.

Tellerhäuser Mining Concession – location and infrastructure

The Tellerhäuser project is located in a tin district in Saxony and is a former East German mine with good underground conditions. It is part of the larger Rittersgrün license and is one of the most advanced tin deposits in the world. The site comprises a former East German mine and has an exceptionally long mining history. There is already an active mining concession for the extraction of mineral resources until June 30, 2070. Tellerhäuser benefits from a very

well-developed infrastructure, including approximately 180 kilometers of underground drifts, 500 meters of shafts, and a main access road nearly 8 kilometers long. First Tin plans to build an underground processing plant, while overburden and processing residues will be used as a by-product for backfilling. The water treatment plant will also be underground, while electricity needs can be met by the Markersbach hydropower plant, just 3 kilometers away.

Tellerhäuser Mining Concession – Exploration Success and Resource

Tellerhäuser continues to deliver good drill results. Drilling results in the fourth quarter of 2022 included 1.5 meters grading 0.75% tin, 1.00% zinc and 33 ppm indium, including 0.6 meters grading 1.43% tin, 1.99% zinc and 62ppm indium, and 3.85 meters grading 0.63% tin, 1.29% zinc and 58ppm indium, including 1.35 meters grading 1.49% tin, 0.78% zinc and 122ppm indium. Deep drilling in 2023 encountered 5.90 meters grading 0.40% tin, 0.74% zinc, 43ppm indium and 5.9g/t silver, among others. A JORC resource estimate completed in 2021 returned indicated and inferred resources of 5.3 million tonnes of rock averaging 1.0% tin, resulting in a total tin resource of 53,000 tonnes.

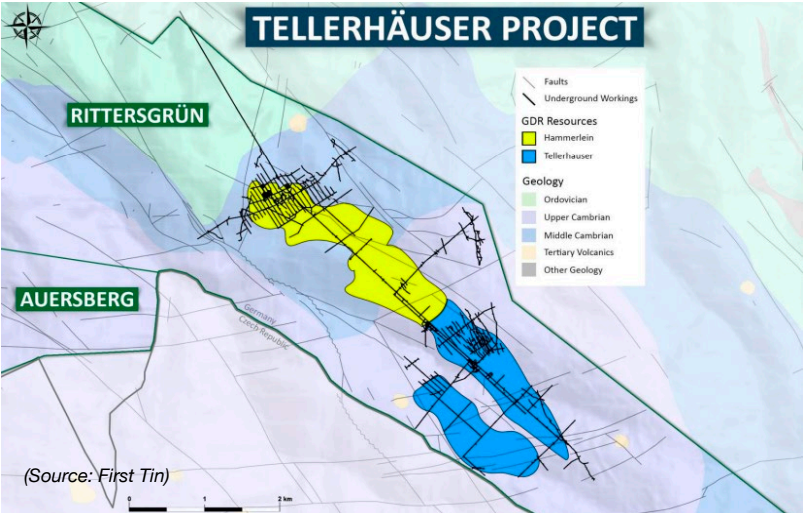
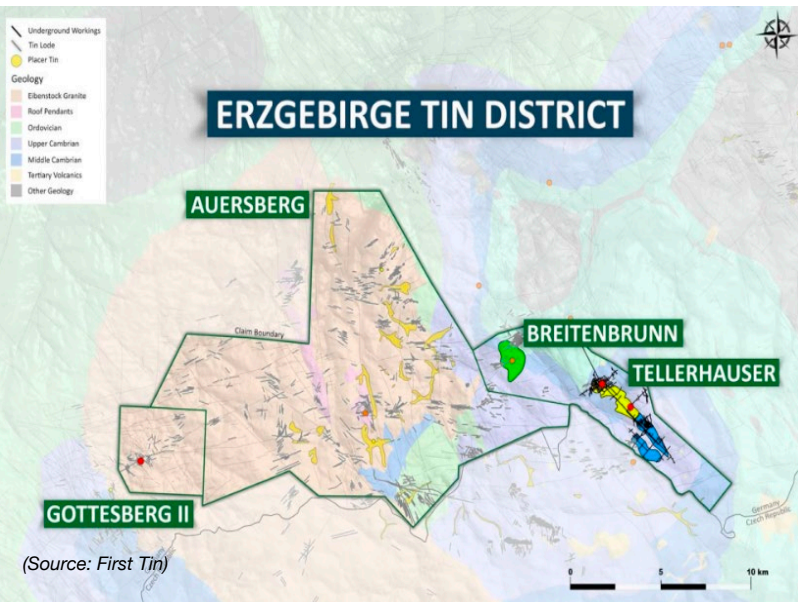
Tellerhäuser Mining Concession – PEA, definitive feasibility study and permits

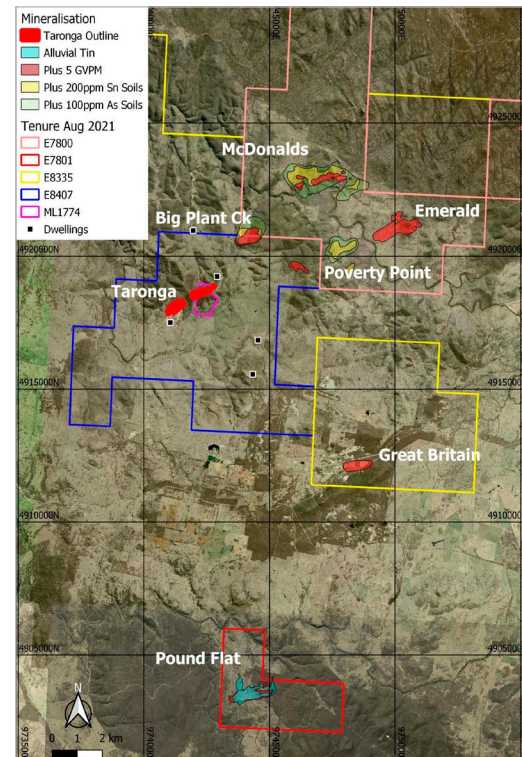
A preliminary economic assessment (PEA) produced a net present value (NPV) of US\$173 million, a cash cost of US\$12,203 per tonne and an internal rate of return (IRR) of 43%, based on a tin price of US\$25,000 per tonne. The cost of capital was estimated at only US\$49 million. Tellerhäuser would still be economic at a tin price of US\$20,000, with an NPV of US\$82 million and an IRR of 26%. For a tin price of

US\$40,000, the NPV would be US\$445 million and the IRR a whopping 87%. In August 2022, the company commissioned DMT GmbH & Co KG to prepare a definitive feasibility study. This is due to be completed in the fourth quarter of 2023. In March 2023, the Saxon Upper Mining Authority was able to confirm that First Tin had successfully completed the preliminary environmental impact assessment. This allowed the company to move directly into the framework operating plan process and complete the permitting process up to 12-18 months faster. The reason for the rapid progress is the minimal environmental footprint the mine is expected to have during construction and subsequent production. A decision is expected before the end of the third quarter of 2024.

Exploration licenses Gottesberg and Auersberg

In addition to the Tellerhaus mining license, First Tin also holds two exploration licenses in Germany. Drilling on the Gottesberg exploration license was recently completed. These targeted shallower parts of the existing resource and exploration of areas outside the known deposit where there is evidence of historic mining activity. In doing so, the Company was able to report some excellent drill intercepts. These include 73.3 meters of 0.49% tin, 6.95 meters of 1.46% tin, 6.5 meters of 0.98% tin and 2.5 meters of 2.72% tin. Gottesberg already has a 2021 resource of approximately 33,000 tonnes of tin. The Auersberg exploration license combines the Rittersgrün and Gottesberg licenses and drilling is being conducted in the vicinity of several historic tin deposits and is targeting vein-like, granular, mostly gray rocks composed primarily of quartz and often closely associated with hermaphrodites that have been mined in the past to a maximum depth of approximately 50 meters due to water intrusion.





Exploration targets Taronga
(Source: First Tin)

Taronga – location and infrastructure

Taronga was acquired in 2022 and benefits from more than a century of development, including extensive drilling, tunneling and mining. Like Tellerhäuser, Taronga is surrounded by excellent existing infrastructure and numerous undeveloped tin deposits that offer significant exploration potential. Significant exploration work was carried out by BHP in 1933, 1958 and 1964 and by the Newmont Joint Venture from 1979 to 1983. A feasibility study confirmed that Taronga is very well suited for a renewable energy operation.

Taronga – exploration success and giant resource

The Taronga deposit is one of the simplest surface hard rock projects in the world and consists of coarse cassiterite in planar veins

that preferentially fracture during crushing. The deposit outcrops are located on a hill and are easily mined as a low ratio open pit. Previous mineral processing test work indicates good recovery, with most of the cassiterite being released at a very coarse crushing size. These characteristics will make the deposit very easy to mine and process. Ongoing RC drilling has proven a 400-meter extension in 2023 to the south-west of the current resource area, which offers great potential for adding tonnage to the existing indicated resource. Among other things, 35 meters of 0.20% tin were encountered there, including 15 meters of 0.35% tin.

Exploration work at Taronga led to the discovery of 6 other targets with planar quartz-cassiterite veins similar to Taronga, including: Great Britain, Pound Flat, McDonalds, Big Plant Creek, Poverty Point and Emerald.

Further, the 2023 drilling demonstrated both the thickness and grade of mineralization previously reported by Newmont between 1979 and 1982.

Finally, in June 2023, First Tin also received confirmation of its “tin district” thesis in the Taronga District, with the first drill hole on the Tin Beetle property returning 7 meters of 0.629% tin within a wider interval of 48 meters of 0.183% tin from only 2 meters depth. Tin Beetle is located 9 kilometers from the Taronga tin deposit. Mineralization was finally confirmed over the entire 2.3 kilometers tested to date. This confirms the Company’s 340 km² property in the Emmaville area as a “tin district” with excellent potential for satellite deposits to the large Taronga deposit. Historically, approximately 88,000 tonnes of alluvial tin has been mined in the Emmaville district, the majority of which is from the Tin Beetle area. Crushing tests confirmed First Tin’s assumption that the mass passing through the plant can be significantly reduced and the tin grade significantly increased. An additional drilling permit has been applied for at the Tingha Tin Field.

In September 2023, First Tin was able to provide its first proprietary resource estimate for Taronga. According to this, the project has measured, indicated and inferred resources of 133 million tonnes of rock averaging 0.16% tin, resulting in a total resource of 138,300 tonnes of tin.

Taronga – PFS and definitive feasibility study

Furthermore, a pre-feasibility study (PFS) was prepared for the plant and a mining lease was obtained for a portion of the deposit. Based on a mine production plan that called for total production of 23.2 million tonnes at a tin grade of 0.16%, the PFS showed solid economics. Thus, based on a tin price of US\$25,000 per ton, the project has an NPV of US\$90 million, cash costs of US\$14,303 per ton, and an IRR of 38%. Capital costs were estimated at US\$76 million. For a tin price of US\$40,000, the NPV would be US\$326 million and the IRR a phenomenal 100%. In August 2022, the company commissioned Mincore Pty Ltd. to prepare a definitive feasibility study. This is expected to be completed in the fourth quarter of 2023.

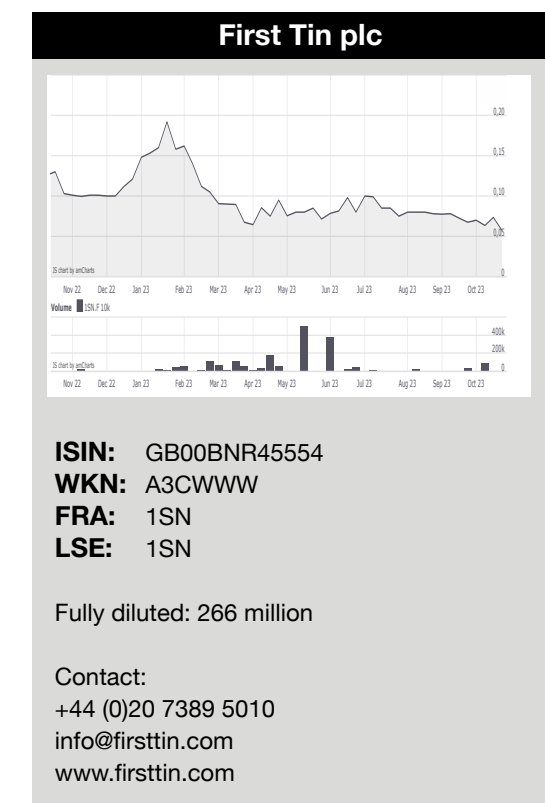
Summary: In excellent position for a promotion (or two) of your own.

First Tin has been able to very quickly develop not one but two high-caliber tin deposits, which together are among the largest tin deposits in the world. The company is superbly financed, with over £15 million so that all work including the two definitive feasibility studies has been funded through. The importance of the two projects was demonstrated in December 2022 when the company was guaranteed up to AU\$494,038 in grant funding from the New South Wales Critical Minerals and High Tech Metals Activation Fund. Saxony is also making good progress. The licenses are located in a min-



(Source: First Tin)

ing area and therefore in a mining-friendly environment. In addition, the mine’s visible footprint should be very small, as all major workings and equipment are planned underground. Thus, the company should see tremendous newsflow in the coming months and the two projects should be elevated to a completely new valuation level with the feasibility studies.



Gama Explorations

Development of several battery metal projects with high potential



Gama Explorations is a Canadian mining development company focused on the discovery and development of high-caliber battery metal projects in Canada. The Company's objective is to create value for its shareholders through the exploration, acquisition and development of undeveloped base metal projects with significant upside potential. Gama Explorations is currently focused on its Muskox lithium project in the Northwest Territories, the Big Onion copper-molybdenum project in British Columbia and the recently acquired Tyee nickel project in Quebec. Initial exploration activities confirmed the presence of potential high-caliber battery metal deposits.

Muskox Lithium Project

The Muskox Lithium Project is located approximately 45 kilometers east of Yellowknife in the Northwest Territories within the Yellowknife Pegmatite Province. A large portion of the 50 square kilometer property remains unexplored. Characteristic of the region and the Muskox Project is a coarse-

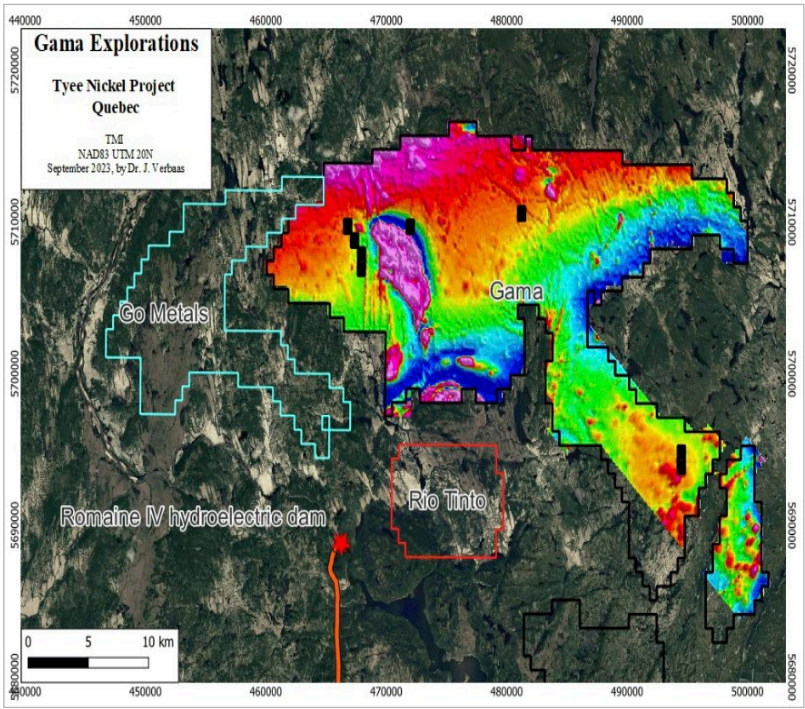
grained, spodumene-bearing pegmatite (the CM-1 pegmatite) with a strike length of over 700 metres and a width of up to 11 metres at surface, located only 100 metres from a year-round road. Recent channel sampling indicates continuity of spodumene content and grades up to 1.34% Li₂O over 5 meters and 1.26% Li₂O over 11 meters. Additional spodumene-bearing pegmatites have been documented approximately one kilometer east of CM-1. The project also hosts several gold occurrences.

In 2023, Gama Explorations undertook an extensive exploration program. This included detailed mapping/prospecting within the Muskox project area with a focus on identifying additional spodumene-bearing pegmatites. Channel sampling of CM-1 was also undertaken. The Company was successful in detecting the CM-1 pegmatite on several occasions during 2023. Mapping indicated better grade continuity along strike of the CM-1 pegmatite than originally thought. CM-1 could extend correspondingly below surface to the south-east, potentially extending its strike length

of 700 meters. This newly sampled location along the CM-1 pegmatite contains visible spodumene. Three additional channel samples were collected along two smaller spodumene-bearing veins identified near CM-1. Three additional channel samples collected along the southeast extension of the CM-1 pegmatite returned high grade Li₂O mineralization, including 5 meters of 0.86% Li₂O. The CM-1 returned 0.72% Li₂O over 5 meters and 1.23% Li₂O over 3.8 meters where it was previously considered barren. Two of three channel samples taken along two smaller spodumene-bearing adits identified adjacent to CM-1 returned high-grade Li₂O mineralization, including 3.2 meters of 0.97% Li₂O, termed PV pegmatites. Both mapping and recent assay results indicate that additional lithium-bearing pegmatites may be discovered between the CM-1 and PV pegmatites. Drill locations and targets have been confirmed. The commencement of an initial drilling program is being planned.

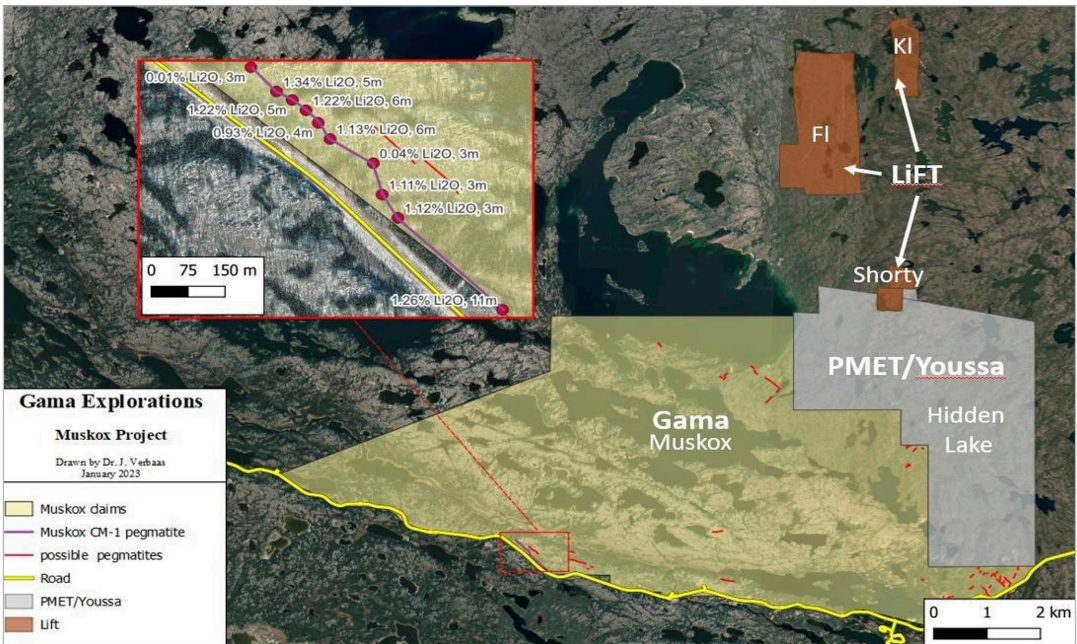
Tyee Nickel Copper Project

The Tyee Nickel-Copper Project is located approximately 130 kilometers north of Havre St. Pierre, Quebec and approximately 12 kilometers north of the Romaine IV Hydroelectric Dam and was recently expanded to 625.9 square kilometers through a combination of staking and acquisition. The Tyee claims include the Havre St. Pierre anorthosite complex, which contains known nickel, copper and platinum group deposits. Tyee also includes some of the most anomalous sediment samples in the complex, as well as geophysical features similar to those of Go Metal's adjacent HSP nickel-copper discovery. A distinct magnetic anomaly is present within the claims that may represent a mafic to ultramafic feeder to the surrounding anorthosite (magnetic low). This feature will be a major focus of exploration as these types of feeders and



Tyee Nickel Project
(Source: Gama Explorations)

conductors are promising for nickel-copper-sulfide accumulation systems. During 2023, Gama Explorations continued to expand at the Havre St. Pierre Anorthosite Complex and announced the purchase of an additional 78.8 km² of claims immediately adjacent to the exploration area of the Company's Tyee Nickel Project. With the purchase of these additional claims, Gama expanded its land holdings to a total area of 625.9 km². In June 2023, Gama Explorations started its Phase 1 exploration program. This consisted of, among other things, a 2,378 line-kilometer SkyTEM geophysical survey that was completed in the summer of 2023. Based on the SkyTEM results, nickel and copper mineralization targets at the Tyee Project in Quebec were assessed and prioritized for immediate exploration work. Drill sites were approved to expedite drilling. Ground exploration commenced in mid-September 2023 and immediately led to the discovery of a new sulphide occurrence in the St. Laurent target over a strike length of 350 meters.



Location of the Muskox
Lithium Project
(Source: Gama Explorations)

Big Onion copper-molybdenum project

The Big Onion copper-molybdenum project is located 16 kilometers east of Smithers, B.C., and is only a 20-minute drive away. This places Big Onion close to major highway infrastructure and within the renowned and well-established metallogenic mining district of British Columbia, Canada, one of the best exploration and mining regions in the world. The Big Onion Claims are characterized by a historic resource, several adjacent induced polarization (IP) geophysical anomalies and numerous targets defined by elevated copper and molybdenum soil geochemistry and rock chips beyond the historic resource. A 630 kilometer airborne geophysical survey was completed in 2016 and defined additional 2D and 3D magnetic anomalies with recommendations for drilling. The geophysical interpretation resulted in increased title acquisition. Limited drilling in 2016 was conducted over selected geophysical targets and encountered a possible extension of the known supergene enrichment zone.

A total of approximately 2 kilometers of geological strike has been drilled to date, with more than 4 kilometers of strike remaining undrilled. The Company has data on more than 45,000 meters of historical drilling. The historical resource is 114.1 million tonnes grading 0.32% copper equivalent with 686.8 million pounds of copper and 21 million pounds of molybdenum in the indicated category and 12 million tonnes grading 0.28% copper equivalent with 64.3 million pounds of copper and 1.5 million pounds of molybdenum in the inferred category.

During 2023, Gama Explorations was able to detect gold grades of up to 5.84 g/t in prospecting trenches. The highest copper and gold values were found more than 2 kilometers east of the historic drilling, indicating a high resource potential.

Top management team

Gama Explorations has a highly experienced and successful management team that is growth oriented with a focus on technically sound exploration and development assets. Management and consultants have diverse backgrounds including geology and investment banking.

Interim CEO Jacob Verbaas is an exploration geologist, with strengths in regional targeting and identifying and executing project-level exploration strategies. He has experience in Australia, North Africa and Canada and has held senior positions with Canadian listed exploration companies since 2017. He found and staked the HSP project during his time as VP Exploration at Go Metals and is the Founder, Director and CEO of CAVU Energy Metals.

Director Norman Brewster is President, Director and Chief Executive Officer of Cadillac Ventures Inc. a development-oriented exploration company and was a Director of Continental Precious Metals Inc. a multi-mineral exploration company, and of BWR Explorations Inc. Brewster is a designated professional geoscientist with Professional Geoscientists Ontario and has been admitted as a member of the Association of Geoscientists of Ontario.

Technical Adviser Bill Cronk has more than 25 years of experience as a geologist and manager of exploration programs for precious and base metal deposits in Africa, Europe, and North and South America, with expertise ranging from basic exploration to advanced stages and pre-feasibility work. Cronk's experience includes working for mining industry leaders such as Dundee Precious Metals and Northern Empire – which was acquired by Coeur Mining – where he gained invaluable management experience and honed his skills in business development, project generation, program design, budget implementation and project management.

Summary: Early-stage opportunity awaits first bull's eye

Gama Explorations is a very young company, having only listed in April 2022. Since then, it has been able to assemble a portfolio of potentially high-caliber battery metal projects in the top jurisdiction of Canada. Thereby, all projects either have known deposits or have meaningful early indicators for corresponding deposits. The Company immediately commenced its first propri-

etary exploration campaigns, which should provide increased newsflow in the coming months. Gama Explorations' management team has already proven in the past that it can make great finds.

Through an oversubscribed financing in February 2023 and a further financing in April 2023, the Company raised more than CA\$7 million, fully funding all upcoming exploration campaigns over the coming months.

Exclusive interview with Jacob Verbaas, Interim-CEO of Gama Explorations

What have you and your company achieved in the past 12 months?

The Company has flown airborne surveys at both its Muskox and Tyee projects and discovered new nickel and copper showings at the Tyee project in Quebec. The Company raised over 5 million dollars in January and is in a great position to advance its battery metals projects.

What are the most important company catalysts for the next 6 to 12 months?

We are looking to start a comprehensive drill program on the Tyee project that will test the newly discovered nickel and copper occurrences.

How do you see the current situation on the market for battery metals?

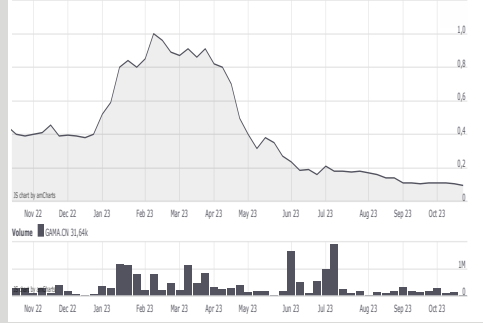
The battery metals market is in a secular upswing, and we expect that the green capex will continue to drive the metals markets. Underinvestment in metals discoveries will cause deficits in the most important markets such as copper and nickel and thanks

to increase in lithium prices over the last decade we have a very clear idea of what those deficits can do to battery metals' prices.



Dr. Jacob Verbaas,
Interim-CEO

Gama Explorations Inc.



ISIN: CA36459L1031
WKN: A3DJ8S
FRA: N79
CSE: GAMA

Fully diluted: 68.3 million

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Golden Arrow Resources

First full hits on several projects



Golden Arrow Resources is a Canadian mining development company specializing in the discovery and development of high-caliber base metal and precious metal projects in Argentina and Chile. The, Vancouver, Canada-based company has a successful history of identifying, acquiring and advancing precious and base metal discoveries. For example, Golden Arrow advanced its Chinchillas silver project in Argentina’s Jujuy province from discovery to development in just five years and then successfully monetized the project by selling it to SSR Mining. Currently, the company is actively exploring in Chile and Argentina. With a pipeline of more than 183,000 hectares of high-grade mineral projects at all stages of development, the company is well positioned to define and develop exceptional new deposits. First full hits in 2023 confirm the high-grade quality of the individual projects.

Flagship project San Pietro – Location and infrastructure

Golden Arrow’s current 100% owned flagship project is called San Pietro, covers 18,448 hectares of exploration and mining concessions and is located in the Atacama region of Chile, approximately 100 kilometers north of Copiapo in an active mining district where all of Chile’s major copper-gold-iron-cobalt (IOCG) deposits are located. The project site has excellent mining infrastructure, being located only 8 kilometers from the mining town of Diego de Almagro. The entire site is accessible year-round by well-traveled roads, with a highway and two power lines running through the project. San Pietro is located immediately west of Capstone Copper’s Santo Domingo mine development project and 10 kilometers northeast of its Mantoverde mine.

Flagship Project San Pietro – Geology

Mineralization at San Pietro is typical of an IOCG system with copper-gold-iron-cobalt minerals in breccias, veins and mantos within a zone of K-feldspar-chlorite alteration. The San Pietro project has an extensive historical database that includes results from over 34,270 meters of drilling, as well as over 1,000 surface samples and several geophysical surveys compiled to identify four main target areas. Golden Arrow’s due diligence confirmed the significant potential of the known targets and identified areas where new interpretation and additional work should improve prospects.

San Pietro Flagship Project – Historical Drilling and Targets

The Rincones target area has been the focus of most historical work and drilling and is therefore the primary target for near-term resource delineation. Highlights of drill hole results (47 holes) included 1.14% copper, 0.12 g/t gold and 335 ppm cobalt over 28 meters, 1.20% copper, 0.21 g/t gold and 579 ppm cobalt over 34 meters, 1.25% copper, 0.32 g/t gold and 70 ppm cobalt over 36 meters, and 0.76% copper, 0.13 g/t gold and 146 ppm cobalt over 20 meters. Several other target areas have also shown significant cobalt grades in the past. For example, within the Colla target area, which is located 2.3 kilometers southwest of Rincones. Just four holes have been drilled in the past over a strike length of 2.2 kilometers, all of which have shown significant cobalt grades. These include 626 ppm cobalt over 10 meters, 414 ppm cobalt over 32 meters, 310 ppm cobalt over 17 meters and 364 ppm cobalt over 12 meters. Colla spans 2.2 kilometers of the northwest trending structure, potentially opening a link to the Rodeo target.

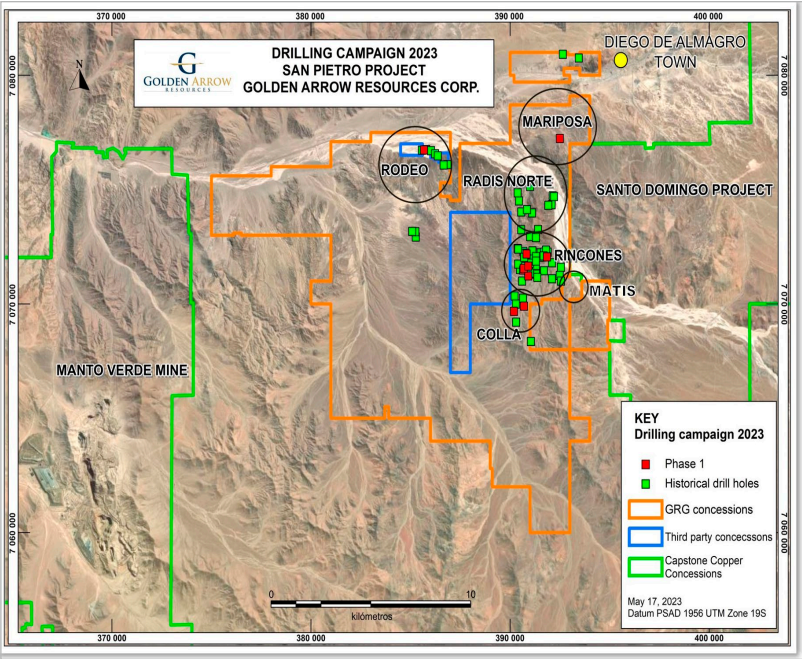
Rodeo is located 7.5 kilometers northwest of Rincones and produced 334 ppm cobalt and 1.03% copper over 34 meters, among other grades. Rodeo lies along the same structure as the Paraiso & Rodeo small private company mining operations. The structure at Rodeo could continue to the Colla target, which is located approximately 5 kilometers to the southeast. Further, the Radiss Norte target, located 2.7 kilometers north of Rincones, had 276 ppm cobalt over 58 meters, 269 ppm cobalt over 27 meters, and 306 ppm cobalt over 29 meters, among others. Radiss Norte is where most of the surface sampling was done, with geophysical surveys indicating that Radiss Norte has deeper targets. Previous drilling has taken place in various directions to intersect the numerous structures.

San Pietro flagship project – Own exploration activities

Golden Arrow Resources started a first drilling campaign with about 2,650 drill meters in February 2023, which was quickly expanded to 10 holes with a total of 3,500 drill meters. The first two drill holes already hit the bull’s eye. These included 34 meters averaging 0.41% copper, 0.07 g/t gold, 466 g/t cobalt and 18.0% iron, including 11 meters averaging 0.98% copper, 896 g/t cobalt and 30.9% iron. Additional drill success was revealed during the remainder of 2023. These included 19.86 meters averaging 0.49% copper, 0.19 g/t gold, 575 g/t cobalt and 17.26% iron, including 6 meters averaging 1.47% copper, 0.34 g/t gold, 517 g/t cobalt and 15.42% iron, and 64.2 meters averaging 0.86% copper, 0.20 g/t gold, 196 g/t cobalt and 25.9% iron at shallow depth.

More projects

In addition to the fairly advanced San Pietro project, Golden Arrow owns both several



Current San Pietro Drilling Program (Source: Golden Arrow Resources)

other earlier-stage core portfolio projects with high discovery potential and joint venture projects that may experience value growth as the Company advances its flagship and core projects.

Caballos

One of these projects is Caballos, which is currently optioned to Hanaq Argentina S.A.. The Caballos property covers more than 12,000 hectares and is located in the province of La Rioja in the Andes Cordillera at an altitude of 4,000 to 4,500 meters above sea level. A paved highway and good gravel roads provide easy access to the eastern part of the property. In 2012, Golden Arrow discovered a large copper-gold porphyry target at Caballos through the completion of a surface exploration program including an IP/resistivity geophysical survey, a detailed ground magnetic survey, geological mapping and additional geochemical sampling of surface rocks and debris. The core magnetic zone of the interpreted porphyry system measures 300 by 800 meters. Sam-

pling at the edge of the magnetic core survey returned 12 meters averaging 2.4% copper within an 18-meter continuous chip sample. A nearby hand trench returned a composite chip sample averaging 0.60% copper and 0.35 g/t gold over 5 meters.

Don Bosco

The Don Bosco copper-gold project comprises a total of approximately 4,300 hectares of exploration licenses covering five distinct target areas in the western province of La Rioja, Argentina. The property is located at an elevation of 2,500 to 3,500 meters above sea level. Work can be carried out throughout the year and an asphalt highway provides easy access to the southern part of the property. The Don Bosco project includes historic copper and gold occurrences as well as high-grade mineralized zones identified by the Company's exploration teams. Golden Arrow conducted several prospecting and sampling campaigns on the project. A total of 187 reconnaissance rock chip samples were collected from three different target areas: El Pircarda copper-gold skarn, Llantenos copper zone and Las Minitas silver zone. In doing so, the Company received some encouraging results, such as a composite chip sample from the San Alberto Scarn zone of 11 meters averaging 0.53 g/t gold, 46 g/t silver and 1.77% copper, a composite chip sample from the El Pircarda Scarn zone of 2.4 metres averaging 2.04 g/t gold, 114 ppm silver and 10.0% copper, and chip samples from the Llantenos Sedex zone of 1 metre grading 25% copper and 8.6 g/t silver, 2 metres grading 3.3% copper and 33 metres grading 0.49% copper.

Espota

The Espota Project consists of two exploration concessions covering 2,887.3 hectares on the eastern edge of the Andes

Cordillera in San Juan Province. The project is located at an elevation of 2,700 to 3,200 meters, which allows for exploration work almost year-round. Access is from the town of Bella Vista via a 25-kilometer provincial road followed by a 13 kilometer gravel road. Golden Arrow has entered into an option agreement to acquire 100% of the project. Golden Arrow has commenced a surface exploration program across the property and has already identified a 1 square kilometer area that hosts multiple targets of shear zones, breccias and veins of quartz-tourmaline-hematite alteration and gold-silver mineralization. Initial channel sampling through breccia bodies in this area returned a best intercept averaging 27.7 metres of 1.57 g/t gold, including single samples of 9.64 g/t gold over 0.80 metres and 33.06 g/t gold over 0.95 metres.

Summary: Further increased news-flow expected due to drilling results!

Golden Arrow Resources was already able to sell a project lucratively, which they now want to repeat with the help of IOCG resources. With San Pietro, the company seems to have found a project that hosts several worthwhile targets and is also framed by large deposits to the west and east. In the current year 2023, it could already be impressively proven that San Pietro hosts corresponding deposits, with the high cobalt grades standing out above all. Thus, the coming months will also be characterized by extensive drilling activities. Espota also appears to have a large resource potential. In September 2023, the company carried out a capital increase of CA\$1.5 million.

Exclusive interview with Brian McEwen, VP Exploration & Development of Golden Arrow Resources

What have you and your company achieved in the past 12 months?

It has been a big year for us at our new flagship San Pietro Iron Oxide-Copper-Gold-Cobalt Project in Chile. We evaluated and updated the large historic database, including the relogging of much of the 34,000m of existing drill core. We completed detailed geological mapping plus new sampling and geophysics programs to refine targets. Most recently we completed our first diamond drilling program of ~4,000 metres, which honed our exploration model, particularly at the main Rincones target. Results were outstanding at all 4 targets tested, with intervals such as 64m @ 0.86% Cu, 0.2 g/t Au, 196 g/t Co and 25.9% Fe from 42.8m depth in SP-DDH-12 at the centre of Rincones. The targets are all open for expansion, and we are focusing the next year on advancing Rincones with more drilling and completing the first mineral resource estimate. Aside from San Pietro, we completed detailed exploration programs at several promising gold properties in Argentina and are evaluating next steps for those.

What are the most important company catalysts for the next 6 to 12 months?

Advancing San Pietro is our main focus and catalysts around that are likely to include results from both a target delineation and a resource delineation drill program, followed by the first mineral resource estimate for the project. Following the model of success at our Chinchillas discovery, we are also actively looking for a partner for San Pietro, which could happen at any time. In Argentina, catalysts could include results from exploration at several of our gold projects, as well as from our joint ventures, plus possible additional project acquisitions.

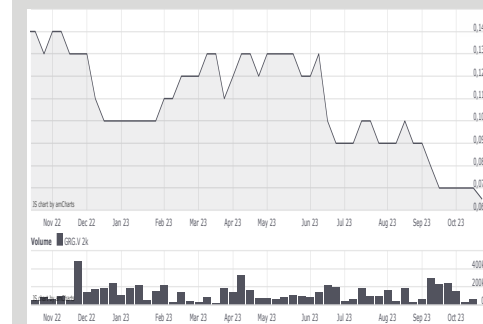
How do you see the current situation on the market for battery metals?

For Golden Arrow, our main battery metal of interest is copper as it is the primary target at our flagship San Pietro property. Indications are that the copper market and price will remain relatively steady for now, with a future shortage predicted by many. San Pietro also has cobalt, which could be a sweetener to the project economics in the future. Cobalt demand for batteries seems to be assured and there is basically no western supply available. So, there is incentive for other cobalt-rich deposits in development around San Pietro in Chile to capitalize on that advantage, and we are watching to see how that develops.



Brian McEwen, VP Exploration & Development

Golden Arrow Resources Corp.



ISIN: CA38080W1023
WKN: A2DSQD
FRA: G6A
TSX-V: GRG

Fully diluted: 141.4 million

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Green Shift Commodities

Several potential high profile assets secured, exploration to start soon

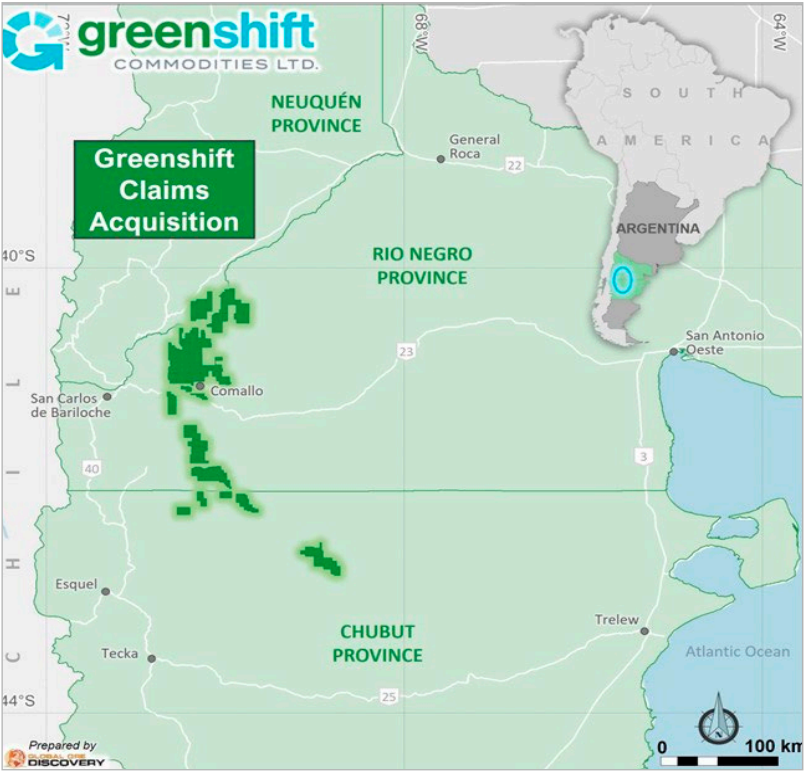


Trumbull Fisher, CEO & Director

Green Shift Commodities is a Canadian mining development company specializing in the discovery and development of high-caliber battery metal, rare earth and uranium projects in Argentina and Colombia. In doing so, it recently secured several potentially high-profile exploration projects covering the full range of metals for the budding electric revolution.

Flagship Rio Negro Project – Location, Scope and Infrastructure

Green Shift’s flagship project is called Rio Negro, covers about 485,000 hectares and spans the three Argentine provinces of Chubut, Neuquen and Rio Negro. The project has good road access, a well-trained local workforce and an internationally certified testing laboratory nearby.



The Rio Negro project, comprising approximately 500,000 hectares of prospective lithium property in Argentina’s Rio Negro, Chubut and Neuquén provinces. (Source: Green Shift Commodities).

Rio Negro Flagship Project – Geology and Historical Work

The staked and granted claims cover a large portion of an intrusive belt known to host lithium mineralization. Historical work by the Argentine State in the 1960s on granite occurrences in the Manuel Choique area identified 19 separate pegmatite bodies where assay results from 60 rock chip samples ranged from 0.6% Li_2O to 4.1% Li_2O , with an average value of 2.0% Li_2O . Manuel Choique covers approximately 50,000 hectares over an area of about 40 by 20 kilometers. This area will also be the initial focus of future exploration campaigns, as it has tens of kilometers of additional prospective lateral extensions with areas of similar geological and geophysical signatures. Manuel Choique has great potential for locating quartz-feldspar systems containing spodumene, similar to deposits in Quebec and Western Australia. The most important target is La Pintada, an approximately 12 by 7 kilometer area within the Manuel Choique granite complex.



Lithium-bearing pegmatite at Manuel Choique, the most advanced target on the Rio Negro project (Source: Green Shift Commodities)

More than 800 structures (possible pegmatite bodies) have already been mapped by interpreting satellite images in the Manuel Choique pegmatite field. This work showed that the structures identified have a total strike length of over 100 kilometers. A recent field visit confirmed the existence of many of the target structures identified on the satellite imagery. Many of the trenches sampled by the state in the 1960s are still open and may be resampled as part of the planned exploration program. Currently, the Company is working on several permits. An aggressive sampling and mapping program continues to be planned. Community consultations for Phase 1 exploration have been completed and the Company has received positive support for the project. The Company expects to mobilize its field crews in due course following receipt of permits.

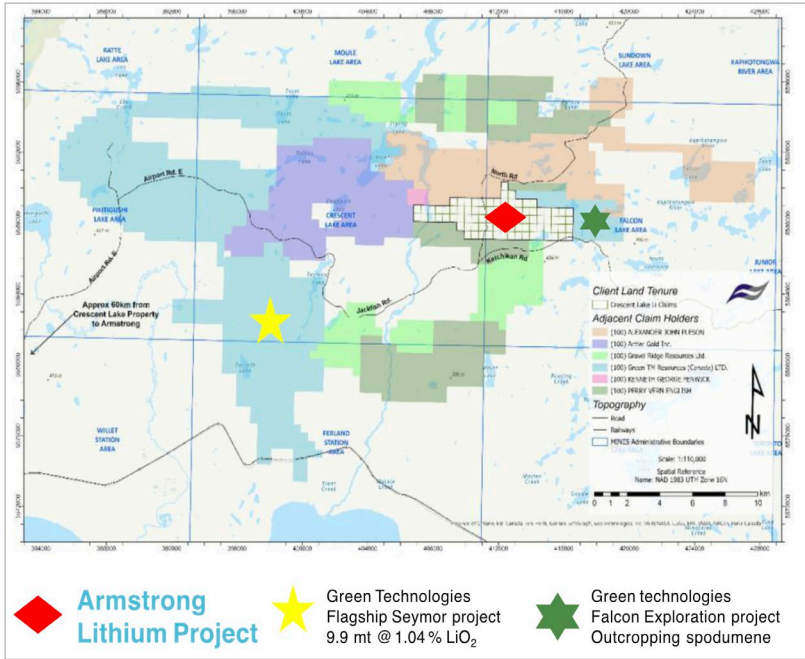
Berlin Deposit

Green Shift’s second project is called Berlin Deposit, is 100% owned by the company and is located in the Colombian province of Caldas. The uranium deposit is located in a sedimentary rock and also contains vanadium, phosphate, nickel as well as rare earths and other elements. The Berlin Deposit is integrated into a very good infrastructure. It is located 60 kilometers from the port of La Dorada on the Magdalena River, which is navigable by barge to Colombia’s largest port on the Caribbean coast. La Dorada is also connected to the Caribbean coast by road and rail. The project is also located within 12 kilometers of a 395MW hydroelectric power plant. The Berlin Deposit already has a historical resource of 21.4 million pounds of U_3O_8 , 810,000 tons of phosphate, 45.2 million pounds of nickel, 96.7 million pounds of vanadium, 838 tons of neodymium, 4,360 tons of yttrium, 59 tons of rhenium, 11.8 million pounds of molybdenum and 49.4



Location Berlin Deposit (Source: Green Shift Commodities)

million pounds of zinc. Exploration work in other mineralized areas indicates that there is an additional exploration target of 20-27 million tonnes of rock grading 0.09% to 0.11% U_3O_8 (equivalent to approximately 50-55 million pounds) over the remaining 7.5 kilometers of the trend. The potential quantities and grades are conceptual in nature. Not enough exploration work has been done to define mineral resources beyond the current deposits. Initial positive metallurgical results indicate that the various commodities can be efficiently extracted from the mineralized rock layer. A proven process that has been used for decades to recover uranium and rare earths at Elliot Lake in Ontario is also suitable for recovering metals and phosphate from the mineralized rock of the Berlin Project. The Berlin Deposit bears strong similarities to both the Nolans Bore deposit in Australia and the Santa Quiteria deposit in Brazil. The Company is working on ongoing optimization through membrane technology and improved recoveries.



(Source: Green Shift Commodities)

Armstrong Lithium Project

In September 2023, Green Shift Commodities acquired the Armstrong Lithium Project. The project consists of 90 contiguous claims with a total area of ~1,800 hectares and is located in the Seymour-Crescent-Falcon lithium belt, ~55 kilometers northeast of the town of Armstrong and ~245 kilometers from Thunder Bay, Ontario, Canada. The Armstrong project is located in the Seymour-Crescent-Falcon lithium trend, which is known to host thirteen spodumene-bearing pegmatites along a 26 kilometer trend between the South Aubrey and Falcon East pegmatite deposits. Significant infrastructure exists near the town of Armstrong, including an airport and rail line. The Armstrong project is accessible by roads and is workable year round. The project property is located in an area that has been heavily focused on lithium exploration; however, the Armstrong project appears to have had little or no lithium focused exploration. The adjacent properties are held by GT1 and Antler Gold Inc. Lithium drilling has been conducted on both adjacent properties, and GT1's Seymour project has a mineral re-

source estimate of 9.9 million tonnes at 1.04% Li₂O, with 5.2 million tonnes at 1.29% Li₂O contained and open along strike and down dip. Previous work on the Armstrong Project included work on lake sediments that confirmed the presence of various base and precious metals including gold, silver, platinum, palladium, copper, nickel, cobalt, chromium, lead and zinc. The project has been little worked recently and requires a systematic sampling and mapping program. While the entire property appears prospective, it is expected that the Company will focus on traversing and sampling the veins and faults. The sharp contrast in the first vertical magnetic derivative is a plausible location for alteration. Another prospective area shows a cluster of pegmatites immediately northwest of the project property boundary that could be a focus for further exploration.

Pampa Litio S.A.

In May 2023, Green Shift Commodities completed the acquisition of a 25% interest in Argentina's Pampa Litio S.A.. Pampa Litio was founded by Argentine geologists to explore for lithium-bearing hard rock pegmatites, particularly in San Luis Province where there are historical deposits of lithium-bearing pegmatites. New Peak acquired an interest in Pampa Litio's mineral exploration properties and conducted a



Lithium bearing pegmatite from the Rio Negro project
(Source: Green Shift Commodities)

number of early-stage exploration programs. To date, Pampa Litio has applied for four exploration properties totaling 34,300 hectares in the San Luis Province of Argentina. The Pampean Ranges host numerous granitic pegmatites with historic mineral resources that have been mined over the last 90 years and account for the majority of feldspar, quartz, mica, beryllium, tungsten, lithium, tantalum and rubidium production in Argentina.

Top management team

Green Shift Commodities has a highly experienced and successful management team.

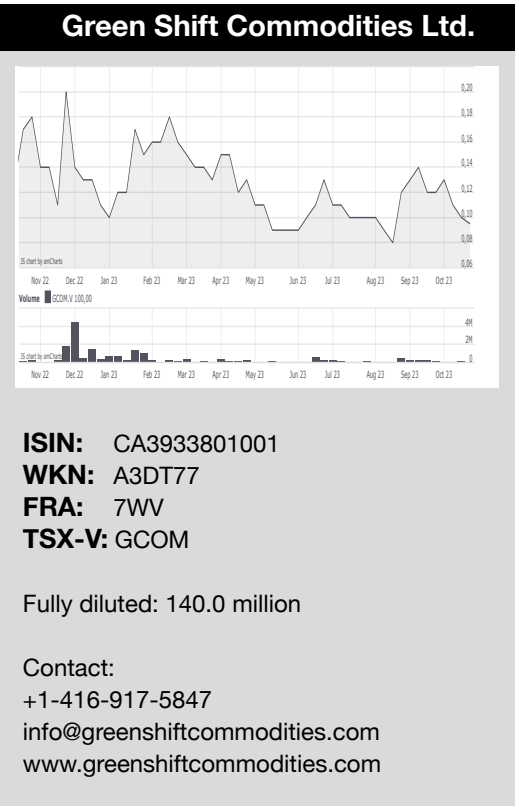
CEO Trumbull Fisher is a capital markets professional with more than 15 years of experience in both investment banking and investment management. He has experience raising capital for small-cap companies while working for institutional investment banks and with start-up companies. Trumbull co-founded an offshore hedge fund that was successfully acquired by another fund in Toronto after several years of management. Trumbull has extensive experience on public and private boards and in other capacities, including as chairman, CEO, president and advisor to public and private companies.

Chairman Dr. Richard Dr. Spencer is a Ph.D. geologist with more than 35 years of experience and brings both entrepreneurial and technical experience to the company. He has led teams that have made significant discoveries: Gencor Ltd.'s exploration team discovered the San Carlos, Mirador and Panantza porphyry deposits at the base, which contain an estimated 24 billion pounds of copper and 3 million ounces of gold; the team from Iamgold Corp. discovered Quimsacocha – Loma Larga, which hosts resources of 3.3 million ounces of gold and 23 million ounces of silver; Crystallex International Corp.'s team at the Las Cristinas gold deposit increased gold reserves by 65% from 10.2 million to

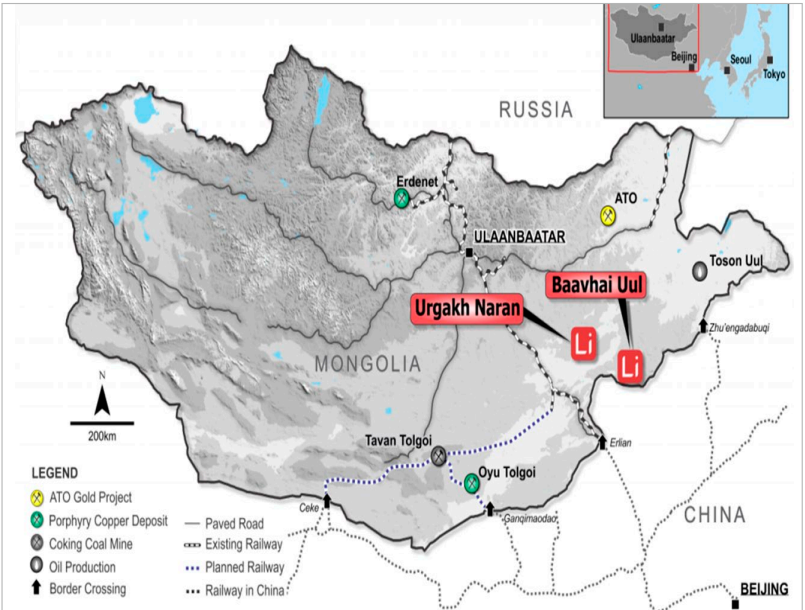
16.8 million ounces. It also conducted targeting and exploration of the giant Witwatersrand Basin gold-uranium deposits in South Africa.

Summary: Initial exploration programs will be trend-setting

Green Shift Commodities already had a prospective multi-element project with a large uranium resource to date and is now venturing into lithium, which is a natural extension of clean energy and battery commodities. The acquisition of Rio Negro and Armstrong, and the investment in Pampa Litio S.A., offers a stake in lithium discoveries in Argentina and Canada. The company is led by a strong team of capital markets and technical experts – many of whom are new to the company – and supported by an experienced team in Argentina and Colombia. Green Shift Commodities offers investors an attractive opportunity to participate in today's rapid transition to green technologies.



Lithium ION Energy is a Canadian-Mongolian mining development company specializing in the aggressive development of lithium brine projects. Management has a strong track record in resource projects in Mongolia, which is why Lithium ION Energy’s flagship projects are also located in Mongolia. Initial drilling confirmed the presence of significant lithium brine deposits. As a second pillar, the company secured two additional projects in Canada in 2023.



(Source: Lithium ION Energy)

Baavhai Uul Lithium Brine Project – Location and Scope

Lithium ION Energy’s flagship Baavhai Uul project is located in southeastern Mongolia, only about 30 road kilometers from the Chinese border and thus from the world’s largest battery producer. The project site covers 81,000 hectares, making it one of the largest approved exploration licenses and also the first lithium brine license in Mongolia’s history. The project is located in one of Mongolia’s largest and also least explored salars.

Baavhai Uul Lithium Brine Project – First Exploration Successes

Baavhai-Uul has high potential for a high-caliber lithium brine resource, as drilling has already confirmed. Average lithium grades of 426ppm (parts per million) were detected directly at surface. The highest lithium concentration was 811ppm. All holes drilled contained lithium concentrations and also had low potassium and magnesium ratios, favoring the formation of large crystals at the present elevation and sometimes low temperatures. The project area is characterized by extremely high evaporation and concurrent low precipitation.

Baavhai Uul Lithium Brine Project – New Discovery of Lithium-Nickel-Copper Resource.

In the fall of 2021, with the assistance of three drill rigs, the Company commenced an initial surface drilling program of 222 holes totaling 1,034.5 drill meters. Holes were drilled to a maximum depth of six meters with samples taken every 0.50 meters. The holes were drilled at a spacing of more than one kilometer, representing a first comprehensive pass through the licenses. Initial exploration success was seen in the first laboratory-verified drill holes. These included the detection of up to 1,502 ppm lithium in clays and evaporites, with the drill hole averaging 700 ppm lithium at a depth of 0.5 to 3.5 metres. Another drill hole averaged 650 ppm lithium at a depth of 4 meters to 6 meters, with the final drill hole sample returning 860 ppm lithium. This new discovery was subsequently named the White Wolf Prospect. Furthermore, traces of nickel and copper were found in several drill holes. One of these returned results of up to 2,150 ppm nickel from 5.0 to 5.5 metres depth in clay samples and an average of 202 ppm nickel. In the eastern area of the license, numerous drill holes assayed

over 200 ppm and up to 480 ppm nickel, which will be the subject of further infill drill programs.

Urgakh Naran Lithium Brine Project – Location and First Top Results

In February 2021, Lithium ION Energy acquired the Urgakh Naran Lithium Brine Project, which covers approximately 29,000 hectares and is located approximately 150 kilometers west-northwest of Baavhai-Uul. Previous work conducted at the project site included an extensive hydrochemical sampling program of identified surface lithium in brines. This revealed that the main body of the Urgakh Naran Salar is approximately 10 kilometers by 3 kilometers in size. Further sampling resulted in a brine sample collected at the surface from a shallow basin that returned a value of 918 mg/L lithium, representing the highest quality lithium brine sample ever collected in Mongolia. In addition, an 82 line-kilometer TEM survey was completed. All lines showed resistivity starting at a very encouraging 0.2 ohms and culminating in a maximum resistivity value of 500 ohms, showing similarities to corresponding salars in the South American Lithium Triangle.

Urgakh Naran Lithium Brine Project – Further Drilling Successes and Current Catalysts

In 2022, they brought to completion an additional 16 line-kilometer TEM survey that overlapped the previous 82 line-kilometers. The results show strong conductivity and low resistivity typical of a significant brine aquifer. In total, this measured 22.7 billion cubic meters of low resistivity aquifer. Furthermore, drilling of three lithologic diamond core holes with a total length of 954 meters was carried out. The Company received top results from all three holes of 123 meters of 278ppm lithium, with a max-

imum lithium grade of 832ppm over 2 meters, 100 meters of 362 ppm lithium, with a maximum lithium grade of 601ppm over 2 meters, and 71.4 meters of 360 ppm lithium, with a maximum lithium grade of 911ppm over 2 meters. In addition, a total of three hydrological test holes were drilled to a depth of 300 meters, revealing cumulative gravelly, porous and permeable zones starting at 184 meters with a thickness of at least 80 meters. Currently, the team around CEO Ali Haji is working on the preparation of a first inferred resource. The necessary hydrogeological studies are underway.

Bliss Lake – Canada

The recently acquired Bliss Lake Lithium Project covers an area of 5,798 hectares and comprises a total of five contiguous licenses. It is located approximately 30 kilometers from Yellowknife, the capital of Canada’s Northwest Territories and 5 kilometers from Li-FT Power Ltd’s Road Access Group, where numerous lithium-bearing pegmatites with greater than 1% Li₂O have been identified and sampled. There are numerous pegmatite occurrences identified from Landsat imagery at the Bliss Lake project, the largest of which is reported to have a strike length of over 300 meters. Lithium ION Energy immediately commenced initial exploration activities at Bliss Lake.

Little Nahanni

In August 2023, Lithium ION Energy acquired by staking two additional claims in the Canadian Northwest Territories, referred to as the Little Nahanni Claims. The Little Nahanni claims total approximately 900 hectares and are located in the area where pegmatites were first discovered in 1961. The Company believes that the Little

Nahanni Claims are under-explored for lithium and will provide the opportunity for lithium discoveries and positive partnerships with regional stakeholders and will complement Lithium ION Energy’s current lithium exploration activities in the Northwest Territories.

Strategic partnership with Aranjin Resources

The discovery of nickel and copper resources at Baavhai Uul prompted Lithium ION Energy to form a strategic partnership with Aranjin Resources. The closed joint venture allows both companies to grant each other exploration rights to their respective exploration licenses in Mongolia. Lithium ION Energy and Aranjin will grant each other the right to explore each other’s properties, with Aranjin receiving an 80% interest and Lithium ION Energy receiving a 20% interest in any base metal projects discovered on Lithium ION Energy’s properties, and Lithium ION Energy receiving an 80% interest and Aranjin receiving a 20% interest in any lithium projects discovered on Aranjin’s properties. Both companies will thereby be able to leverage each other’s expertise in their respective metals, with Aranjin receiving the right to explore Lithium ION Energy’s properties for base metals (including copper, lead, zinc, nickel, cobalt and associated metals) and Lithium ION Energy receiving the right to explore Aranjin’s properties for lithium. The area covered by the joint venture includes all mineral rights in Mon-

golia currently owned by Lithium ION Energy and Aranjin. This includes the Sharga Project, the Bayan-Under Project, the Baruun Valley Project, the Baavhai-Uul Project, the Urgakh-Naran Project, as well as any mineral rights acquired by either company in Mongolia after the date of formation of the joint venture. This structured approach aims to increase their exploration acreage in the mineral-rich regions of Mongolia, ensuring that both Lithium ION Energy and Aranjin maximize their opportunities to take a property through to the development stage.

Summary: First resource estimate will attract attention

The lithium market is currently hot, especially China is desperately looking for attractive lithium deposits. Lithium ION Energy was therefore one of the first to recognize the great advantages of Mongolia as a location. Especially the proximity to the largest battery market China is almost unbeatable. Lithium ION Energy’s projects are so huge that they could even host several high-caliber lithium brine deposits, as recent drilling has impressively demonstrated. Added to this are now the projects in the Northwest Territories, which also offer high potential for an economic lithium resource. Soon Lithium ION Energy will be able to present a first resource estimate and soon also a first economic feasibility study, which should lift the company to a completely new valuation level.

And not to forget ION’s ‘crown jewel’, Urgakh Naran, in the strategic location of Mongolia. We’ve already found grades of up to 918 mg/L showing us a significant volume of low resistivity, with very close similarities to South America and Nevada. Very exciting for us, as we’ve been back out there in the last few weeks, working towards an inferred resource on this project that we’re fully funded for thanks to a recent private placement.

What are the most important company catalysts for the next 6 to 12 months?

As mentioned, we’re highly focused on having an inferred resource at Urgakh Naran to share with the market soon.

We’ve also been actively engaged with potential strategic investors and hope to sign on with one once we have announced an inferred resource.

ION also believes that bringing in a strategic will further our goals to advance our Canadian assets. Our Bliss Lake asset could result in a discovery in a highly prospective district, with potential to be a consolidation opportunity for some of the larger players in that area.

We are now reviewing high resolution satellite imagery and will probably do some flowthrough funding this year to commence exploration work in Spring 2024. Most importantly, ION will first meet with our local First Nations community to ensure that they’re comfortable with our path forward, so that together we can unearth the value of what could be a significant resource potential.

How do you see the current situation on the market for battery metals?

The reality of today’s market has impacted every commodity, and especially junior miners. However, the ION team fully believes in our long-term value proposition.

We’re first movers in the jurisdiction closest to the largest manufacturing and consumer base for electric vehicles. I actually had the pleasure of visiting China recently, and to see their shift to electrification firsthand with +50 EV manufacturers and more EVs on the road than any other place on the planet. This was gratifying to see, as the CEO of a company that is determined to play a pivotal role in our world’s battery metals supply chain.

Mongolia is poised for greatness in the resource world. Rio Tinto’s CEO recently announced that Mongolia is the mining jurisdiction that he’s most interested in, and the likes of Elon Musk and Emmanuel Macron have had strategic conversations with the Mongolian government.

Pair the inevitable global electrification demands with operating in a jurisdiction like Mongolia, and ION Energy is very optimistic about the battery metals market!



Ali Haji, CEO

Exclusive interview with Ali Haji, CEO of Lithium ION Energy

What have you and your company achieved in the past 12 months?

ION Energy has been rather aggressive as a team, having started the company in 2020, and already successfully built out a

global portfolio. We recently acquired two assets in the Northwest Territories: a known jurisdiction with industry peers with market caps of anywhere between \$300M and \$1B and already showing proven success.

Lithium ION Energy Ltd.



ISIN: CA4620481099

WKN: A2QCU0

FRA: 5YB

TSX-V: ION

Fully diluted: 77.3 million

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Lithium One Metals

Rapid growth in Canada’s future top lithium districts



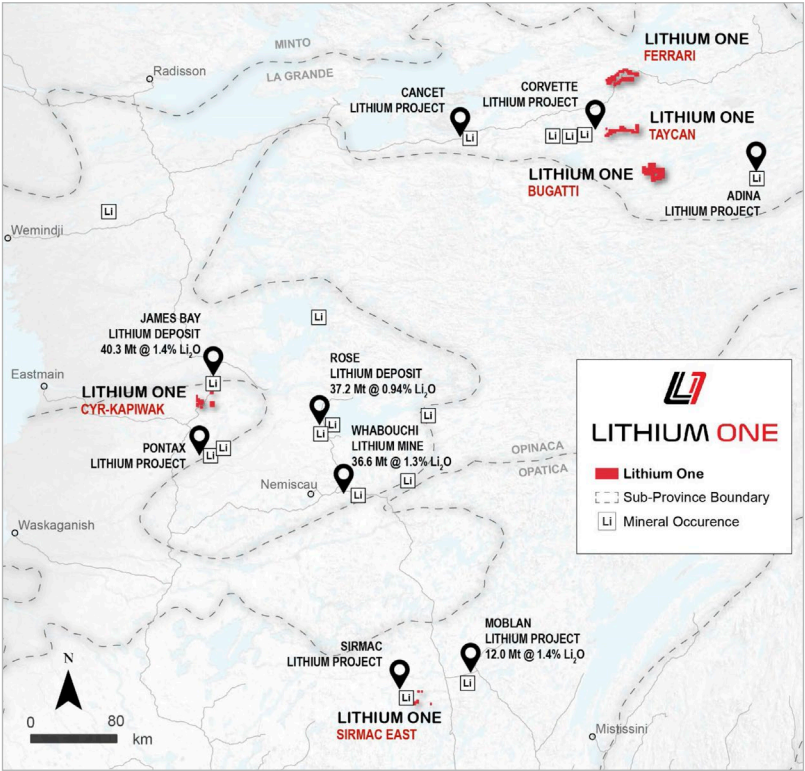
Dale Ginn, CEO

Lithium One Metals is a Canadian mining development company focused on the acquisition and development of high potential lithium properties in Ontario and Quebec – home to Canada’s emerging lithium areas. While Lithium One continues to evaluate opportunities for portfolio growth and recently completed the acquisition of Norris Lithium, the company is currently focused on exploration of the prolific Corvette lithium property in James Bay, Quebec and northwestern Ontario. Overall, Lithium One has a strategic portfolio of lithium properties adjacent or near existing discoveries and deposits.

James Bay Lithium Projects in Quebec

Lithium One holds a dominant land position of approximately 23,650 hectares in one of the fastest growing lithium districts

James Bay Lithium Projects in Quebec
(Source: Lithium One)



in James Bay. There, the company has several advanced stage projects and numerous early-stage deposits. The most important ones are presented below.

Taycan

The Taycan Lithium Project consists of 70 mineral claims covering approximately 3,600 hectares. The Taycan property is located approximately 14 kilometers south of the Trans-Taiga all-weather gravel road and 18 kilometers south of the Cargair seaplane base. The project is adjacent to the Patriot Battery Metals Corvette lithium discovery and lies within the 50 kilometer “CV Lithium Trend”, a growing spodumene pegmatite area. The project also includes the stand-alone “Lac Astrid” claim, which is enclosed by Patriot’s Corvette property. Previous exploration, including regulatory mapping from 2011, identified white pegmatite outcrops with muscovite and tourmaline that could host high-grade lithium. The company launched an exploration campaign in mid-2023, initially focused on exploration, mapping and sampling of pegmatites. Lithium One proclaimed Taycan as the highest exploration priority project in June 2023.

Bugatti

The Bugatti Lithium Project consists of 140 mining claims covering 7,363 hectares. It is accessible by road and is located approximately 30 kilometers southwest of the Corvette Project and 29 kilometers southwest of the Taycan Lithium Project. It is also 75 kilometers from the Adina Lithium Project, owned by Winsome Resources, which has intersected up to 1.34% Li₂O over 107.6 meters. Bugatti is located on a highly prospective lithium-cesium-tantalum pegmatite trend that extends from Corvette Lake to the Adina Lithium Project. The property lies on the edge of

the La Grande Greenstone Belt and is underlain by tonalite and gneiss with mapped pegmatites on the property. Lithium One commenced a two-phase work program in August 2023.

Cyr-Kapiwak

The Cyr-Kapiwak Lithium Project is located approximately 100 kilometers east of Eastman and is accessible by road. It consists of four properties with a total of 42 mineral claims covering 2,220 hectares. The project is located adjacent to the recently permitted James Bay Lithium Mine and is in close proximity to numerous government mapped pegmatite outcrops. The project area is underlain by the Casabiscou Suite, an assemblage of veins and intrusive masses of S-type white granitic pegmatite that locally includes spodumene. The Cyr-Kapiwak properties are located within 12 kilometers of the contact between the Nemiscau and La Grande sub-provinces. Spodumene-bearing pegmatite blocks with up to 2.9% Li₂O were mapped on the northernmost property. The rock source of the lithium-bearing boulders has not yet been determined. Lithium One started from August 2023 a two-phase work program on the property. The Cyr-Kapiwak project is also located adjacent to the recently permitted James Bay lithium mine with a resource estimate of 40.3 million tonnes at 1.4% Li₂O1.

Sirmac East

The Sirmac East Lithium Project is located approximately 170 kilometers northwest of Chibougamau, Quebec and is a prime location for lithium exploration. It consists of 12 mineral claims in 5 blocks totaling 656 hectares. The property is easily accessible by a network of highways and forest roads and is close to existing infrastructure, including a 700 kV power line. The area is

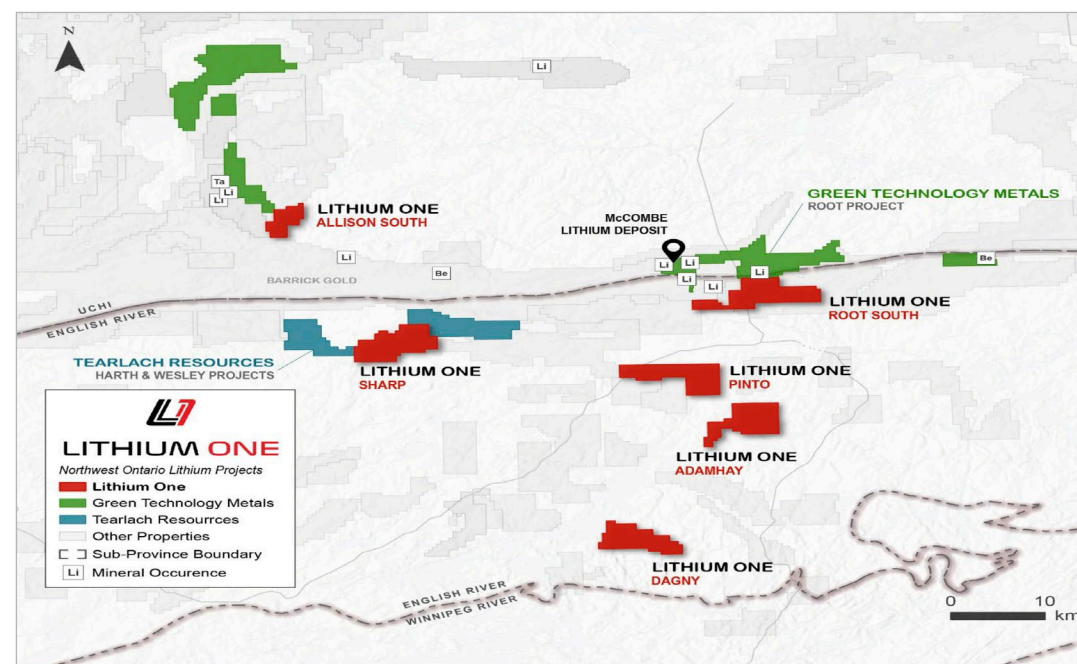
highly prospective for lithium occurring in spodumene-bearing pegmatites, with rock samples collected from the property showing elevated lithium values. The Sirmac East lithium project is located in the north-eastern part of the Superior Geological Province, in the Frotet-Evans volcanic-sedimentary belt. The structural trend is approximately east-west. Lithium deposits in the Frotet-Evans belt include Vision Lithium’s Sirmac deposit with a historical estimate of 1.4% Li₂O and the Say-one-owned Moblan lithium project with a mineral resource estimate of 12.03 million tonnes at 1.4% Li₂O.

Acquisition of Norris Lithium

In September 2023, Lithium One completed the acquisition of Norris Lithium. The transaction added two lithium exploration projects, “Highway” and “Bus”, totaling 4,500 hectares in the renowned Corvette lithium belt in James Bay, Québec. This brought Lithium One’s total land holdings in the area to 20,750 hectares. Norris Lithium’s Highway property is immediately adjacent to Lithium One’s Ferrari property, which grew to 9,000 hectares as a result of the merger. The merged company thus has a total area of 23,650 hectares with lithium potential in Québec.

Lithium projects in Ontario

In Ontario, Lithium One holds a land package covering approximately 26,000 hectares. Several mapped pegmatites have been identified on properties with high prospects for lithium exploration. All projects are located near the boundaries of sub-provinces – low-lying structures that serve as conduits for fertile peraluminous granites. Lithium projects in Ontario are predominantly located within 20 kilometers of Lithium One’s property boundaries.



Lithium Projects in Ontario
(Source: Lithium One)

Root South Project

The Root Lithium Project consists of five recently acquired properties totaling 19,786 hectares in northwestern Ontario. Several pegmatites have been mapped on the project that are highly prospective for lithium exploration. The Root South project consists primarily of the Root South, Allison South, Sharp, Dagny and Adamhay sub-projects, the most significant of which are presented below.

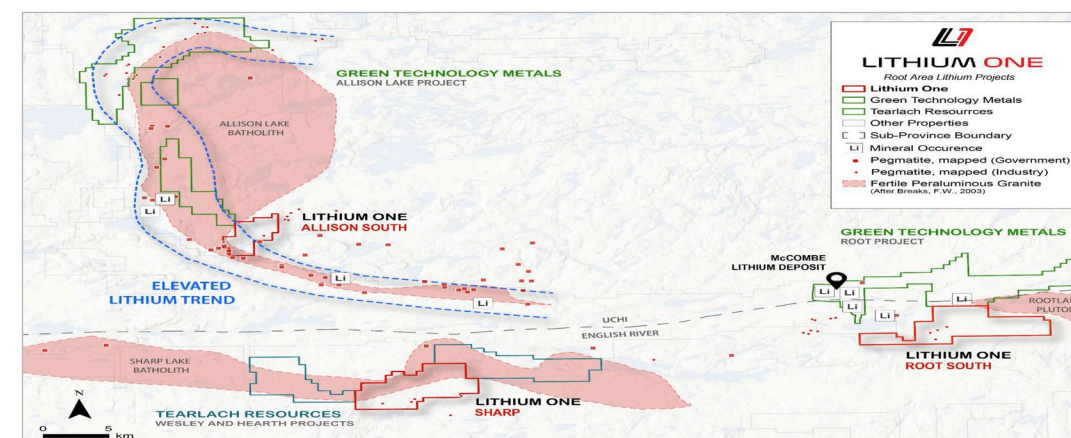
Root South subproject

The Root South subproject is adjacent to the Root Project, owned by Green Technology Metals, and hosts an 8.1 million tonne lithium deposit named McCombe averaging 1.3% Li_2O . The Root South property has several mapped pegmatite occurrences and has a limited lithium exploration history. The property covers 3,570 hectares in the Red Lake Mining District and has year-round road access. Root South is located approximately one kilometer from the boundary between the Uchi and English River sub-provinces. The property is in close proximity to the Root

Lake lithium-cesium-tantalum pegmatite group and several muscovite-tourmaline-bearing pegmatites of considerable dimensions (more than 30 metres wide) mapped on the property by previous operators in the fall of 2022.

Allison South subproject

The Allison South Lithium Property is located in the Red Lake Mining Division, 100 kilometers east of Red Lake, Ontario, with good access to highways and forest roads. It is adjacent to the Allison Lithium Project, owned by Green Technology Metals, and is 40 kilometers southeast of their Root Lithium Project. The project consists of 58 claims covering 1,180 hectares. Allison South Lithium is located 10 kilometers from the Uchi Subprovince/English River Subprovince terrain boundary and underlies the Allison Lake Batholith, a peraluminous, fertile S-type granite with multiple pink and white pegmatites and recorded lithium mineral occurrences to the northwest and southeast. The margins of the batholith have been identified by government mapping as an under-explored and highly prospective area.



Lithium Projects in
Northwestern Ontario
(Source: Lithium One)

Sharp subproject

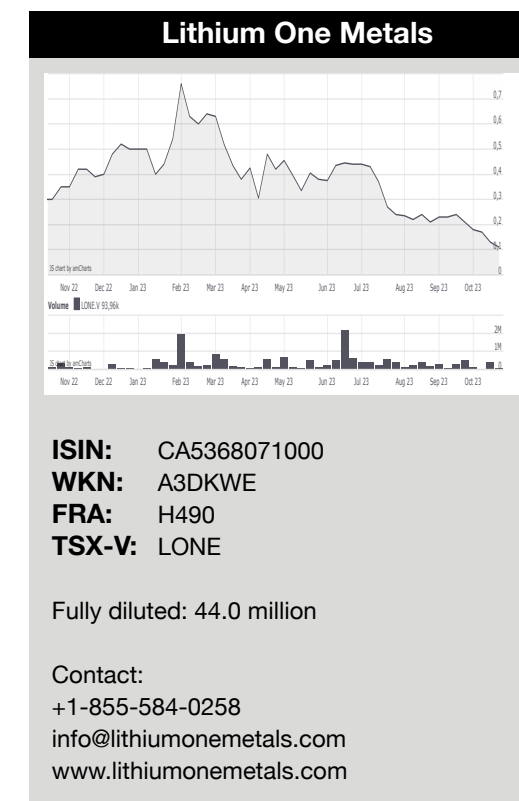
The Sharp lithium property covers 3,225 hectares in the Red Lake mining district, with access to the project via logging roads. The property is adjacent to the Wesley and Harth Lithium projects, which are owned by Tearlach Resources, which acquired the properties in 2022 and is awaiting results from base field work completed in the fall of 2022. Sharp is located approximately 4 kilometers from the boundary between the Uchi and English River sub-provinces and is underlain by peraluminous fertile S-type granites. The property is in close proximity to the Root Lake LCT pegmatite group and several muscovite-tourmaline-bearing pegmatites of significant dimensions mapped on the property by previous operators in the fall of 2022.

In June 2023, the Company also started an exploration campaign in Ontario, initially focusing on exploration, mapping and sampling of pegmatites. Subsequently, drilling is planned in both regions after obtaining the required permits.

Summary: Several exploration campaigns should provide a lot of news in the near future

The team around Lithium One's new CEO Dale Ginn and new CFO Joseph Meagher has assembled a portfolio of several potentially high-caliber lithium projects in two

of Canada's most promising lithium districts in just a few months. The projects are all located near existing deposits and also on rock formations known for their lithium richness. In the coming months, the Company will be conducting extensive exploration campaigns on all of the key projects, which will result in increased newsflow and initial hits. Through a financing, the Company raised CA\$1.4 million in fresh funds in September 2023.



Tearlach Resources

First signs of at least one bull’s eye



Charles Ross, Interim-CEO

Tearlach Resources is a Canadian mining development company specializing in the exploration and development of lithium projects in North America. The company is pursuing a two-pronged strategy. On the one hand, the company has secured a majority stake in a lithium project in Nevada, which is adjacent to one of the world’s largest lithium resources. On the other hand, it is pursuing a hub-and-spoke strategy for each of the projects in Ontario and Quebec, which means that a central processing plant (hub) is fed by several satellite projects (spoke). In the current year 2023, the company was able to score a first bull’s eye on its Gabriel project.

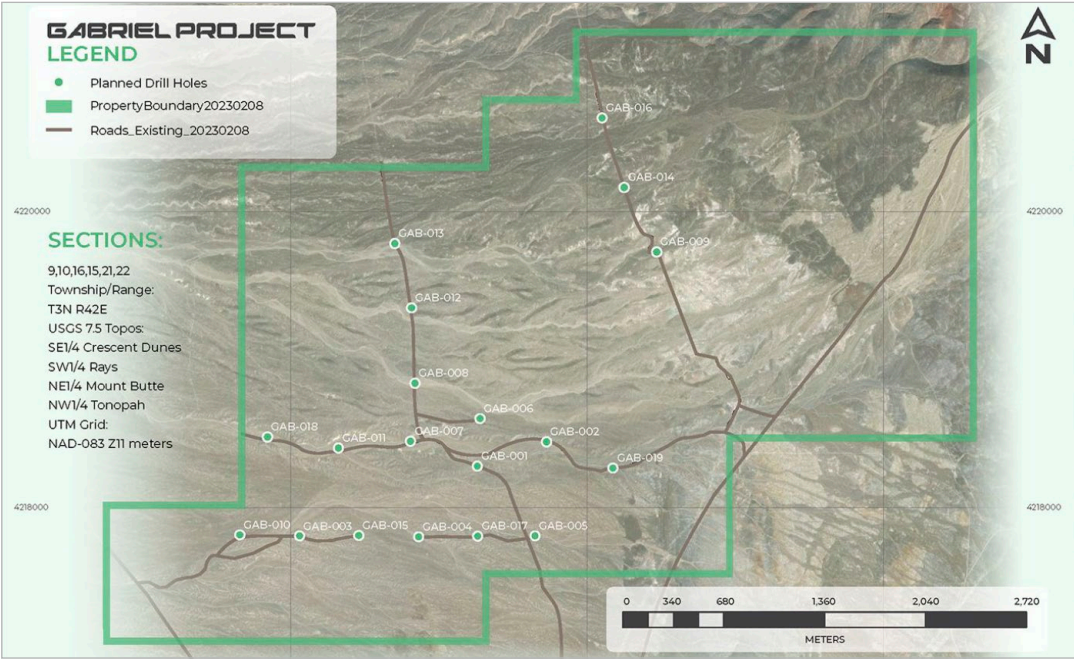
Gabriel Project – Nevada

Tearlach Resources entered into a joint venture with Blackrock Silver in January 2023 to earn up to a 70% interest in the lithium rights of the Gabriel Project north of Tonopah, Nevada. The project is surrounded by lithium-bearing assets – such as American Lithium’s high-grade TLC project with a

world-class resource of over 10 million tonnes of lithium carbonate equivalent (LCE) – and is well positioned for the company to begin ground exploration and drilling campaigns. The project is known to have excellent lithium grades both near surface and at depth, including 1,217ppm lithium over 1.5 meters. The average thickness of the lithium bearing zones known to date is over 28 meters. The first phase of drilling was completed in April 2023. During this process, the Tearlach team found that the results averaged 29% higher than Blackrock’s original results. As a result, it was decided to conduct a control assay program on drill hole samples from selected Blackrock drill holes to expand the geographic distribution of drill hole data for resource modeling. In doing so, the initial drill holes contained broad zones of mineralization with intercepts in excess of 1,000 ppm lithium and grades up to 1,460 ppm. The two holes had grades in the mineralized zones up to 85% higher than Blackrock Silver’s program. In June, Tearlach continued to report results from the re-assaying of six rotary holes drilled by Blackrock Silver in 2022 at the Gabriel Project in Tonopah. These re-assay results confirmed the lithium mineralization intersected in the holes drilled by Blackrock, with the re-assay results indicating 14 – 33% were higher than the original results and had individual grades up to 1,660 ppm lithium. As a result, the Company expanded the Gabriel property by 226 hectares. This expansion was achieved by staking 37 unpatented mining claims on public lands managed by the Bureau of Land Management. The new claims are underlain by the favorable Siebert Formation, with the best rock chip sample grading 840 ppm lithium.

Final Frontier Project – Ontario

The Final Frontier lithium project is located 176 kilometers north of Red Lake and near Frontier Lithium’s PAK project. Final Fron-



Gabriel Project Drilling Program
(Source: Tearlach Resources)

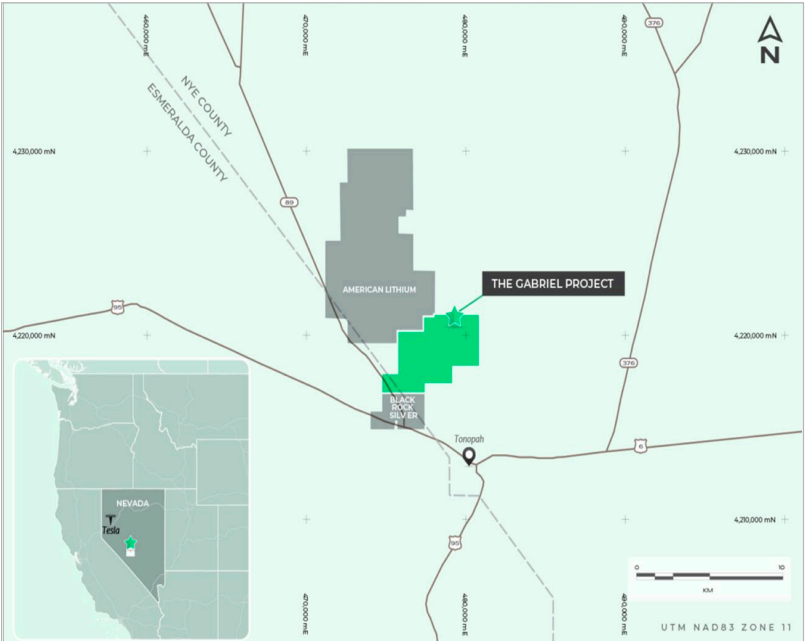
tier consists of three claim blocks, Pakwan, Pakwan Extension and Margot. Pakwan consists of 51 claims with a length of 9.2 kilometers and a width of 1.8 kilometers and is optioned from a third party. Pakwan Extension consists of 23 claims with a length of 5.3 kilometers and a width of 0.9 kilometers and is 100% owned by Tearlach Resources. Margot consists of 102 claims with a length of 11.5 kilometers and a width of 3.7 kilometers and is optioned from a third party. Access to Final Frontier is by winter road or by air via the North Spirit airstrip.

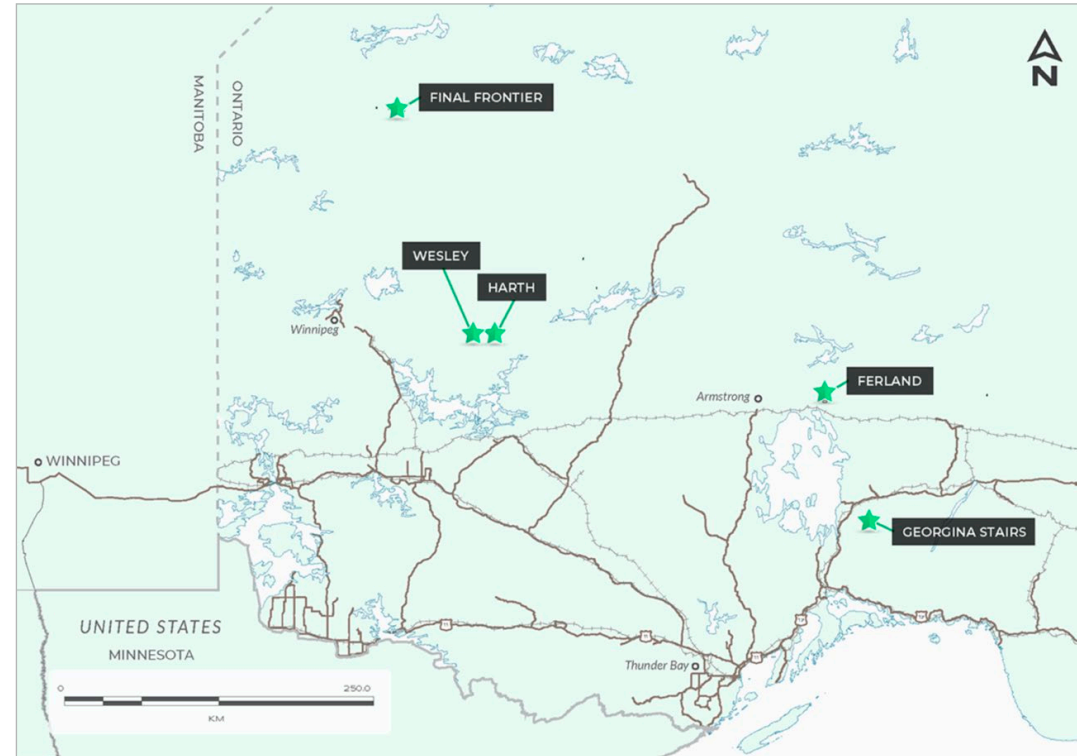
Georgina Stairs Project – Ontario

Georgina Stairs is located 12 kilometers from the town of Beardmore, 50 kilometers from the Equinox Gold/Orion Mine Finance Greenstone gold mine development, 53 kilometers from Nipigon and 146 kilometers from the city of Thunder Bay. Thunder Bay is a transportation hub with a deep-water port for shipping on Lake Superior, a rail line and Trans-Canada highways running east and west across Canada, and a highway south into the United States. Georgina Stairs consists of 585 cell claims near the

Beardmore, Lake Jean, Parks Lake and Leopard Lake areas and is 100% owned by Tearlach Resources. The original claim block is approximately 11,078 hectares in size, measuring 14 kilometers long and 12 kilometers wide. Roads connect the property to Trans Canada Highway #11. The geology of the project is the same as Rock Tech Lithium’s Georgia Lake project and is located 9 kilometers east of Rock Tech’s spodumene pegmatites. The geology is also the same as Balkan Mining and Minerals Limited’s Gorge Lithium Project and is located 4.7 kilometers north of their spodumene pegmatites. Tearlach quickly identified similar geophysical signatures to the known spodumene pegmatites in Georgia Lake. The company then staked a second large land package in the Georgia Lake area. The new property, Georgina East, covers 500 cell claims, is 10,580 hectares in area and measures approximately 17 kilometers by 10 kilometers. Initial mapping and sampling work began in June 2023, and a major milestone thereafter was the discovery of eleven pegmatite outcrops, including both sodium-rich and potassium-rich varieties, indicating that fractionation of the pegmatite melt may have occurred, generating lithium-rich compon-

Location Gabriel Project
(Source: Tearlach Resources)





Location of projects in Ontario
(Source: Tearlach Resources)

ents. Tearlach's ongoing geochemical sampling program will focus on defining geochemical and mineralogical vectors to potential lithium-rich areas of the system, focus.

New Frontier Project – Ontario

The New Frontier project consists of three claim blocks: Wesley, Harth and Ferland. The Wesley and Harth properties are located 68 kilometers east of Ear Falls. The Wesley property consists of 7 claims and is 9.7 kilometers long and 2.8 kilometers wide. The Harth property consists of 6 claims and is 7.5 kilometers long and 4.7 kilometers wide. The Ferland property is located 52.8 kilometers east of Armstrong, consists of 6 claims and is 10 kilometers long and 4 kilometers wide. All three properties have road access and are optioned from a third party. The Harth and Wesley properties are located approximately 8 kilometers apart and both properties are located in the English River sub-province and south of the Uchi-English River sub-provincial bound-

ary. In October 2022, Tearlach Resources collected 33 samples at Wesley. This identified a pegmatite dyke with graphic texture, green muscovite, tourmaline and garnet. Ferland is located in the Winnipeg River sub-province. Most of the property consists of bedded to gneissic tonalite-granodiorite interbedded with diabase sills.

Rose Fliszar Muscovite Project – Quebec

The Rose Fliszar Muscovite Project is located 340 kilometers north of the town of Matagami and 155 kilometers east of the Cree village of Eastmain. It consists of three properties Fliszar North, Muscovite Ridge and Rose North. Fliszar consists of 5 claim blocks totaling 40 claims. Fliszar North is located north of Opinaca Reservoir with road access as it is located between Sarcelle Dam and the Eleonore Newmont Gold Mine. Muscovite Ridge is located 21 kilometers east of Fliszar North. Muscovite Ridge consists of 7 claim blocks totaling 84 claims. It is located east of Newmont's

Eleonore Gold Mine and can be accessed by a combination of road and boat access along the Opinaca River. Rose North consists of 7 claim blocks totaling 82 claims and is located north of the Eastmain-1 Dam. It is also located 15 kilometers north of Fury Gold Mines' Eau Claire gold project. Fliszar has 17 white pegmatites consisting of granite and paragneiss. The presence of muscovite, tourmaline and garnet indicates a higher level of fractionation and greater potential for lithium mineralization. At Muscovite Ridge, the presence of tourmaline and garnet in the pegmatites indicates enrichment with boron and iron from the paragneiss.

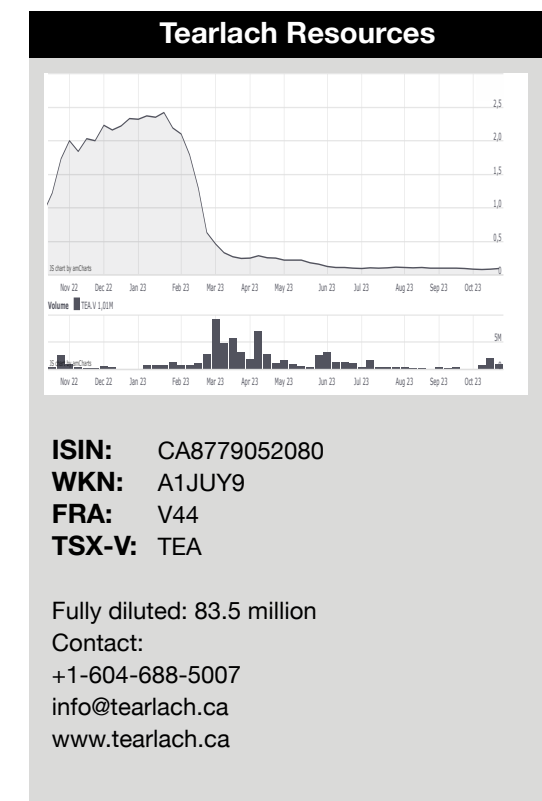
Shelby Project – Quebec

The Shelby project is located 467 kilometers north of the city of Matagami and 184 kilometers east of the city of Radisson. The Shelby Project consists of 6 properties: Patriot Northeast, Patriot North Spodumene, Patriot East, Patriot North, Patriot South and Patriot West. Patriot West and Patriot North Spodumene are accessible via Trans Taiga Road, while the other properties must be accessed by helicopter. The Patriot North Spodumene property is located south of the La Grande 4 Reservoir. The Shelby properties are located within the La Grande Greenstone Belt along the La Grande and Opinaca subprovincial boundaries. Patriot Northeast consists of 44 claims totaling 2,224 acres and is located northeast of Patriot Battery Metals' Corvette Lithium property. Patriot North Spodumene consists of 30 claims totaling 1,530 hectares and is located northeast of the Corvette property. Patriot East consists of 36 claims totaling 1,887 hectares. The property is located east of the Corvette Lithium property. Patriot North consists of 20 claims totaling 1,023 hectares. The property is located adjacent to the Corvette Lithium property. Patriot South consists of 28 claims totaling 1,446 hectares. The property is located 27 kilometers southwest of Winsome Resources' Adina Lithium Project. Patriot West, comprising two claim blocks of 60 claims total-

ing 3,124 hectares, is adjacent or in close proximity to Winsome Resources' Cancet lithium property.

Summary: Extended exploration campaigns should provide for increased news flow

Within a very short period of time, Tearlach Resources has assembled a promising portfolio of potentially high-caliber lithium projects in Canada and the USA. Although, or perhaps because, the majority of the licenses have hardly been explored for corresponding lithium deposits, Tearlach has a tremendous blue-sky opportunity to land at least one bull's eye and possibly even establish a hub-and-spoke plant. The Gabriel project in particular has shown that there are high-grade lithium deposits there. The company has nothing more in mind than to become Canada's largest and most important lithium producer.



US Critical Metals

Critical Metals and Rare Earths from and for the USA

US Critical Metals is a Canadian mining exploration and development company specializing in the development of high-caliber lithium, cobalt and rare earth projects in the US. There, they were able to assemble a portfolio of three potentially high-profile projects that host the critical metals for the U.S., lithium and cobalt, as well as rare earths. All metals or elements feature significant projected demand growth and insufficient supply and are exceedingly important for critical applications for U.S. interests including electrification and national security. An initial drilling program is underway. A lithium project was recently acquired that is located in one of the most high-profile lithium districts in the world.

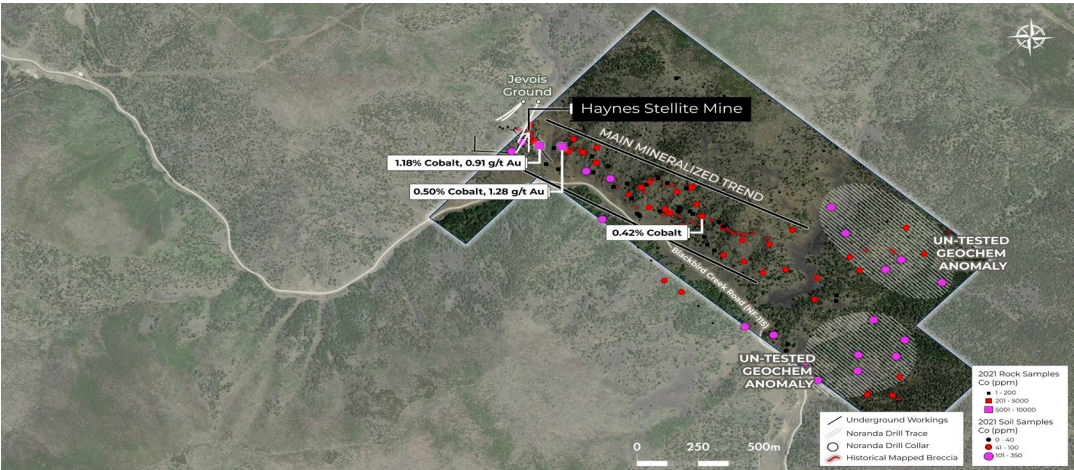
Clayton Ridge Lithium Project

The Clayton Ridge lithium deposit is located in south-central Nevada on the eastern flank of Clayton Valley in Esmeralda County, a large, low-lying basin that hosts the only producing lithium project in the U.S. as well as several major lithium exploration and development projects. The project site is lo-

cated approximately 20 kilometers west of Highway 95 and Goldfield, Nevada, a regional mining center. Access to the project site is good and both exploration and development can be conducted year round. Clayton Ridge consists of 180 contiguous claims covering approximately 3,600 acres with 90 unpatented ore mining claims recently staked. The project was originally developed by the prospector who had already acquired certain claims for American Lithium Corp. and Ioneer Ltd. Clayton Ridge hosts a potential caldera deposit with intrusive veins penetrating the mudstone to the northeast of the property. In doing so, the project potentially offers a similar geological model to Century Lithium's lithium mudstone deposit. A gravity survey conducted in 2011 and 2012 by Hasbrouck Geophysics over the region identified a large low gravity anomaly. Samples collected at surface indicated grades up to 950 ppm lithium, warranting further exploration work throughout the basin and at depth. In this regard, there is excellent potential to build large tonnage as mapping shows units over 100 meters thick. The Company commenced initial core drilling in the southern and central zones of Clayton Ridge in mid-2023. Drilling was based on surface sampling and mapping completed by the Company. To date, an additional 315 rock chip samples have been collected in the project area.

Haynes Cobalt Project

The Haynes Cobalt Project is located in the Blackbird Mining District of the Idaho Cobalt Belt in Lemhi County, Idaho, USA, approximately 32 kilometers southwest of Salmon, Idaho, and less than 2 kilometers east of the historic Blackbird Mine. The Idaho Cobalt Belt hosts numerous historic copper-cobalt deposits and mines, as well as Glencore's Blackbird Mine and Jervois Global's cobalt operations. The project property consists of 23 contiguous un-



Rock samples from Haynes project returned positive preliminary results
(Source: US Critical Metals)

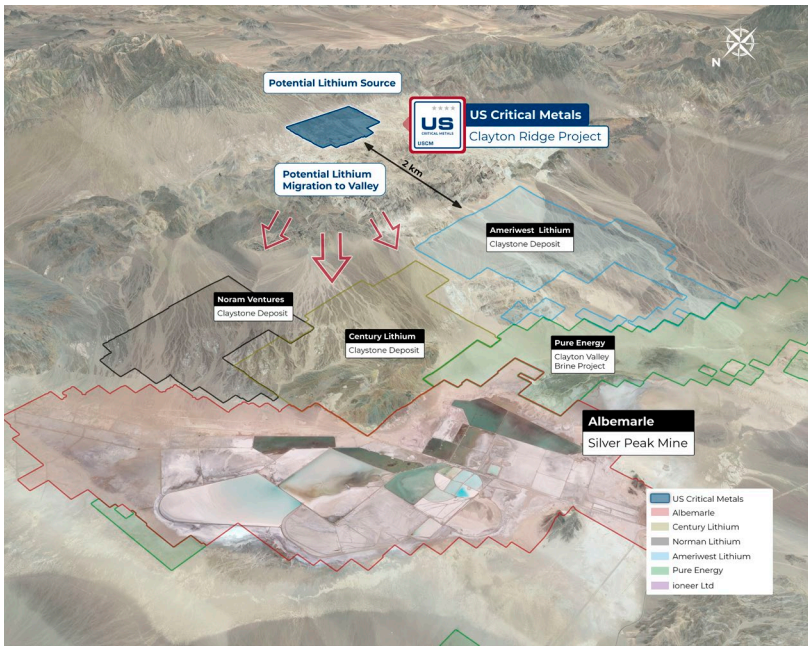
patented mining claims covering approximately 192 hectares. In July 2021, US Critical Metals signed an option agreement with Arizona Lithium Co. Ltd, DGRM and TY & Sons Investment Inc. to acquire a 100% interest in the Haynes Project. The project site is accessible via well maintained gravel roads. The project is underlain by thinly bedded, banded, very fine grained grey and black quartzite with interbedded dark green shale. The mineralized material is within a breccia zone in the quartzite. Heavily silicified and replaced by tourmaline, with an approximate strike of 130° and near vertical dip. Cobaltite occurs within the tourmaline-bearing breccia zone with a strike length of approximately 2 kilometers. Exploration conducted by Noranda Exploration Inc. from 1979 to 1981 further developed the property in the vicinity of the historic adits. The results of surface and underground drilling were promising. Noranda defined the known two kilometer trend of tourmaline-bearing breccia rocks on the property in 1980. Tourmaline-bearing breccias are associated with cobalt mineralization in the historic adits. US Critical Metals recently mapped and sampled the property and completed a geophysical survey. The soil geochemical sampling completed demonstrated two high priority areas for follow-up work. Ore-bearing samples contained abundant heavy rare earth mineraliz-

ation. Rock sampling returned positive preliminary results of 1.18% cobalt and 0.91g/t gold and 0.50% cobalt and 1.28g/t gold, among others.

Sheep Creek Rare Earth Project

Sheep Creek is one of the highest-grade rare-earth projects in the USA. It is located in Ravalli County in southwestern Montana within the alkali belt between Montana and Idaho. Sheep Creek covers 223 lode claims encompassing approximately 4,500 acres. Historical grab and chip sampling of carbonatites indicates the potential for high-grade mineralization with up to 18% total rare earths, including 2.4% (23,810 ppm) neodymium and praseodymium in combination, as well as niobium and other strategic metals. Sampling conducted indicated an average total rare earth content of 6.8% for 51 historical samples. The average neodymium and praseodymium content was 0.9% (864ppm). Thorium grades averaged 200ppm, below the allowable limit of 500ppm. Over 50 carbonatite dykes up to three meters wide can be traced for more than 300 meters along strike. The claims are located on multiple-use land administered by the US Forest Service. Major ore minerals identified include ancylite, allanite, low thorium monazite and col-

Clayton Ridge Lithium Project
(Source: US Critical Metals)



umbite. The veins are valuable as they contain light rare earths and other strategic metals. US Critical Metals' independent partner is US Critical Materials Corp. Montana Technological University has also received funding from the US Army Research Lab to conduct various engineering studies on Sheep Creek. The project site hosts at least eleven of the critical risk elements defined by the US Geological Survey. Key elements identified include neodymium and praseodymium, as well as cerium, dysprosium, europium, gadolinium, lanthanum, niobium, scandium, strontium, and gallium. These elements are critical for the production of batteries for electric vehicles, for various important technologies, and for military and defense applications. The majority of rare earth production is currently controlled by the Chinese government and poses a significant national security risk to U.S. interests. Sheep Creek includes three adits that were developed for niobium mineralization by the Continental Columbium Company in the late 1950s but have not yet been assayed for rare earth mineralization. Historical sampling confirms high-grade mineralization in the property area. The Company has already completed detailed mapping and surface and underground sampling on the historic claims. Furthermore, a program of stream sediment sampling has been completed across the claim block. 37 carbonatite samples collected in 2022 revealed rare earth mineralization with grades up to 171,317 ppm (17.13%) total rare earths, including 22,910 ppm (2.29%) combined neodymium and praseodymium, which are the most sought after of the LREE group. Additional samples were collected from adits 1 and 3, which were developed for niobium mineralization by the Continental Columbium Company in the late 1950s. A total of 23 carbonatite samples confirmed rare earth mineralization with grades up to 102,293 ppm (10.23%) of rare earth elements, including 13,940 ppm (1.39%) of neodymium and praseodymium. Underground results showed an average TREE grade of 50,400 (5.04%), including an average of 6,721ppm (0.67%) of neodymium and praseodymium.

McDermitt Lithium East Project

In September 2023, US Critical Metals signed an exploration and joint venture agreement related to the McDermitt Lithium Project in Nevada. The project covers 6,508 acres and is located in the McDermitt Caldera, an extinct 40x30 kilometer super volcano that formed approximately 16.3 million years ago as part of a hotspot currently located beneath the Yellowstone Plateau. After an initial eruption and the simultaneous collapse of the McDermitt Caldera, a large lake formed in the caldera basin. This lake water was extremely rich in lithium and led to the accumulation of lithium-rich clays. Subsequent volcanic activity uplifted the caldera, draining the lake and bringing the lithium-rich graben sediments to the surface, creating the near-surface lithium present on the project. The McDermitt Caldera is potentially one of the largest sources of lithium clays in the world and hosts some of the largest lithium deposits in the U.S., including the Thacker Pass project in the southern part of the caldera.

Summary: Exploration programs should lead to success as soon as possible

US Critical Metals has recognized the signs of the times and has put together a portfolio of potentially high-profile projects with critical metals for the USA in three US states. The timing for critical metals is favorable, as the US has launched energy security and climate change programs worth at least US\$369 billion over the next ten years. US Critical Metals projects are all located in the US and could contribute to US supply security in the future. The company is in the midst of several exploration programs that should provide increased newsflow. Using a CA\$2.5 million cash financing in April 2023, the company is adequately funded to achieve its next major milestones.

Exclusive interview with Darren Collins, CEO of US Critical Metals

What have you and your company achieved in the past 12 months?

In the last 12 months, we have acquired, financed, permitted, explored and expanded multiple discovery focussed properties within the US. This includes the Clayton Ridge Lithium Property in Nevada, McDermitt East Lithium Project in Nevada, Sheep Creek Rare Earth Project in Montana, and Long Canyon Uranium Project in Idaho. The construction and advancement of this portfolio over the last year provides investors diversified exposure across critical commodities and reduces overall exploration risk associated with a single asset company. Specific milestones include:

- Fulfilling earn-in obligations at Clayton Ridge, which we anticipate owning 100% of the asset post a final phase of current drilling
- Entering into an earn-in arrangement for McDermitt East Lithium Project, one of the most exciting lithium basins in the US (property lies only 19km away for Thacker Pass – the largest lithium deposit in the US)
- Exploring and expanding the acreage positions of the super high grade Sheep Creek Rare Earth Project, including the completion of above and below ground sampling, geophysics and mapping
- Acquiring 70% of the Long Canyon Uranium Project as a strategic holding to further advance as uranium markets develop

What are the most important company catalysts for the next 6 to 12 months?

The company will be putting out results from our maiden drill program at Clayton Ridge in Nevada. It is planned these results will be released this quarter and will present three separate basin structures within the property boundaries. In addition, we will be actively exploring our McDermitt East Lithium Project in the Thacker Pass Area with the objective of defining and permitting a drill program as soon as possible. We will

also be showcasing our summer exploration activities at the Sheep Creek Rare Earth Property.

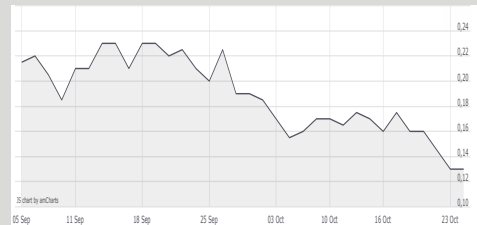
How do you see the current situation on the market for battery metals?

The market potential for battery metals remains attractive from a supply and demand perspective. Major automotive manufacturers continue to roll out new lines of electric vehicles and new resource projects are going to be required to meet the demand of consumers. We also see significant protectionism developing for critical commodities. This includes governments outside the US imposing trade restrictions or new mining laws that will restrict international availability. This underscores the need for the exploration, development and mining of assets within the US.



Darren Collins, CEO

US Critical Metals Corp.



ISIN: CA90366H1010

WKN: A3DHEZ

FRA: 0IU0

TSX-V: USCM

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