About Globe

- Globe Metals & Mining Limited is a Perth based company listed on Australian Stock Exchange (ASX Code: GBE)

Investment Summary

- 100% interest held in Kanyika Niobium Project in Malawi (Africa)

Directors and Management

Ms Alice Wong - Non-Executive Chairperson
Mr Alistair Stephens - Managing Director
Mr William Hayden - Non-executive Director
Mr Bo Tan - Non-executive Director
Mr Ricky Lau – Non-executive Director
Mr Michael Fry – CFO/Company Secretary

Capital Structure

Shares on Issue: 465,922,373

Substantial Shareholders

Apollo Metals: 52.79%
Ao-Zhong International Minerals: 25.36%

Director Holdings*

Mr Alice Wong: 245,983,611 (52.80%)
Mr William Hayden: 1,276,923 (0.27%)
Director Stephens: 1,200,000 (0.26%)
** both direct and indirect*

Contact

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Managing Director
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Niobium

Commodity and Product Information

Globe Metals & Mining Limited (ASX: **GBE**, **Globe** or the **Company**) hereby a provides a presentation in relation to Niobium the primary metal contained at its Kanyika Project in Malawi.

The Company's presentation provides up to date information on Niobium's sources, uses, demand and supply.

Authorisation for Release

This presentation has been authorised for release by the Company's Managing Director, Alistair Stephens.

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Managing Director
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Michael Fry
Company Secretary
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Kanyika Niobium Project

Positioned to be the first niobium mine in fifty years

Enabling Excellence in Engineering

Critical to Technology

Niobium Product Overview
"Sources, Uses and Outlook"
September 2021

Globe Metals & Mining

ASX: GBE

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Disclaimer

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The information in this presentation is an overview and does not contain all information necessary for making investment decisions. In making investment decisions, investors should rely on their own examination of the Kanyika Niobium Project and consult their own legal, technical, business and/or financial advisers. The information contained in this presentation has been prepared in good faith by Globe, however no representation or warranty expressed or implied is made as to the accuracy, correctness, completeness or adequacy of any statements, estimates, options, or other information contained in this presentation. To the maximum extent permitted by law, Globe, its Directors, officers, employees and agents disclaim liability for any loss or damage which may be suffered by any person through the use of reliance on anything contained in or omitted from this presentation.

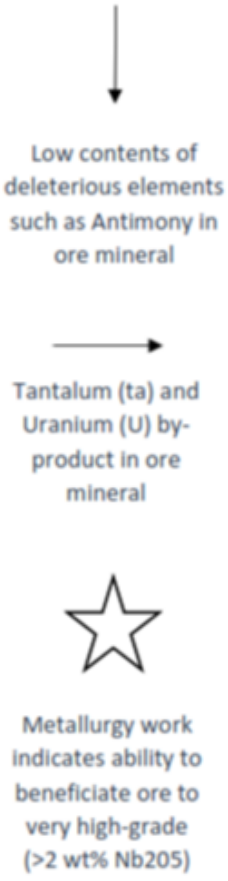
Certain information in this Presentation may refer to the intentions of Globe with respect to the Kanyika Niobium Project, but these are not intended to be forecasts, forward looking statements or statements about the future matters for the purposes of the Corporations Act or any other applicable law. The occurrence of the events in the future are subject to risk, uncertainties and other actions that may cause Kanyika Niobium Project's actual results, performance or achievements to be materially different from the results, performance or achievements implied by the forward-looking statements. Such factors include, but are not limited to, general economic, market and business conditions, market prices for niobium, demand for niobium, niobium supply, concluding of off-take agreements, obtaining of all necessary permits for development and production as and when required, estimation of resources and reserves, development and production costs, transportation delays and costs, risks and uncertainties related to construction and commissioning, delays in construction of the mining operation, accidents, equipment breakdowns, title matters, labour disputes or other unanticipated difficulties with, or interruptions in, development or production, exchange rate fluctuations, and risks and uncertainties associated with doing business in Malawi. In addition, there may be information herein that is information about prospective results of operations, financial position or cash flows and which is provided only to assist in an evaluation of the Kanyika Niobium Project outlined herein, but are not to be relied upon as accurate representations of future results and may not be appropriate for any other purpose.

This presentation may contain forward looking statements including statements regarding our intent, belief or current expectations with respect to Kanyika Niobium Project's performance, market, political, social and environmental conditions, project configuration, construction and commissioning costs and timelines, and general risks and uncertainties. Readers are cautioned not to place undue reliance on these forward looking statements. While due care has been used in the preparation of forecast information, actual results may vary in a materially positive or negative manner. Forecasts and hypothetical examples are subject to uncertainty and contingencies often outside Globe's control. The information in this presentation is current as at the date of the publication of this presentation.

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Project Highlights

First Project in fifty years	Kanyika Niobium Project is positioned to be the first ever niobium mine in Africa and Globe the first new producer in 50 years.
68.3 Mt Resource	JORC (2012) compliant mineral resource estimate of 68 Mt with grade of 0.283% Nb205 (M+I+I) (Cut-Off Grade = 1,500 ppm Nb205)
Favourable metallurgy	Patented metallurgical advancements allowing substantially simpler beneficiation with greater recovery and lower process OPEX.
Integrated operations	Project is configured to maximise leverage off existing supporting industries and central to markets
High growth industries	Project provides an opportunity to participate in the growing alloy market, and the high-growth battery and electronics industries.



Globe
Metals & Mining

Niobium

Uses & Industry Applications

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Strategic Appeal of Niobium

Commercial Niobium projects are rare, strategic & valuable

China is the largest global consumer with no commercially viable niobium projects

Niobium is a 'strategic metal' for USA, Russia and Britain

Niobium makes steel stronger, lighter & significantly improves corrosion resistance

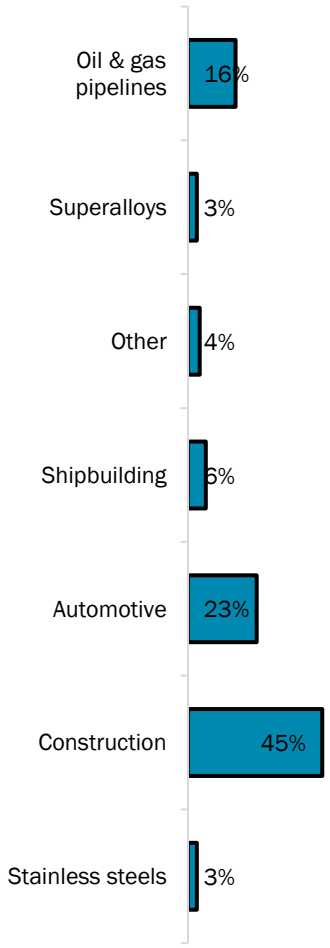
Critical in high strength low alloy (HSLA) steels for construction and automotive industries, in superalloys for aerospace and military equipment, and in various 'green' technologies such as wind turbines and rechargeable batteries

KEY ADVANTAGES

Exposure to fast growing electric vehicle market	Titanium niobium anodes expected to become standard for the next generation Lithium-Ion batteries – refer Toshiba announcement, *October 2017*
Lack of any direct substitutes	No cost effective substitutes for Niobium which match its strength characteristics
Low intensity of use	Demand for higher quality steels leading to higher intensity of use. Emerging countries, especially China & India, underpin long term demand.
Only 3 major niobium producers worldwide	Existing producers responsible >95% of global supply. No new mine within last 20 years.

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Conventional Uses for Niobium - by Industry











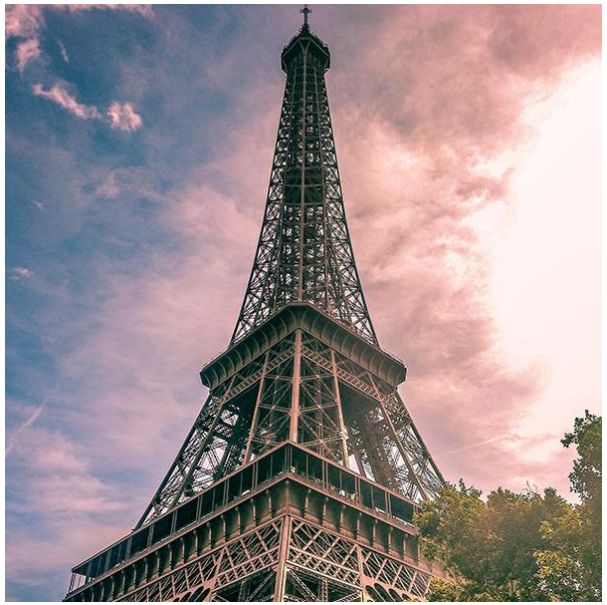


Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Conventional Use - Example Applications



The Millau Viaduct in southern France was constructed using HSLA Steel containing 0.025% niobium; reducing the weight of steel and concrete by 60%



Construction of the Eiffel Tower in Paris used 7,300t of wrought iron. Today it could be built using only 2,000t of HSLA steel



Most of the world's 3.5m kms of high pressure gas and oil pipelines contain niobium to make them safer, lighter and able to transport large volumes of hydrocarbons at higher pressures.

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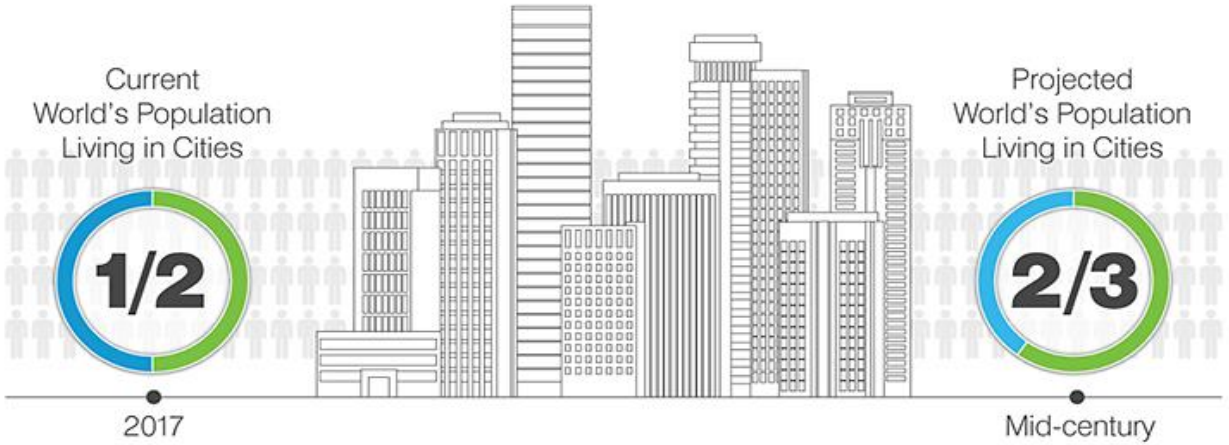
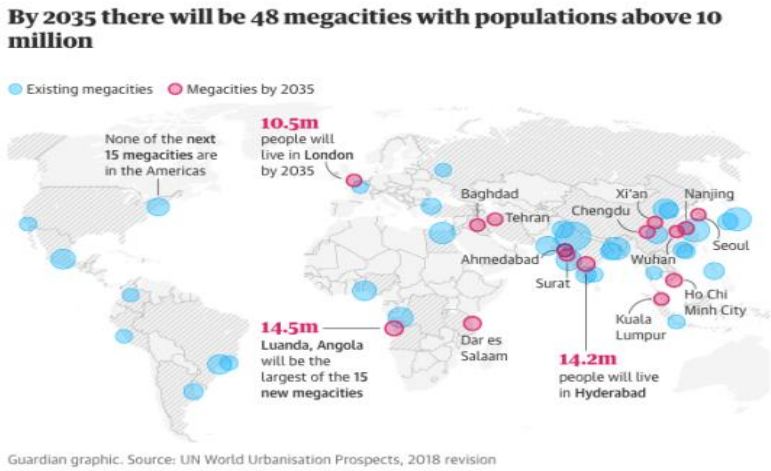
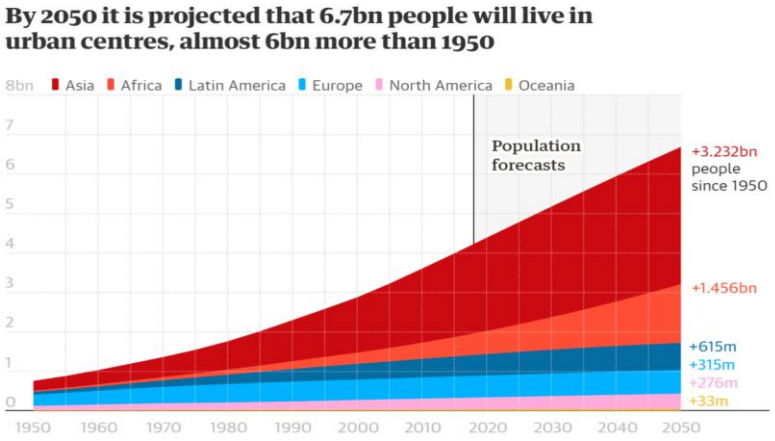
Conventional Use – Structural Steel

Use of niobium for structural steel is forecast to continue to grow due to increasing rate of urbanisation and the expected growth in the number of cities, with HSLA steels integral to high-rise construction.

People will need somewhere to live.







Source of Images: UN Worldwide Urbanisation Prospects (www.theguardian.com/cities)

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Conventional Use – Structural Steel

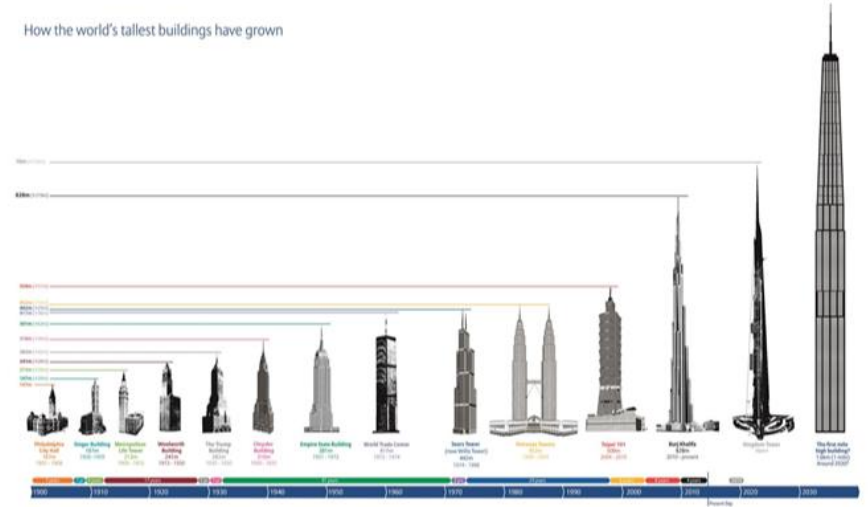
Cities are increasing in number and getting larger and taller.

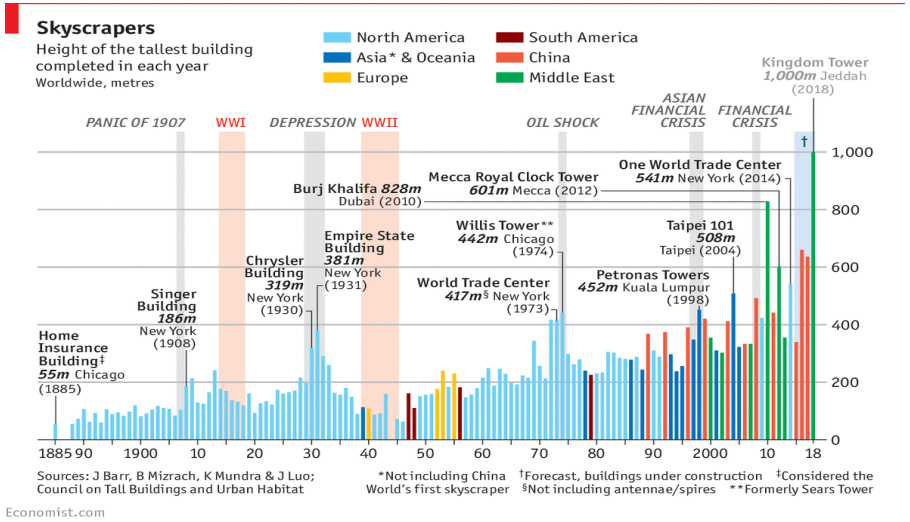
2017 was a record year for skyscraper construction with 144 built. Over half were built in China.

The Burj Khalifa is the tallest building in the world today boasting more than 160 stories and standing over 828 metres.

It is estimated that there will be 30 cities the size of New York city built between 2020 and 2050.

By 2100, Lagos (Nigeria) is predicted to be the world's largest city with a population of between 85 and 100 million people.

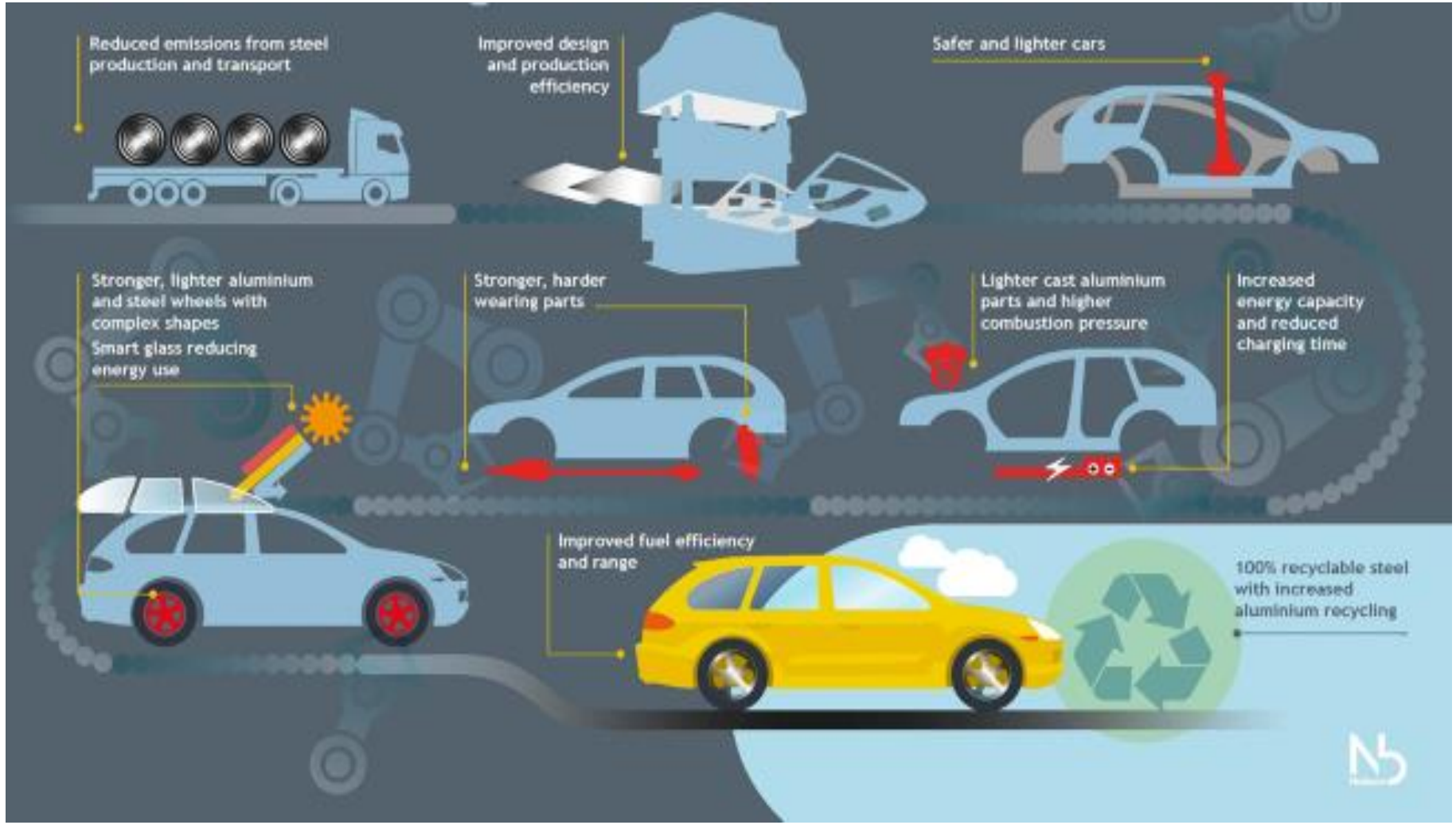




Source of Images: Top: www.theconstructionindex.co.uk; Bottom: www.economist.com/graphic-detail/2015/04/24/constructive-one-upmanship

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Conventional Use – Automotive



The use of niobium to create stronger and lighter vehicles has and continues to change the face of the automobile industry.

$9 of Niobium added to a mid-sized automobile reduces its weight by 100kg, increasing fuel efficiency by 5%.

(*Source: World Steel Association*)

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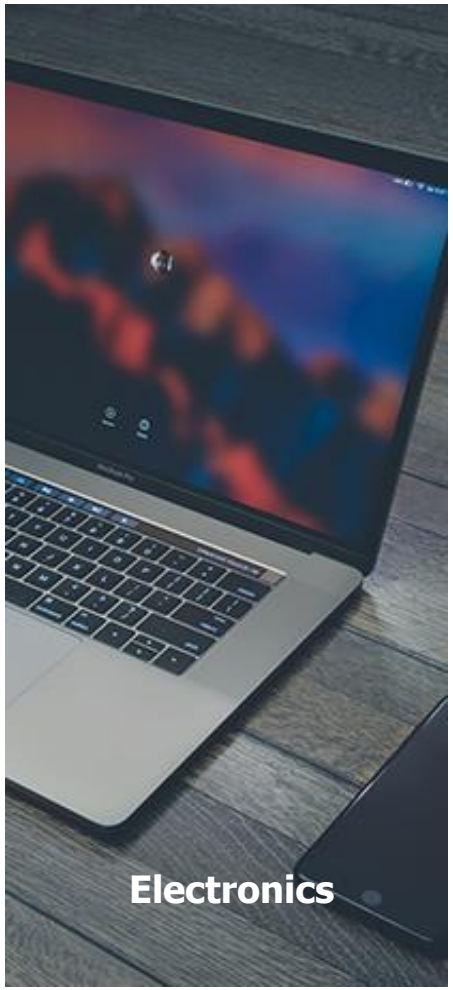
Emerging Uses for Niobium









Niobium – Enabling Excellence in Engineering

Emerging Use – Electric Vehicle Batteries

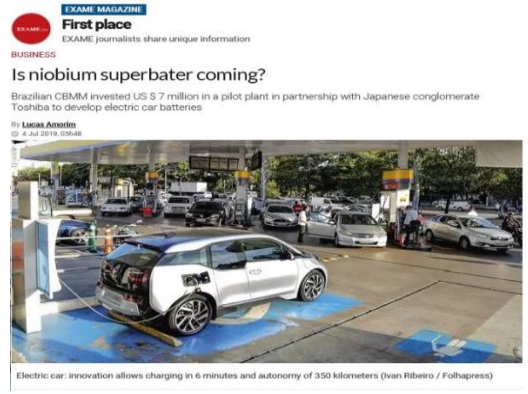
Globe Metals & Mining

Niobium addresses almost all of the major barriers to electric vehicle adoption.

Why is Niobium important for LIB development?

Niobium addresses almost all of the major barriers to EV adoption

Barriers to EV adoption		Niobum's Role
RANGE ANXIETY		
Consumers worry that an EV will not travel as far as an ICE vehicle and that performance will vary		**Niobium** helps increase the energy density of batteries, giving more power and increased range, and improves performance at low temperatures
CHARGING TIME		
Charging times can vary significantly depending upon the car and charging station but can take several hours		**Niobium** materials can increase the rate with which batteries charge and discharge
PERFORMANCE/LONGEVITY		
Batteries have a relatively short operating life as materials degrade during charge/recharge cycle		**Niobium** increases the stability of the battery so it can withstand more charging cycles
COSTS		
Even with subsidies, BEVs are more expensive than equivalent ICE vehicles		**Niobium** is readily available and cost effective compared to other battery materials
CHOICE		
There are few BEVs on the market		This is changing rapidly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First place

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BUSINESS

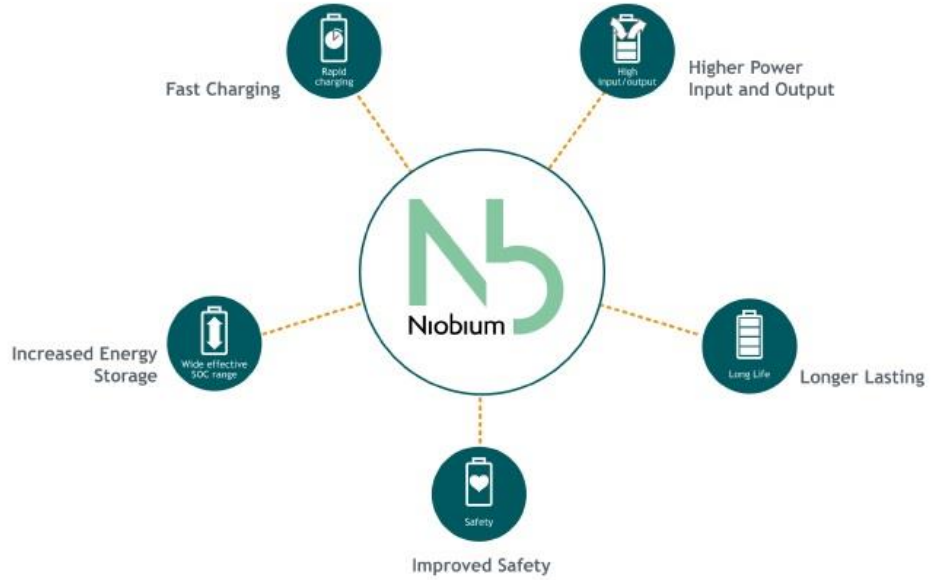
Is niobium superbater coming?

Brazilian CBMM invested US $ 7 million in a pilot plant in partnership with Japanese conglomerate Toshiba to develop electric car batteries

By Lucas Amorim

4 Jul 2019, 05h48

Electric car: innovation allows charging in 6 minutes and autonomy of 350 kilometers (Ivan Ribeiro / Folhapress)



Source: www.deq.ufv.br/arquivos_internos/eventos/NbinLiBFinalnb.tech.pdf

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Emerging Uses – Battery Products

Globe Metals & Mining

Recent R&D has demonstrated the importance of Nb to making highly efficient and rapid charging battery products

Toshiba banking on Niobium Titanium Oxide Anode to grow its Battery Market share

Toshiba's SCiB™ rechargeable battery is presently used in a wide range of fields, from automobile to social infrastructure. Not content, Toshiba's SCiB™ battery's evolution has reached a point of re-examining its core identity—the anode material. Toshiba is focused on working with niobium titanium oxide (NTO) as the next-generation anode material for its outstanding characteristics. The new battery offers high- energy density and the ultra-rapid recharging required for automotive applications, and will give a compact electric vehicle (EV) with a drive range of 320km after only six minutes of ultra-rapid recharging—three times the distance possible with current lithium-ion batteries.

https://www.toshiba-clip.com/en/detail/p=791
https://kommunikasjon.ntb.no/pressemelding/toshiba-develops-next-generation-lithium-ion-battery-with-new-anode-material?publisherId=90063&releaseId=15972993



Bender exploring Niobium as a viable alternative to cobalt

Developing new battery components is a challenge for electric vehicle manufacturers. In addition to performance and safety, eliminating the need for resources from sources of concern, such as the cobalt present in the positive electrodes (cathodes) of batteries, is essential for the success of the final product. Cobalt consumption is increasingly on the rise. By 2029, the demand for this metal will be equivalent to 300,000 tons compared to the 70,000 tons consumed in 2019, according to estimates by Benchmark Minerals.

More than 60% of cobalt available in the market is produced in the Democratic Republic of Congo, where its extraction and exploitation has been linked to corruption, environmental destruction, child labor and human rights violations. Bender Motors, on the other hand, will use niobium to develop and manufacture the positive electrodes for the batteries of its electric vehicles.

Bender has identified that niobium has other advantages when applied to the development of materials for positive battery electrodes, for example, niobium improves thermal characteristics, which favors safety.

https://bendermotors.com.br/en/2020/06/22/niobio-ingrediente-chave-da-bender/





Emerging Uses – Battery Products

CBMM spending big on R&D and banking on electric vehicle demand

February 2021: CBMM's Vice President Ricardo Lima announces that CBMM is predicting that its sales of niobium oxide, used in the production of batteries, will reach 45,000 tons by 2030, up from just 100 tons currently. Lima also said that if CBMM's forecasts were met, sales of niobium oxide would rise to represent about 25% of CBMM's revenues.

https://www.reuters.com/article/brazil-mining-batteries/brazil-miner-cbmm-seeks-to-sell-45000-tons-of-niobium-oxide-by-2030-idUSL1N2KF2VE?edition-redirect=in

March 2021: CBMM will invest around 200mn reais (US$35mn) in its technology program, with an annual increase of close to 60% for the batteries area.

CBMM is expanding its niobium oxide production capacity to target electric vehicle makers. In the coming weeks CBMM will inaugurate a new manufacturing area in Araxá, Minas Gerais state, which will allow it to reach a capacity to produce 150,000t of niobium products annually.

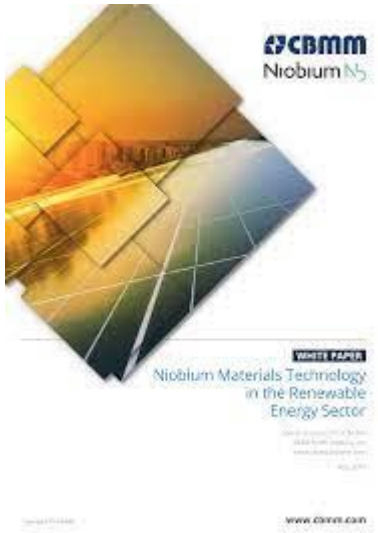
https://www.bnamericas.com/en/news/brazil-niobium-miner-cbmm-eyes-startup-acquisitions

May 2021: CBBM and TSX listed Nano One® Materials Corp announce that they have entered into an advanced lithium-ion battery cathode materials coating development agreement.

Nano One is a clean technology company with a patented low carbon intensity process for the production of low cost, high-performance cathode materials used in lithium-ion batteries..

"Nano One has successfully demonstrated the use of niobium as a coating for various cathode materials and has several related patents now granted and pending," "Our One-Pot process enables us to form coatings simultaneously with the underlying cathode material. This avoids extra steps and costs while enabling individual nanocrystals, also known as single crystals, to be coated for increased durability. With the support and partnership of CBMM, we will build on these successes and optimize our One-Pot process for the production of niobium coated nickel rich cathode materials for demanding applications such as electric vehicles."

https://www.newsfilecorp.com/release/83095/Nano-One-Enters-into-a-CoDevelopment-Agreement-with-Niobium-Producer-CBMM



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Emerging Uses – Battery Products

Recent Press

An electric battery that you can charge in under a minute? It is the holy grail for electric car users frustrated by the long recharge times for their vehicles. And it may be about to become a reality as a Cambridge-based company, Nyobolt, brings out an ultrafast battery based on niobium rather than lithium-ion.

In addition to being faster to charge, the niobium batteries have a longer life span than lithium-ion batteries, do not degrade in extreme temperatures in the same way that lithium-ion batteries do, and are much less likely to catch fire.

https://sifted.eu/articles/nyobolt-niobium-battery/

"New niobium battery technology will completely change our perceptions of electric vehicles, but the benefits of niobium are not just limited to passenger EVs", said Claude Dufresne, President & CEO of NioBay Metals Inc.

NioBay believes that the role of niobium in future batteries will serve to complement its other advantages, including high heat resistance, strength, and weight reduction when combined with steel.

"When you combine all these advantages together, you have something special, and it is likely that we will soon see niobium batteries in commercial vehicles, Formula E racing cars, power tools, automated warehouse vehicles, and robotics. Even eVTOL flying cars are in the spot light, with niobium based technologies providing both the power and weight reduction necessary for electric aircraft to take off vertically."

https://www.globenewswire.com/news-release/2021/04/06/2204936/0/en/NioBay-Initiates-Test-Works-for-the-Production-of-Battery-Grade-Niobium.html

"The number one barrier to the adoption of electric vehicles is no longer cost, it is range anxiety," said Doron Myersdorf, CEO of StoreDot. "You're either afraid that you're going to get stuck on the highway or you're going to need to sit in a charging station for two hours. But if the experience of the driver is exactly like fuelling [a petrol car], this whole anxiety goes away."

"I think such fast-charging batteries will be available to the mass market in three years," said Prof Chao-Yang Wang, at the Battery and Energy Storage Technology Center at Pennsylvania State University in the US. "They will not be more expensive; in fact, they allow automakers to downsize the onboard battery while still eliminating range anxiety, thereby dramatically cutting down the vehicle battery cost."

Dozens of companies around the world are developing fast-charging batteries, with Tesla, Enevate and Sila Nanotechnologies all working on silicon electrodes. Others are looking at different compounds, such as Echion which uses niobium oxide microparticles.

https://www.theguardian.com/environment/2021/jan/19/electric-car-batteries-race-ahead-with-five-minute-charging-times

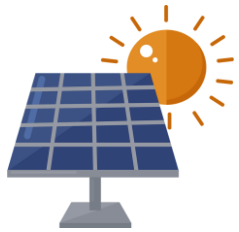
Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Emerging Use – Electronics

Niobium is meeting the developing needs of electronics.



Low-ESR (electron spin resonance) **niobium oxide electrolytic capacitors** are gaining importance in audio circuits. Niobium oxide capacitors can replace aluminum at a lower capacitance value with equivalent filtering. The niobium oxide capacitor's failure rate is five times lower than commercial aluminum electrolyte.



Perovskite solar cells (PSCs) utilising niobium pentoxide are emerging as one of the most promising photovoltaic technologies due to their high efficiency, low cost and ability to produce thin and flexible devices. Niobium pentoxide in PSCs is showing significant advantages over conventional titanium dioxide solar cells. Manufacture of these PSCs is now growing and is becoming increasingly widely available.

Niobium's unique combination of physical and chemical elements makes it a material of choice in a myriad of challenging high technology electronic applications

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Emerging Use – Medical Imaging

Niobium is meeting the developing needs in medical imaging.



The development of portable diagnostic tools is important to expand the applications of imaging devices in ambulatory care, clinics, and emergency care departments. Handheld ultrasound devices provide quick and safer images that are critical in emergency care.

Ongoing trials and studies to explore the potential of MRI technology for the early detection of neurological conditions are showing positive results. The development of new radiofrequency coils is anticipated to expand these applications during the forecast period.



Increasing demand for advanced diagnostic systems in developing countries is a key factor driving the market. Developing countries have shown a surge in the volume of imaging procedures in the past few years. The low density of installed imaging systems in these regions is expected to provide significant growth potential during the forecast period. Favorable government policies and booming medical tourism in these countries are expected to attract global market players in the untapped market.

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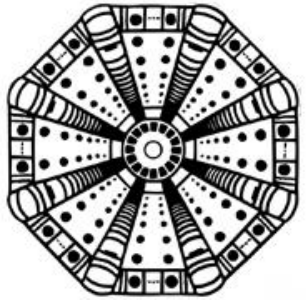
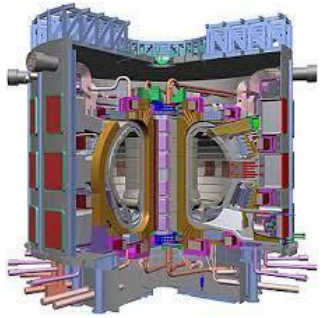
Emerging Use – Superconducting Magnets

Niobium is meeting the developing needs for Superconducting magnets.



CERN physicists and engineers used super-conducting electromagnets made from NbTi to contain and direct beams of highly accelerated particles. Among its many successes, CERN's Large Hadron Collider (LHC) detected the Higgs boson, an elementary particle in the Standard Model of particle physics. LHC is currently being upgraded to include a new set of Nb3Sn magnets, which will make it even more powerful and when complete in 2026, scientists will be able to explore the fundamental structure of the universe as never before.



Power from nuclear fusion ITER is an international project to build the world's largest tokamak, a magnetic fusion device that could be used to generate electricity. The NbTi and Nb3Sn superconducting electromagnets imprison a doughnut-shaped ring of plasma (far hotter than the Sun's core) in which nuclear fusion occurs. The total weight of the magnet system, including the steel support structures, is about 10,000t, of which 500t are Nb3Sn strands and 250 t NbTi strands. The reactor is expected to be ready for preliminary testing in late 2025.

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Emerging Use – Superconducting Magnets

Niobium for Science

Niobium-based superconductors have allowed a host of exceptional technologies to be developed, including life-saving MRI machines, magnetic levitation trains, and mass spectroscopy. They are also used in particle accelerators and nuclear fusion reactors - applications that are pushing back the boundaries of science.

Source: https://www.tanb.org/images/Niobium%20for%20science%20%20(v_4).pdf

KRISS Develops World's First Niobium-based Superconducting Nano-device

The Korea Research Institute of Standards and Science announced on April 14 that it developed the world's first niobium-based superconducting nano-device that can be used in a quantum computer.

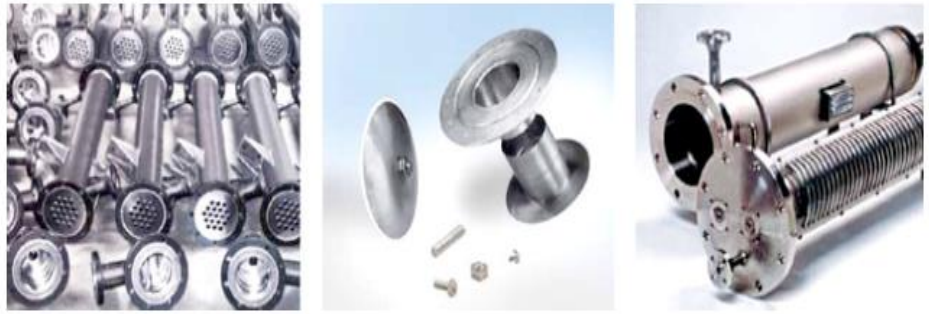
A quantum computer processes data by quantum bit computing unlike binary computers. It is capable of quickly handling tasks unresolvable with existing computers using a quantum mechanical phenomenon such as quantum superposition and, as such, is emerging as an information and communications infrastructure technology of the next generation.

Source: http://www.businesskorea.co.kr/news/articleView.html?idxno=64845

Applications of Niobium

Niobium's unique combination of physical and chemical elements makes it a material of choice in a myriad of challenging high technology applications such as electronics, optics and superalloys. It demonstrates superconducting properties at very low temperatures, which make it suitable for use in particle accelerator construction. Niobium carbide improves operating efficiency of hard metal cutting tools by increasing their stability.

Niobium not only imparts anti-reflective properties to optical surfaces, but also optimizes their scratch resistance. This quality makes it useful in applications such as optical lenses, monitors, and touchscreens, to name a few. Single crystals grown from lithium niobate are used as the base material for radio frequency filters or SAW filters, which facilitate wireless data transfer and mobile communication without disruption.



Source: www.azom.com/article.aspx?ArticleID=13931

Globe
Metals & Mining

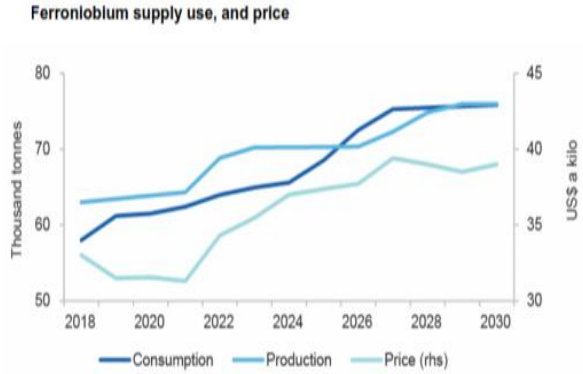
Niobium Market

Existing and Forecast Supply and Demand

Niobium Supply

- World production is primarily sourced from Brazil with Brazil having the world's largest reserves of Nb (98.53%), followed by Canada (1.01%) and Australia (0.46%).
- In 2020 the mine production of niobium was estimated at 78,000 metric tons worldwide.
- Niobium production has risen by around a quarter over the past seven years, with major producers increasing their production capabilities significantly in recent times to cater for increasing demand from the steel industry and growing demand from the electric vehicle industry, military and space industries and medical industry.
- CBMM, the world's largest supplier of niobium, recently announced that by 2030 it expects to produce and sell 45,000 tons of niobium oxide, used in the production of batteries, up from just 100 tons presently.
- Majority of niobium production is in the form of ferroniobium (FeNb) and used in the manufacture of High Strength Low Alloy Steels.
- Niobium can be substituted by molybdenum and vanadium in high-strength, low-alloy steel, and by tantalum and titanium in stainless and high-strength steels. However, substitution may add to costs and lead to a loss in performance.





Source: Australian Government, Department of Industry, Innovation and Science: Outlook for Critical Minerals (2019)

Niobium – Enabling Excellence in Engineering and Critical in Technolgy

Niobium Supply: Brazil Dominant

CBBM, Brazil

(70% privately held, 15% each by Chinese SOEs and Japanese steel mills)

- ✓ US$13.33Bn enterprise
- ✓ Open pit mine
- ✓ Commenced operation in 1961
- ✓ 150,000 tpa capability FeNb*
- ✓ Nb_2O_5 facility installed for growth
- ✓ Price leader
- ✓ **Sold 15% for US$1.5B to Chinese consortium**
- ✓ **Sold 15% for US$1.5B to Japan Korea consortium**

Niobec, Canada

(100% privately owned - Magris Resources)

- ✓ US$530m enterprise
- ✓ Underground mine
- ✓ Commenced operation in 1976
- ✓ 7,500 tpa capability FeNb*
- ✓ No Nb_2O_5 capability
- ✓ Price follower
- ✓ **Acquired by Magris Resources Inc in 2012 for US$500m**

Catalao, Brazil

(100% privately owned – China Molybdenum)

- ✓ US$1.5Bn enterprise
- ✓ Open pit mine
- ✓ Commenced operation in 1976
- ✓ 7,500 tpa capability FeNb*
- ✓ No Nb_2O_5 capability
- ✓ Price follower
- ✓ **Acquired in 2016 by China Molybdenum for US$1.5Bn**

Niobium market presently controlled by 3 producers, collectively producing 99% of current supply

*published data of company websites

Niobium Supply: Only A few Suppliers

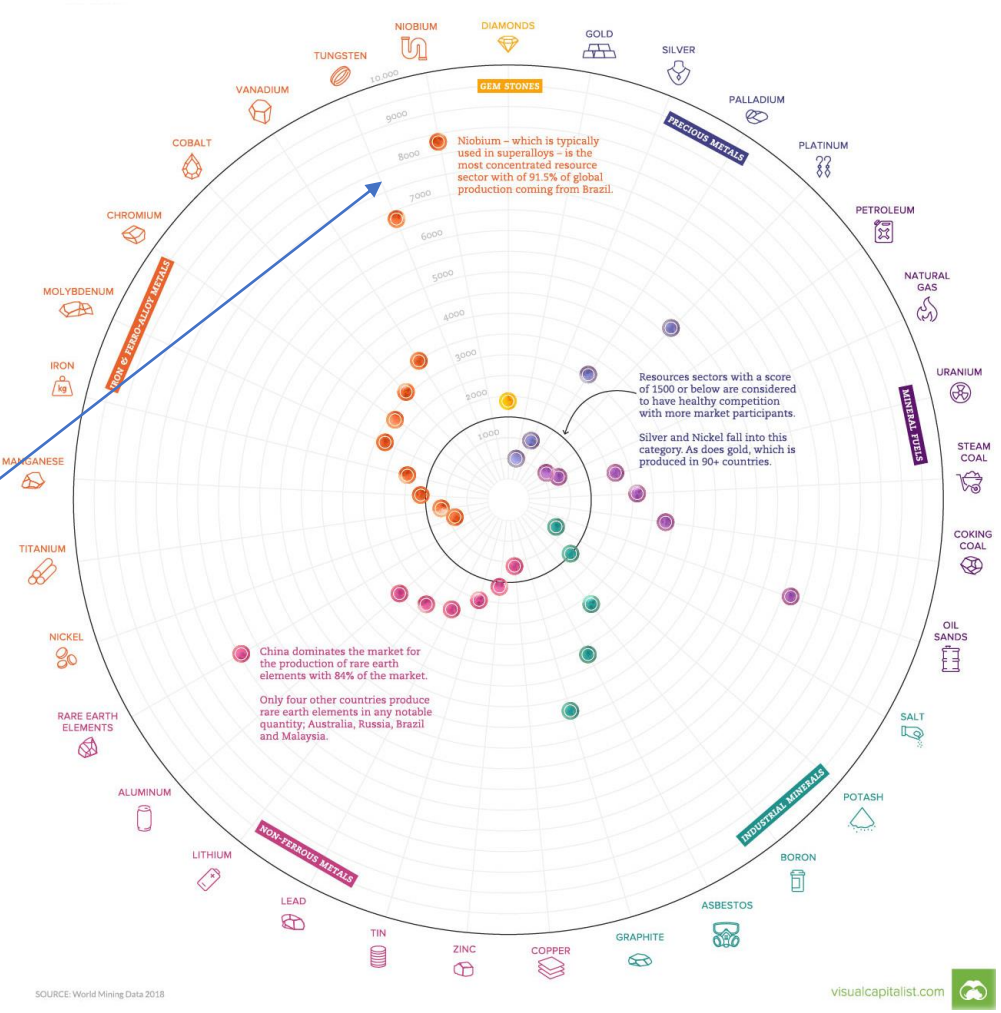
The Herfindahl-Hirschman Index, pictured right, is a commonly accepted measurement of market concentration, and in this case, it shows which mineral sectors have healthy competition between countries, as well as the sectors that are more monopolistic.

Anything below a 1500 score on the Index is considered a competitive marketplace.

The closer the score is to 10,000, the closer the market is to a monopoly.

Niobium scores over 8000 on the scale, demonstrating that the industry is highly concentrated, and is most likely a quasi-monopoly in its current form and approaching a monopoly.

Source: www.visualcapitalist.com/measuring-competition-valuable-minerals



Niobium Demand

Niobium (Nb) was initially applied in 1933 to stabilize stainless steels against intergranular corrosion.

Around 1970, niobium started to be used in many technological applications, especially in heat treatments at high temperatures, in the form of superalloys and, over the past four decades, Nb has been employed on an industrial scale.

In recent years, applications of niobium have increased steadily in various segments such as: micro-alloyed steels, super alloys, thin films, medical implants, titanium and aluminum alloys, superconductors and copper alloys, electrolytic and ceramic capacitors.

An estimated 86% of niobium is currently consumed as ferro-niobium.

Scientists and manufacturers are discovering the range of technological applications for niobium





Niobium Demand

Growth in demand for steel and for higher quality steel products forecast to drive consumption of niobium.

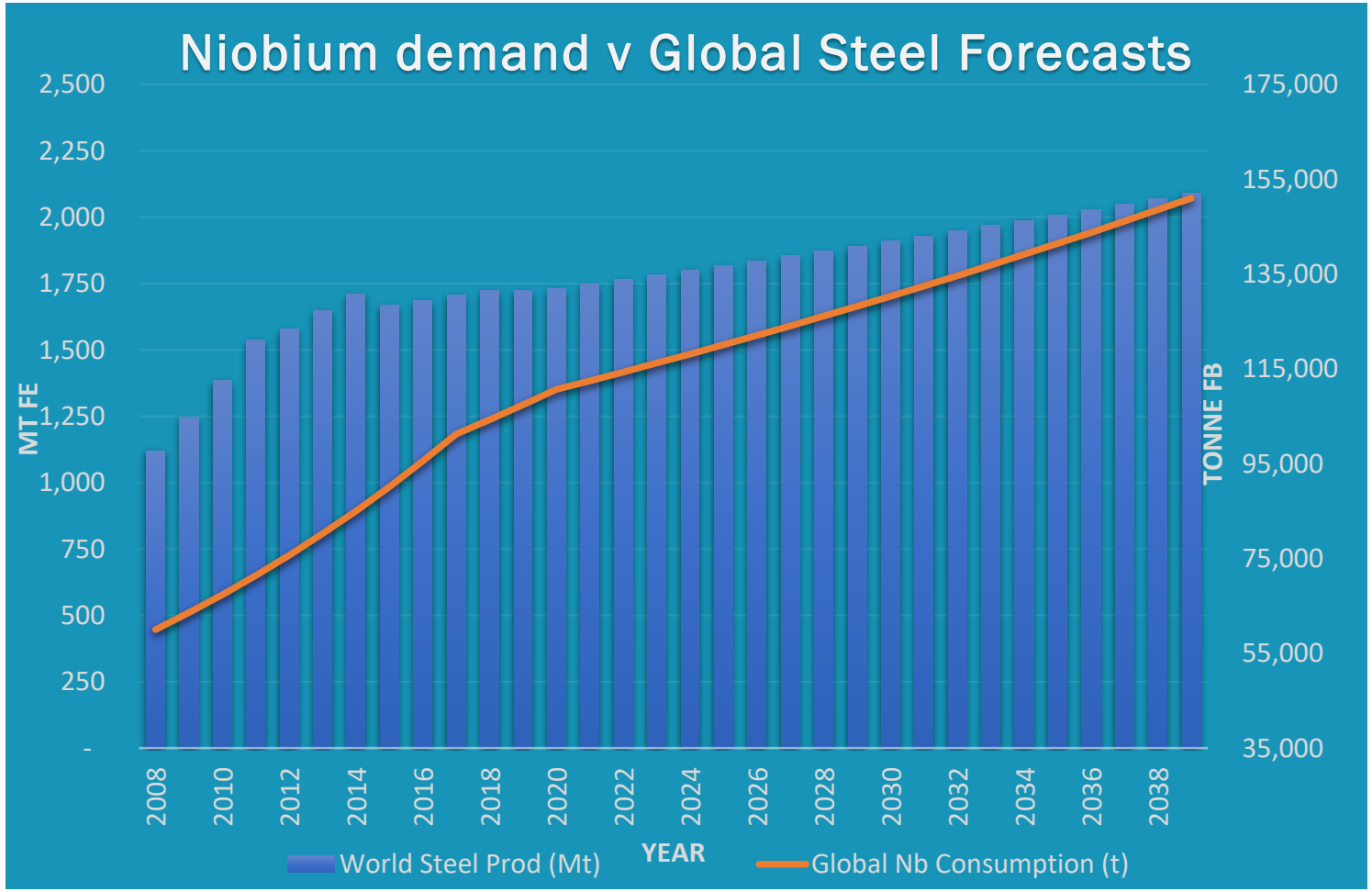
HSLA steels account for ~90% of global Niobium consumption

Niobium Demand Drivers – two factors:

i) increase in overall steel production; and

ii) increase in the amount of niobium used in steel (usage intensity rate).

Source: www.statista



Demand Driver – Structural Steel

Short Term

In April 2021, Worldsteel (the World Steel Association) released its Short Range Outlook for steel demand for 2021 and 2022.

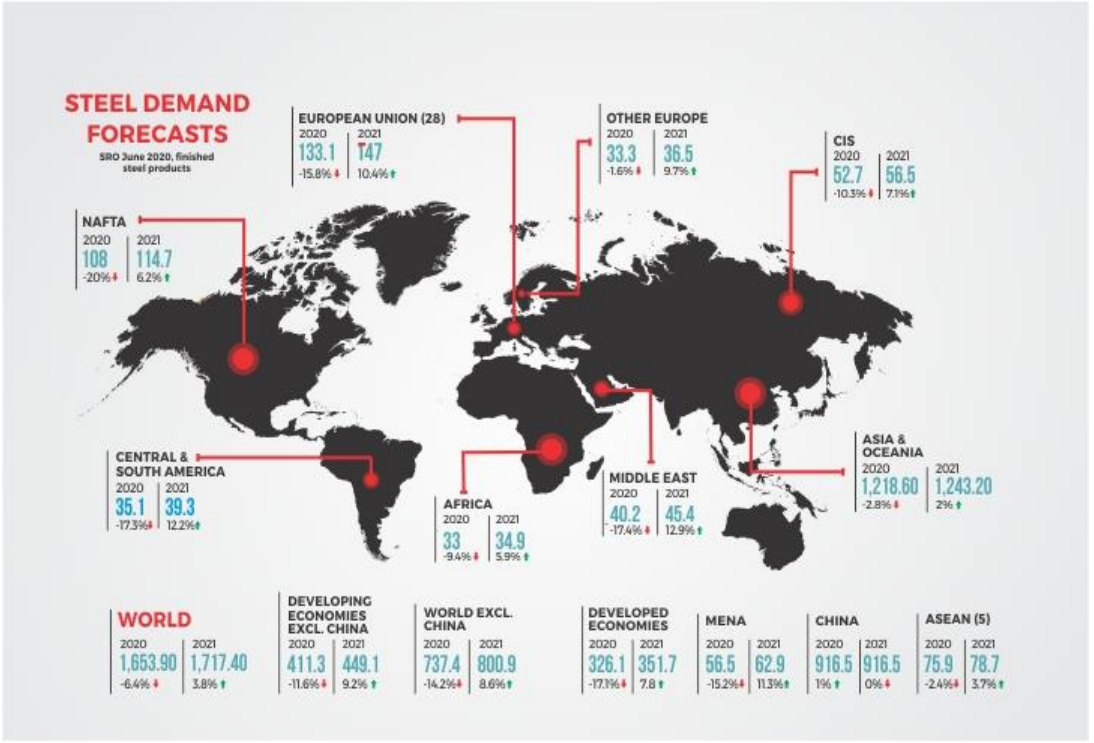
Worldsteel is predicting global steel demand will grow by 5.8% in 2021 to reach 1,874.0 Mt after declining by 0.2% in 2020 due to the COVID-19 pandemic; and expects 2022 steel demand to grow by a further 2.&% to reach 1,924.6 Mt.

The robustedness of the steel industry is largely due to China which has rebounded quickly since lockdown ended in Feb 2020 benefitting from the from the government's intervention of of various measures to stimulate its economy the centrepiece of which has been infrastructure spending.

Medium Term

Research by Business Opportunities has released its latest report on 6 April 2021 concluding that;

"The market for niobium is expected to grow at a CAGR of 4.7% in the forecast period of 2021 to 2025 and is expected to reach USD80.78 billion. Major factors driving the market are the increased consumption of niobium in structural steel and extensive utilization of niobium-based alloys in manufacturing aircraft engines. "



Source: www.steel-360.com

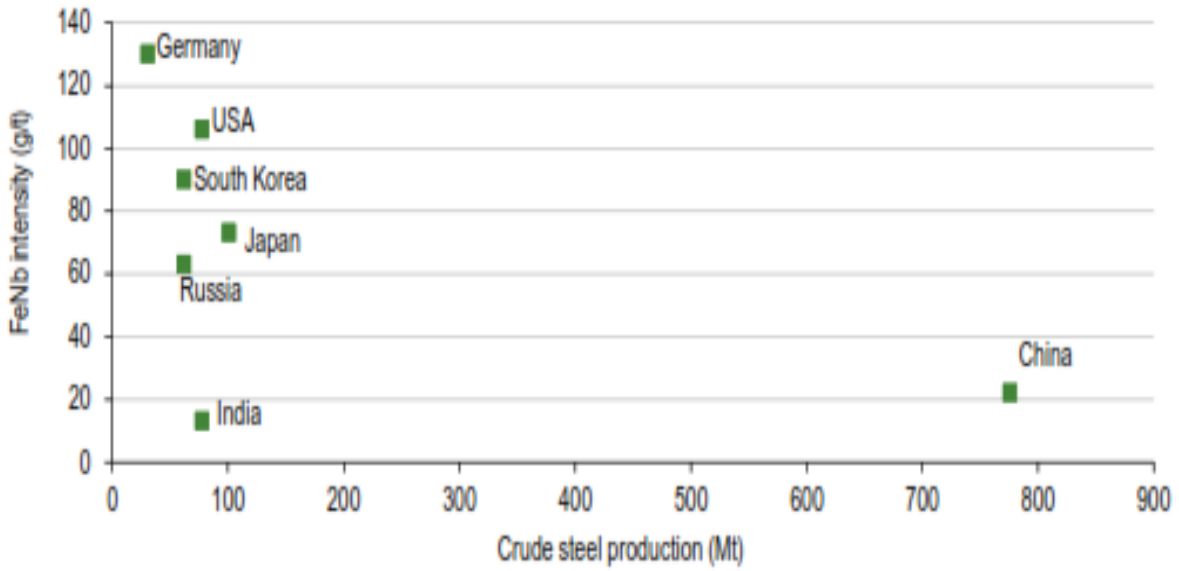
Demand Driver – Increased Intensity of Use

Overall intensity of use of ferro-niobium (FeNb) in steel is at its greatest in highly developed countries (eg Germany, USA) and averages in excess of 100g/t.

Overall intensity of use of ferro-niobium (FeNb) in steel in India and China is extremely low; averaging less than 20g/t.

Intensity of usage expected to increase in China as it moves to higher quality steel products as has already happened in other parts of Asia (South Korea, Japan).

The rate of increase of intensity of usage in China is forecast to be the main driver for niobium consumption in the medium term.



Source: Roskill

The niobium market controlled is by 3 producers, collectively producing 99% of current supply

Niobium Pricing – Concentrate and finished product

Concentrate

- Nb_2O_5 concentrate is sold in very low volumes
- Typically a by-product from tantalum production
- Pricing: $25/kg ±20%

Niobium Pentoxide

- Niobium is mostly sold as FeNb for HSLA steel use
- FeNb currently sells at ~$50/kg of contained Nb
- Nb_2O_5 is a value add product used in manufacture of master an super alloys and in chemical applications.
- Pentoxide is a premium product which attracts a premium price.



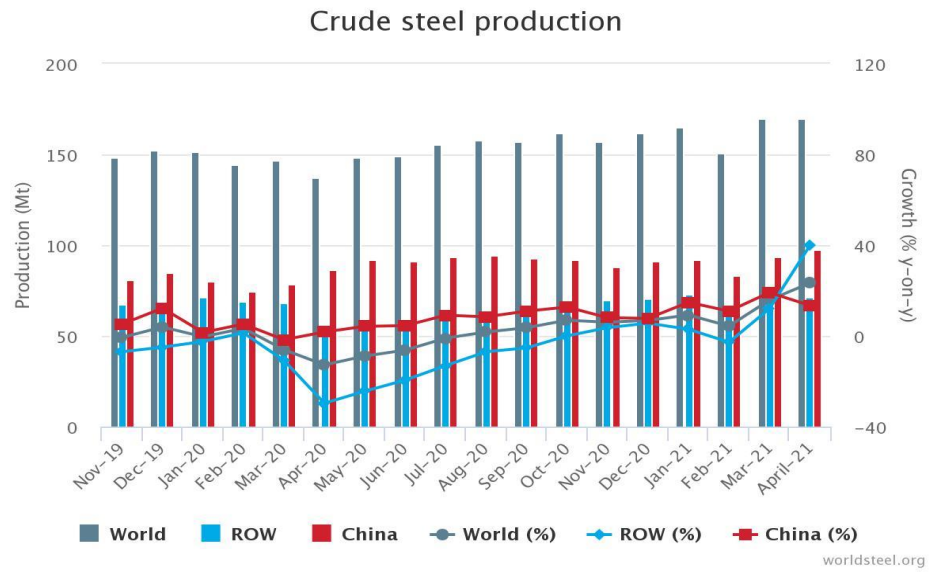
Source: https://metalary.com/niobium-price/

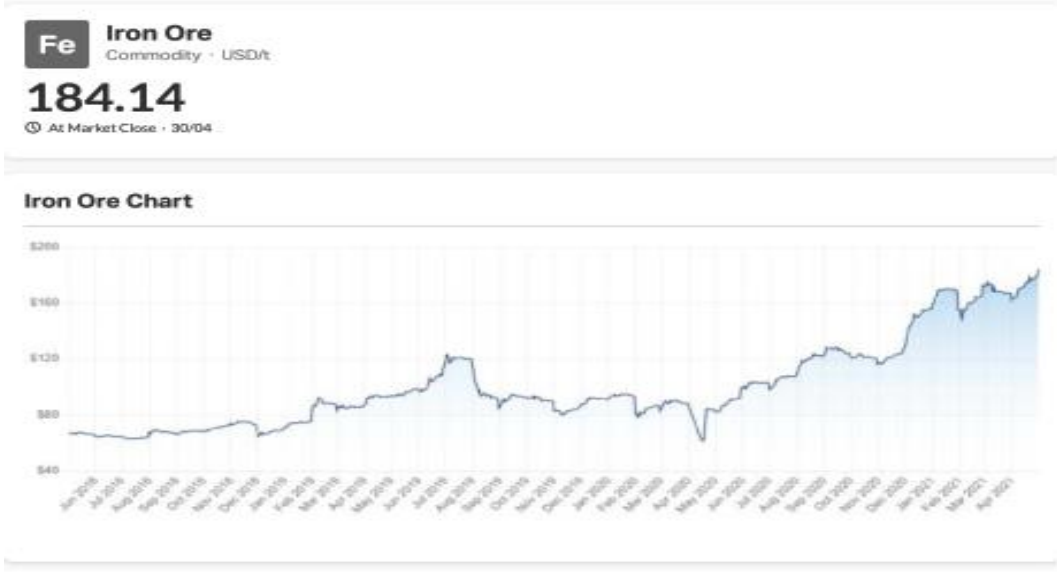
Outlook Demand Driven by Steel Demand

HSLA steels presently account for ~86% of global Niobium consumption.

Overall steel demand is extremely high at present. Latest reports state that COVID-19 pandemic stimulus packages targeting infrastructure spending are the underlying cause. China steel manufacturers reporting diminishing inventories despite record production levels. Infrastructure spending expected to continue to drive steel demand for foreseeable future.

Consequently, the iron ore price is currently trading at an all-time high due to current demand levels and a tightening in supply as a result of reduced output from Brazil due to COVID-19 pandemic and a range of other factors.





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Competent Persons Statement

Mineral Resource Estimates:

The information in this report that relates to Mineral Resources is extracted from the report titled "Kanyika Niobium Project – Updated JORC Resource Estimate" released to the Australian Securities Exchange (ASX) on 11 July 2018 and available to view at www.globemm.com and for which Competent Persons' consents were obtained. Each Competent Person's consent remains in place for subsequent releases by the Company of the same information in the same form and context, until the consent is withdrawn or replaced by a subsequent report and accompanying consent.

The Company confirms that is not aware of any new information or data that materially affects the information included in the original ASX announcement released on 11 July 2018 and, in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the original ASX announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original ASX announcement.

Full details are contained in the ASX announcement released on 11 July 2018 titled "Kanyika Niobium Project – Updated JORC Resource Estimate" is available to view at www.globemm.com

Ore Reserves:

The information in the report that relates to Ore Reserves is extracted from the report titled "Kanyika Niobium Project – Project Feasibility and Economics" released to the Australian Securities Exchange (ASX) on 19 August 2021 and available to view at www.globemm.com and for which a Competent Person's consent was obtained. The Competent Person's consent remains in place for subsequent releases by the Company of the same information in the same form and context, until the consent is withdrawn or replaced by a subsequent report and accompanying consent.

The Company confirms that is not aware of any new information or data that materially affects the information included in the original ASX announcement released on 19 August 2021 and, in the case of estimates of Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the original ASX announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original ASX announcement.

Full details are contained in the ASX announcement released on 19 August 2021 titled "Kanyika Niobium Project – Project Feasibility and Economics" is available to view at www.globemm.com