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Alphamin RESOURCES

Alphamin Resources - AFM CN

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Overview

Industry Overview

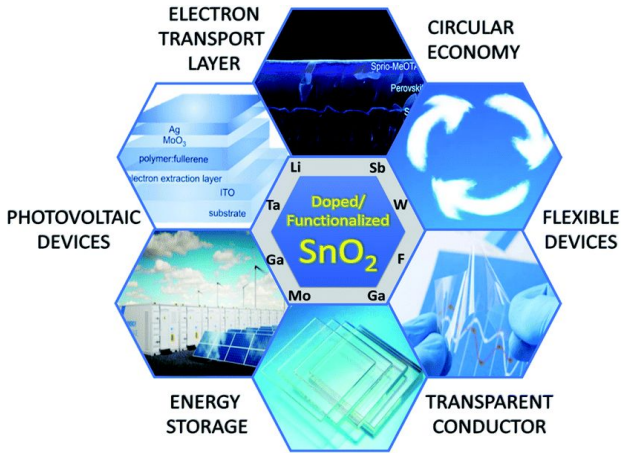
Industry Overview: Tin is the best way to play tech / renewables

Tin is used in many forms and is essential in the production of electronics and semiconductors

In 2004, **environmental regulations in Japan & the EU** required manufacturers to **curb the use of lead** in circuit boards for electronics. This has proved to be **a boost for the most common lead-free solder mix of tin-copper**.

Other uses:

- It takes a high polish and is used to coat other metals to prevent corrosion.
- Tin salts sprayed onto glass are used to produce electrically conductive coatings.
- Niobium-tin alloy is used for superconducting magnets.
  Tin-based perovskite solar cells, tin has been successfully used in PSCs with the highest efficiency over 13% at present, making tin-based perovskites the most promising active materials for lead-free PSCs

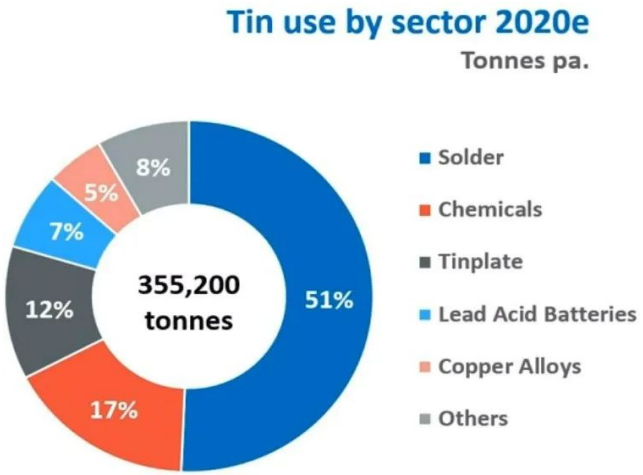


Geography of tin

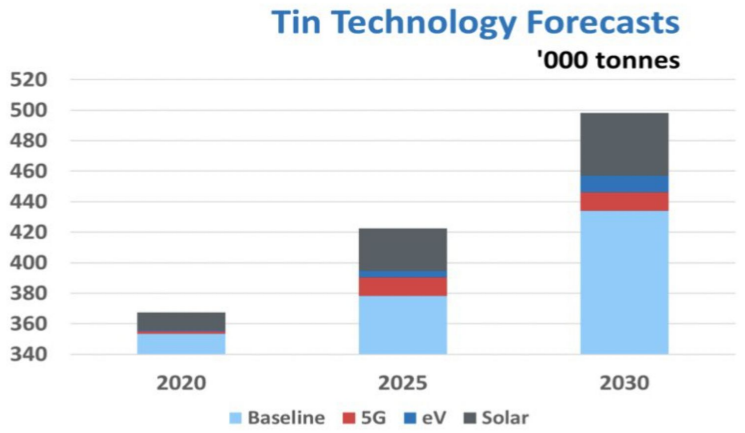
MIT research showed tin will be the metal most likely to be positively affected by future technology

- It is expected that more tin will be widely used in modern society as catalytic, sensing, optoelectronics, and energy storage materials in the future.
- Global supply dominated is by China, SE Asia and Peru, yet these regions have huge ESG issues and lower tin grade.

- The supply market is dominated by SE Asian producers, like Myanmar, Thailand, Indonesia and China, as well as Minsur in Peru



Deficits are likely after 2025:



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Alphamin Resources

Business overview

Alphamin is a Democratic Republic of Congo (DRC) tin mine responsible for **4% of all mined tin**, expanding into a southern deposit which will make this 7%.

Expansion to Mpama South (in DRC) to finish and commence mining operation by YE2023

Alphamin is a strategically important due to their incredibly high ore grade >4% on average, compared to <0.5% for an average tin mine

AFM is one of only two investable pure-play tin miners and cleaned their balance sheet over the past 2 years net debt went from C$67m at YE2020 to net cash C$158m last quarter.

Alphamin is the **pinnacle of what an ESG investment should be**: bringing opportunity and wealth to the Bisie region of the DRC

Financial Overview

as of 03/02/2023	in CAD	in USD
EV	**1,112**	**830**
Debt	4	
Cash	120	
NCI	45	
Equity Value	**1,184**	**883**
price per share	$0.93	
current tin price	28,000	
USD / CAD	1.3403	
EV / EBITDA (ttm)	*3.7x*	

Historical annual financials	FY 2020	FY 2021	FY 2022
Tons processed (ton)	366,634	416,173	436,400
Tin grade processed (ton)	3.9%	3.6%	3.8%
Overall plant recovery (ton)	71.0%	74.0%	75.0%
Payable tin produced (ton)	10,319	10,969	12,493
Payable tin sold (ton)	11,474	11,521	12,764
Average price achieved ($/ton)	16,336	30,629	30,636
Revenue	**187,445**	**352,883**	**352,883**
Simple EBITDA	**58,301**	**174,238**	
Reported EBITDA	**58,302**	**198,592**	
margin	*31%*	*56%*	
On mine operating costs ($)	76,926	78,021	
On mine cost per ton ($/ton)	6,704	6,772	
Off mine cost per ton ($/ton)	4,517	6,620	
Sustaining capex per ton	248	782	
AISC ($/ton)	**11,469**	**14,174**	

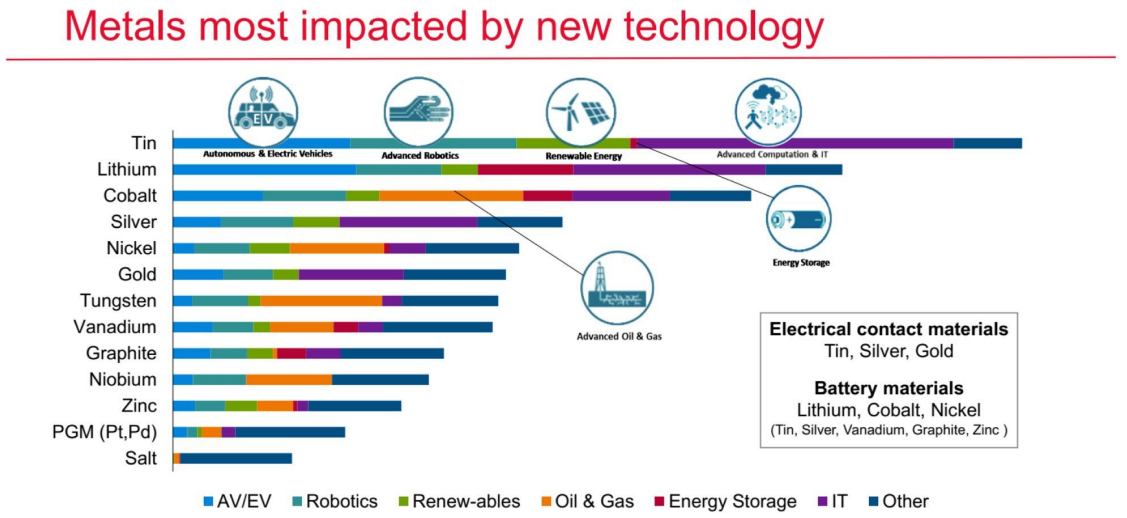
Thesis

Thesis 1 (Demand): AFM is a sustainable macro play riding on mega trends

Tin has strong demand fundamentals & is fueled by future mega trends

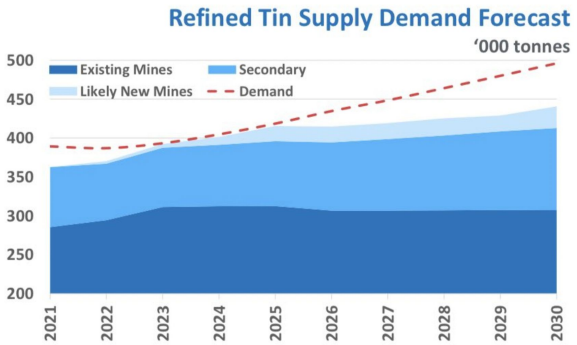
- Tin primarily used for soldering circuit boards in semiconductor industry
- Now viewed as an essential metal underpinning mega trends such as:
  - EV
  - Renewable energy (solar panels)
  - Advanced robotics/ AI
  - IoT (tin is used in everything electronic related - Iphones, computers, circuit boards)

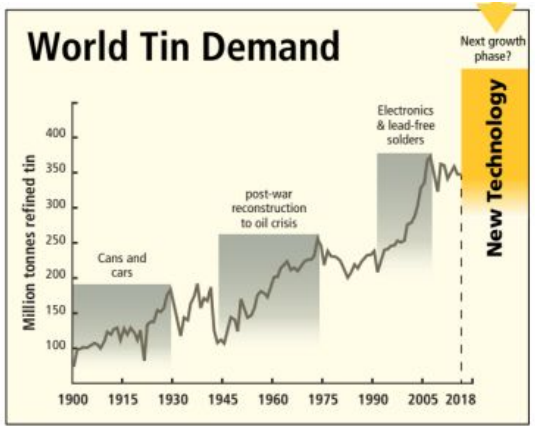
- Tin's importance (A), and completely overlooked (Sprott's new Energy Transmission Metals ETF does not even include Tin)
- As opposed to other metals pitched in BC (lithium/cobalt/nickel), tin is set to benefit the most



- In 2004, new environmental regulations in Japan & the EU required manufacturers to curb the use of lead in circuit boards for electronics = lead to a boom in tin-copper usage
- Tin is critical to fuel the next growth phase
  - EV requires 3x more tin (~1,200g) than an ICE vehicle (400g tin)
  - Switch from 5G to wireless requires more tin
  - Global solar roll out on steep growth curve - 14k tonnes of tin required

Deficits are likely after 2025:





Thesis 1 (Supply): Major producing regions under pressure

Supply landscape context

- Historically, tin consumers relied on low-cost, low-tech alluvial deposit production out of MAS/IND regions that could act as price-suppressants
- Resulted in minimal investment into production & exploration
- Shallow pool of players outside China

Major producing regions under pressure

4 countries produce 73% of global tin concentrate:

China's mined tin output = flat for past 10 years and reaching depletion

- Chinese tin not a viable option due to US/CHN tensions

Myanmar's high grade surface material is almost depleted

- Have to transition to low grade mines

Indonesia's mining capabilities are limited

- On-shore alluvial resources are depleting and offshore mining is growingly shunned upon - costs increasing, smaller deposits + hard to find
- Indonesia considering an export ban on tin

Peru uprisings are knocking 4% of mined tin from production with no end in sight

Protesters using stones to block the main road between Arequipa and Juliaca, Peru.

Other viable options?

- Tin market volatility and recent price decline adds to lag in tin investments
- Significant lead time from ***resource -> feasibility -> funding -> development = lead time of 5+ years***
- Outside of AFM's new South Expansion project, new projects unlikely to get production before 2027

There is literally no alternative to AFM's reserves in the short/medium term

Existing tin supply is slowing

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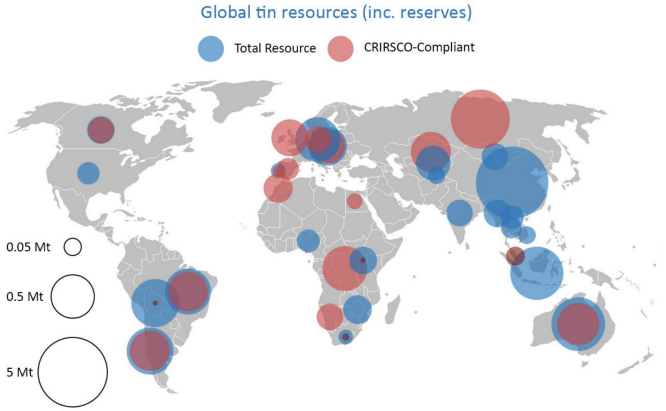
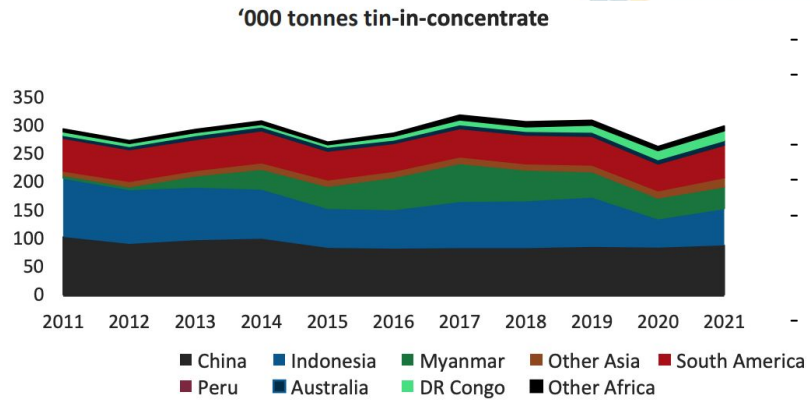
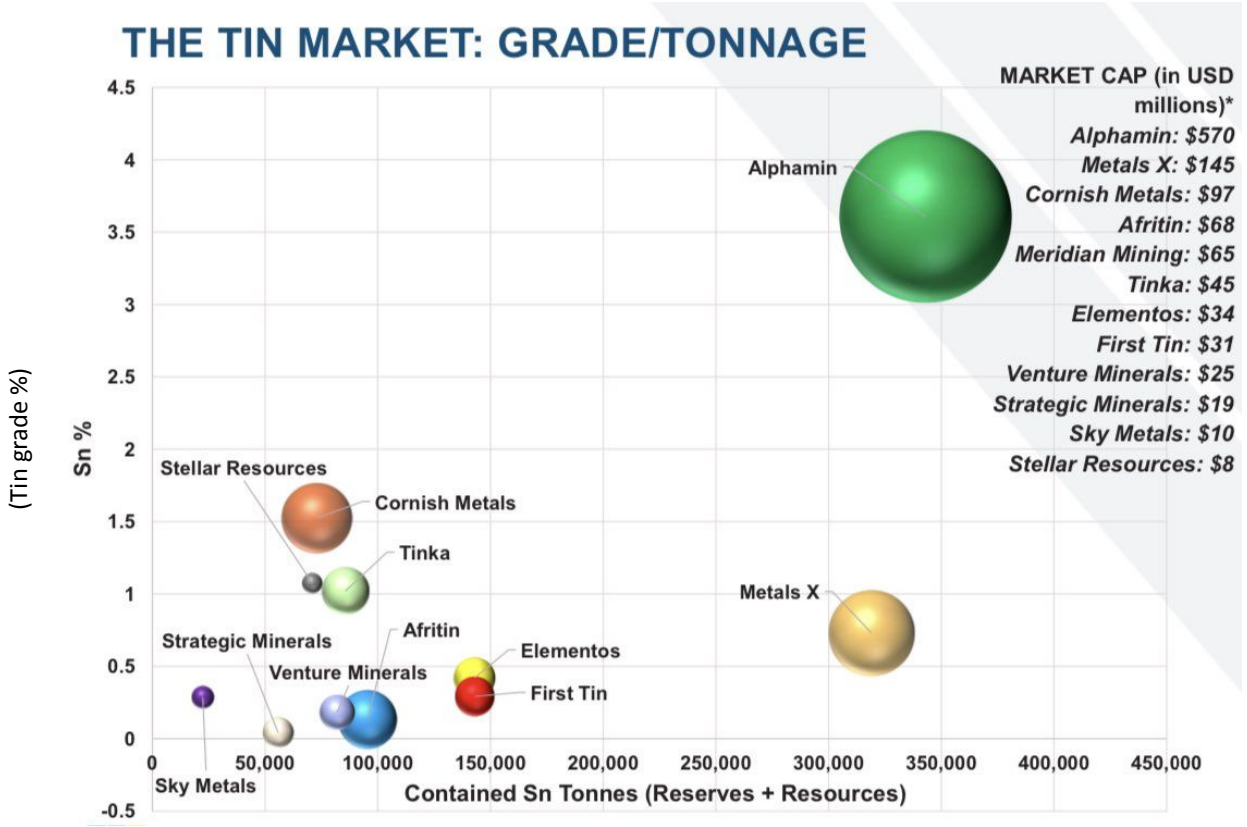
Thesis 2: AFM ore and grade

Alphamin has Superior ore grade compared to peers

1. Ore Grade:
   - At a tin grade of roughly 4.5%, Mpama North (AFM's main tin mine) is the world's highest-grade tin resource − about four times higher than most other operating tin mines in the world. vs <1% industry average
2. Potential expansion:
   - 5 exploration licenses and 1 current mining license covering 1,270km in the DCR
   - regional drilling program
3. Expanding to South Mpama mine (2023):
   - will go from supplying 5% to 7% of tin mined worldwide
     - As they continue to expand their business, they'll gain more EoS
   - 16 diamond core holes already drilled and expected similar grade to the North mine
   - uses positive cash flow for expansions and operated in the lowest quartile of the global tin mine cost curve







- High grade = lower production costs
- More efficient, high grade ores are easier to extract and process, meaning higher margins
- Less waste
- Share of DCR growing
- SEA tin deposits are usually sand or alluvial deposits which are bad for the environment and dangerous and has been dubbed 'death metal' in the area
- The Bisie Tin mine also has one of the largest reserves of tin while being one of the smallest mines, this means less costs and equipment is needed to move the ores.

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Mpama Ridge Exploration Targets

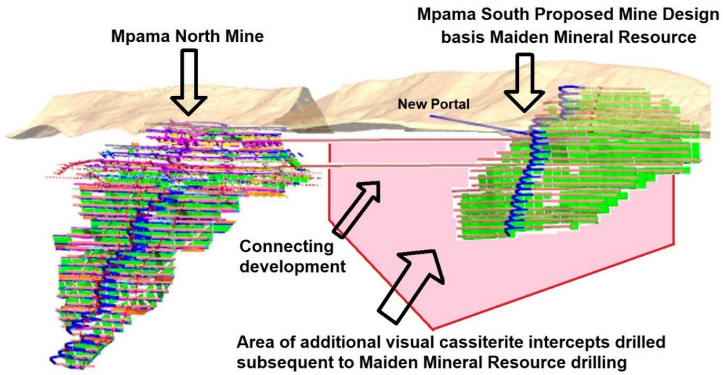
Further upside potential

Project can continue to be expanded south:
Not factored into our model assumptions and considered further upside potential; Marouge and other identified targets along the Mpama Ridge fall within the same lithological trend as Mpama North and South and show high potential for mineralization due to their geophysical and geochemical anomalies

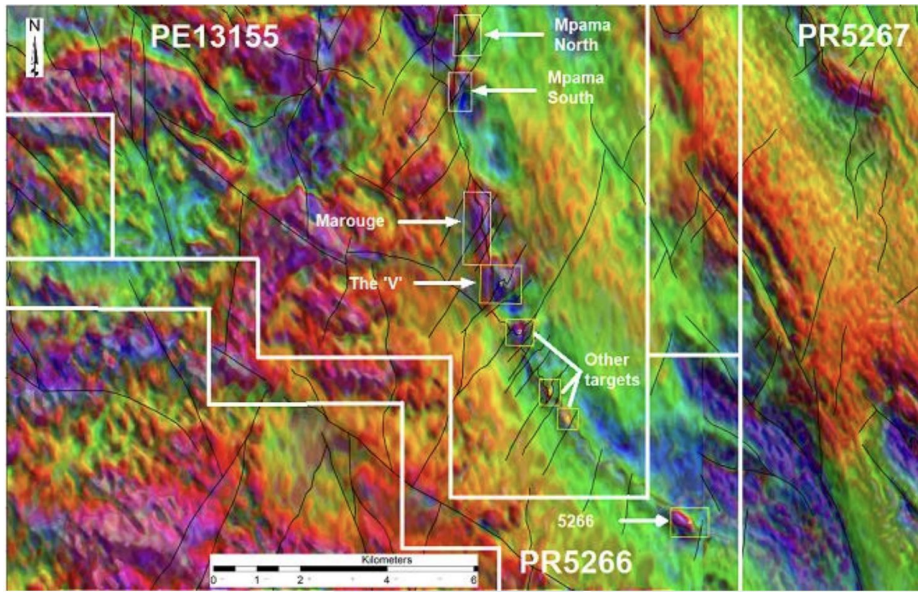
Two sites represent all these features strongly:

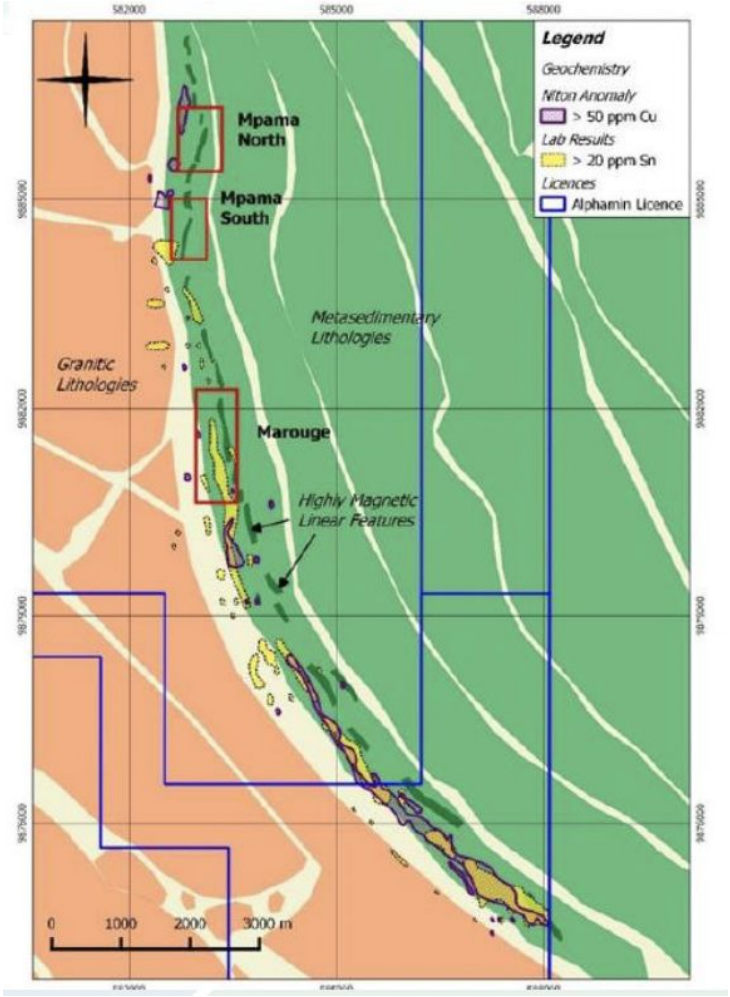
- Marouge
- The 'V'

Geochemical sampling and analysis to be followed by drilling



Lithological horizon





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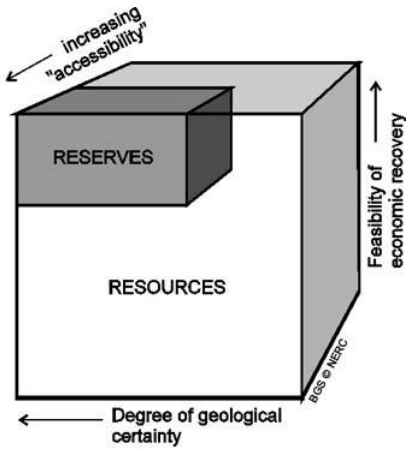
Valuation

Model & Valuation

Revenues and cost breakdowns



Life of Mine (LoM) total reserves:

- North: 145,950
- South: 91,600

Tons processed = extraction from the resources

Payable tin produced/sold = processed x tin grade x recovery

Revenue = Payable tin produced/sold x tin price

Without new projects the current mines are projected to deplete by 2032

Costs are derived from the On-mine costs (typically fixed) and Off-mine costs (tied partially to the fluctuating market price of tin)

All-In Costs (AIC) on a $/ton basis, is used to derive projected EBITDA
All-In Sustaining Costs (AISC) adds sustaining CapEx per ton; a more appropriate cash cost used to project a mine's Cash Earnings

In our model we have a scenario analysis for 4 tin prices →

Valuation

AFM trades at 3.2x 2024 cash earning and has a 3% annual dividend (6.5% yield)

Using a static tin price of $30k/ton would give us 50% upside

$30k/ton is conservative because the price needed to meet future demand is assumed to be $33k/ton (Appendix 3)

Also the model does not factor in future discovery and mine development

Derived Valutaion	Current Value (C$)	in CAD	in USD
PVCF / EV (USD)	**1,112**	**1,697**	**1,266**
Debt	4	4	
Cash	120	120	
NCI	45	45	
Equity Value	**1,184**	**1,768**	**1,319**
price per share	$0.93	$1.39	
implied upside		49.4%	

Sensitivity Analysis	($ / ton)	Discount Rate				
Tin Price Scenario		8.00%	9.00%	10.00%	11.00%	12.00%
Low	**20,000**	$0.56	$0.54	$0.52	$0.51	$0.49
Present	**30,000**	$1.51	$1.45	$1.39	$1.34	$1.29
Sustainable	**50,000**	$3.53	$3.38	$3.24	$3.11	$2.99
Squeeze	**100,000**	$8.72	$8.34	$7.99	$7.66	$7.35

ESG and Risks

RISKS

Threats to tin demand are principally from cost reduction, through reduced usage and **substitution** with cheaper materials, and health regulations.

Circuit designers strive to use fewer components and to **miniaturize the electronic** footprint of gadgets; both these trends reduce the amount of solder needed (although transistor shrinkage has met limitations since mid 2000s)

In chemicals, the threat comes from **cheaper alternatives or the need to comply with regulatory pressures**. For example, zinc–calcium compounds can be used as a PVC stabiliser, even if performance is inferior.

Dirty and endangering alluvial (in water) tin mining in SE Asia

ESG

Industry

- Dirty and endangering alluvial (in water) tin mining in SE Asia is sickening - tin has been labelled “death metal” in Indonesia.
- Similarly horrific situation in Peru and Myanmar, where illegal and unregulated artisanal mining has caused huge deforestation, slave labour and violence against indigenous communities.
- Artisanal mining is essentially slave mining, but it is now becoming economically not viable in the region.

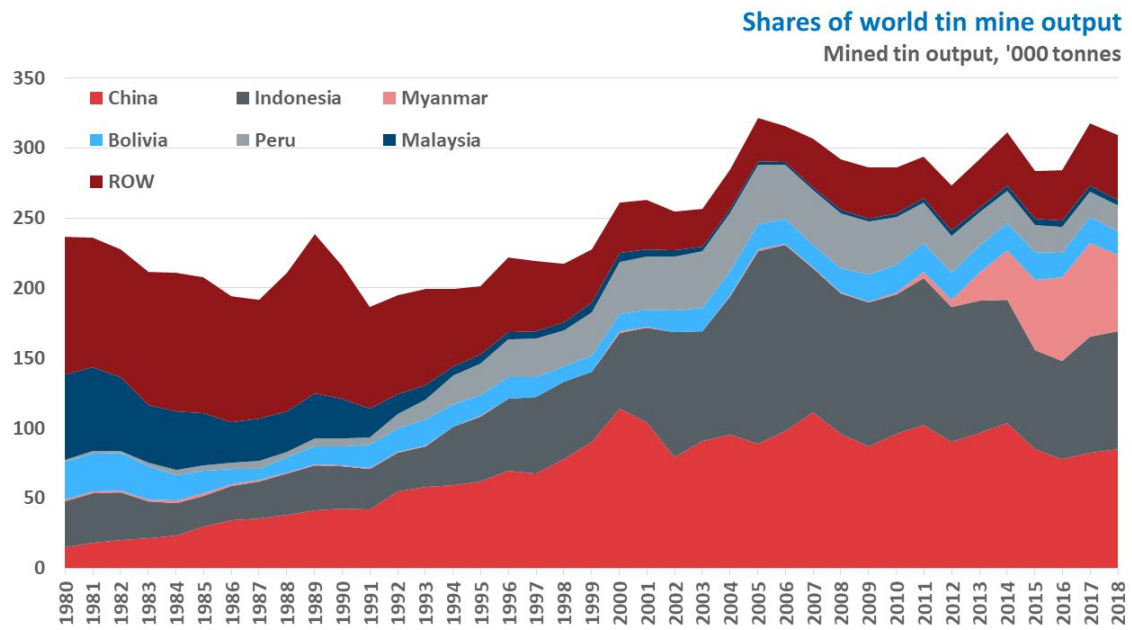
AFM

- AFM created a safer and growing economy for BISIE mining region, proven by them giving .
- AFM compliant with the US’ Dodd−Frank Act Section 1502- minimising the sale of conflict minerals as well as the OECD’s ICGLR certification - mineral compliance. Dodd Frank also raised consumer awareness and drive for sustainably sourced materials.
- Spurring the building of surrounding infrastructure to aid the mining process, such as roads, telecommunications and banks. Thousands of jobs have also been created for local residents.
- Also adheres to the DCR’s 2018 mining code that gives a % of royalties to the region.

Q&A

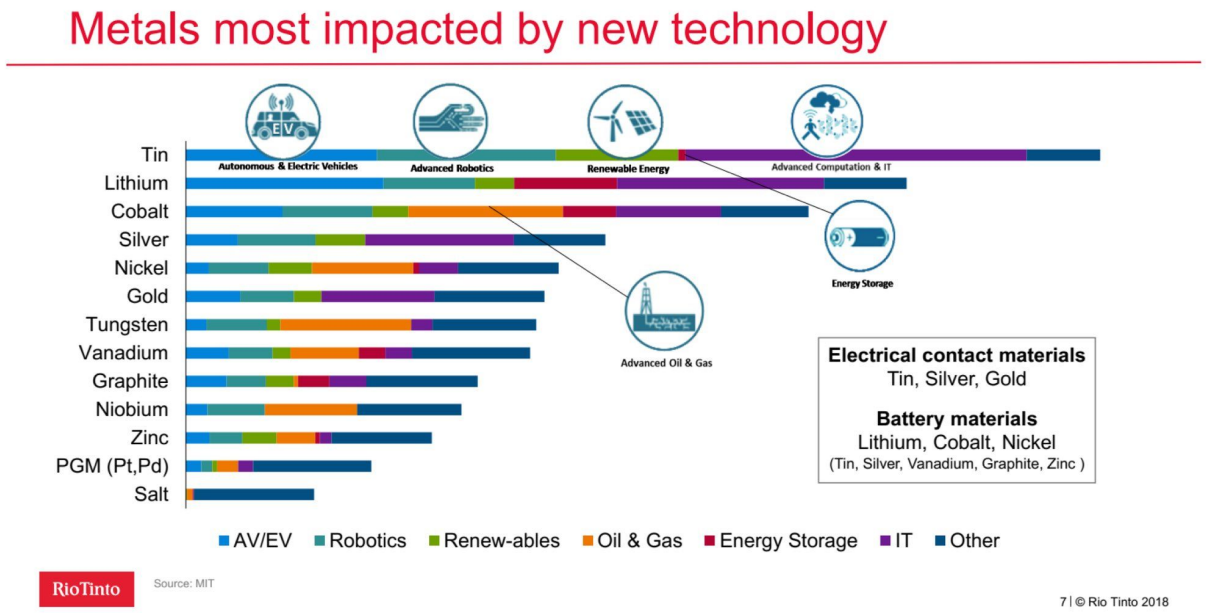
Appendix 1

Sources of Global Tin Supply



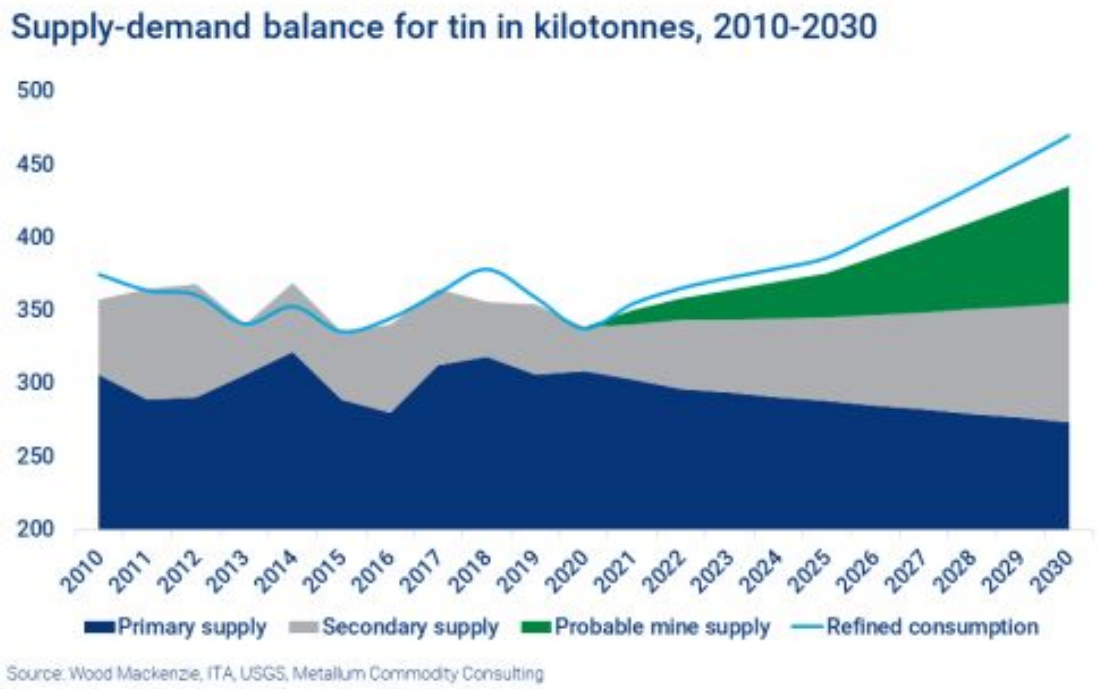
https://www.internationaltin.org/tin-supply/

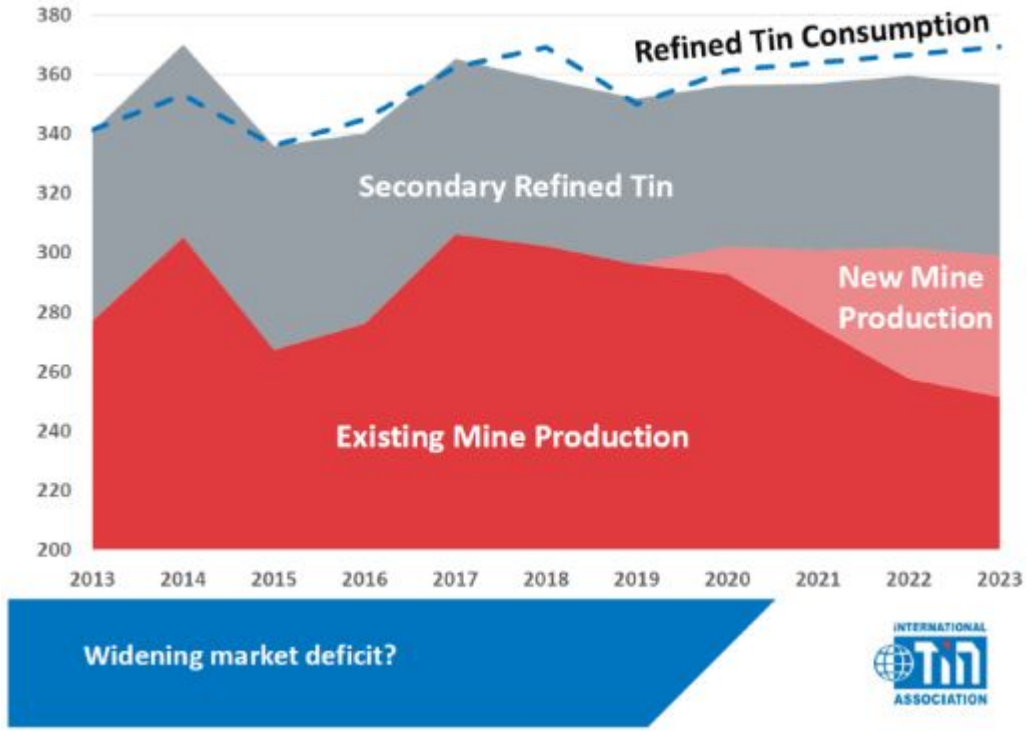
Tin is predicted by MIT to be the metal that will be most affected by technology



Appendix 2

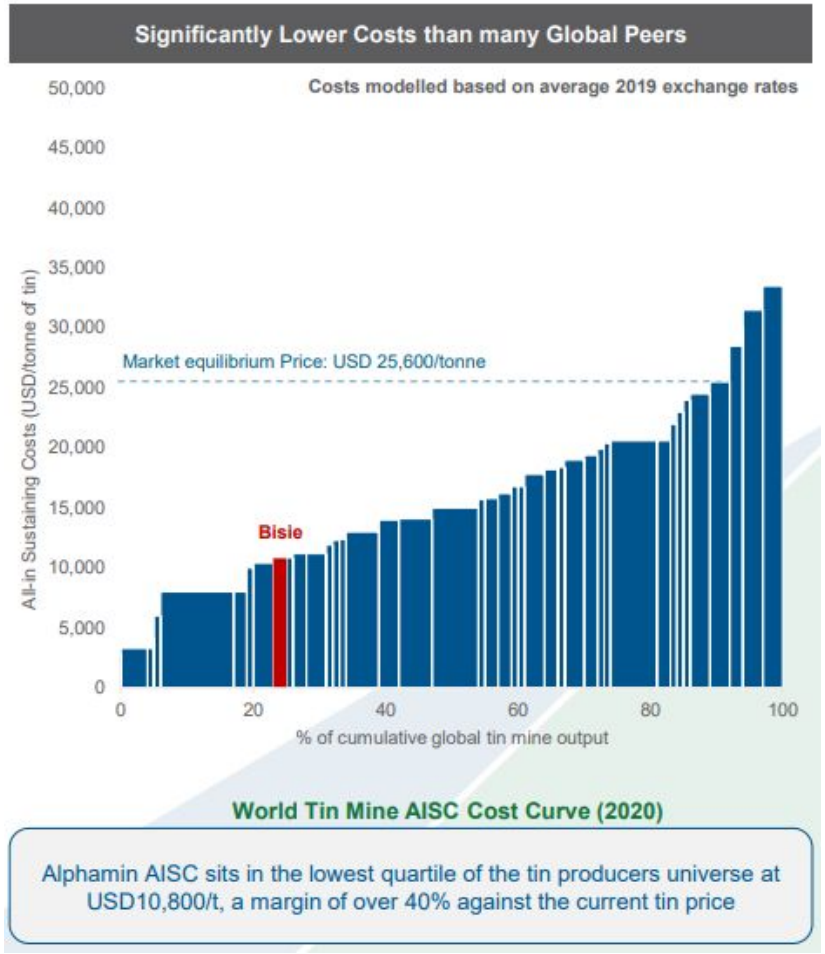
Supply deficit

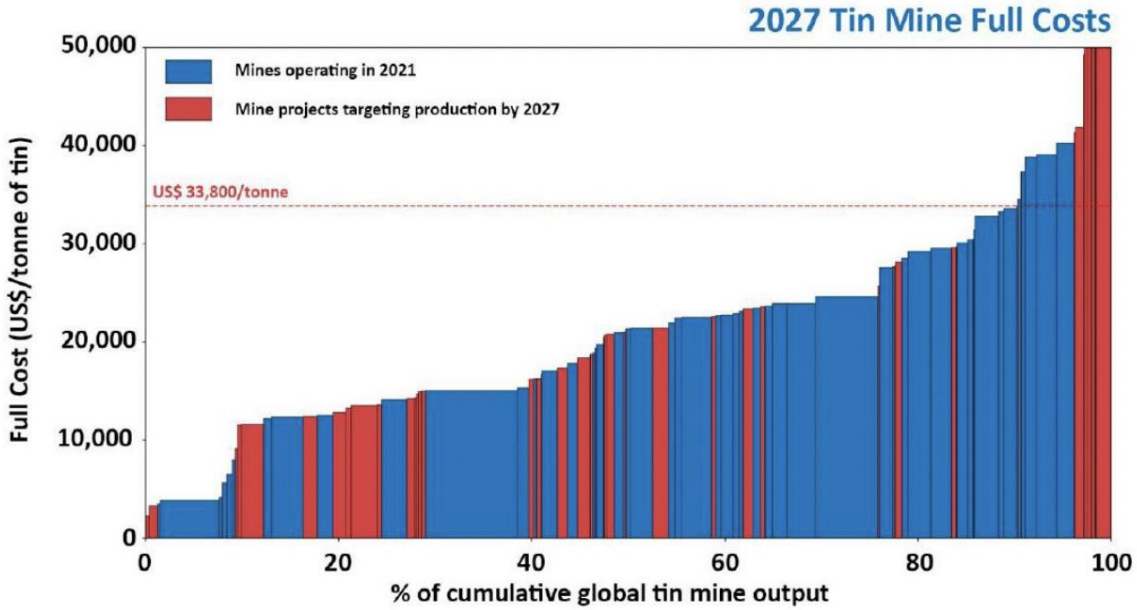




Appendix 3

Increasing tin price: Due to SE Asia depletion and Peru disruption





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Appendix 4

Geopolitical: supply tension and potential acquisition target

China imports a third of all their concentrate... almost all from Myanmar. Myanmar exhausts reserves as soon as next year. The Chinese mandate is security of supply and not IRR driven.

However, the systematic decline of mine grade in Myanmar is inevitable, and the cost of underground mining continues to rise. The reduction in the production of tin mines in Myanmar will directly affect the import of tin in China. At present, resources can only support Myanmar's output of more than 50,000 tons for less than three years, there is a high probability of decline in the future, and no new resources have been found on the ground. Political instability in Myanmar's WA state will also affect local tin mining, Myanmar tin mine supply worries.

We should make an early layout, speed up our efforts to go abroad, and actively explore and exploit overseas tin ore resources. There is a shortage of global resources and a low number of years of security. The import of tin concentrate in China is highly dependent on a single country in Myanmar, but its reserves and grade are declining rapidly, only enough to be exploited for three years. At the same time, the output of the world's major producers of tin resources is unsustainable. Peru also faces a rapid decline in reserves and grade. Indonesia, on the other hand, has been affected by policy and exports have been restricted. In the future, the global supply of tin mines will face a crisis. Go abroad policy environment is good, Belt and Road Initiative, China-Africa cooperation (copper, aluminum, lithium pricing power). It is suggested that the early layout and the allocation of overseas tin resources should focus on Southeast Asia, Africa and South America. Relying on the "Belt and Road Initiative" initiative, cooperation on tin resources projects has been carried out in Myanmar, Indonesia, Australia and other countries. The potential countries of tin resources in South America, such as Bolivia, Peru and Brazil, have maintained good cooperative relations with China, which provides a strong guarantee for Chinese enterprises to carry out tin resources cooperation in the region. The rising production of tin in the Democratic Republic of the Congo (DRC), Nigeria and Morocco in Africa is also the goal of our country's focus and layout.

2021 Top 10 Refined Tin Producers

Refined tin production (tonnes)

Order	Company	2020	2021	YOY Change (%)
1	Yunnan Tin (China)	74,800	82,000	*9.6%*
2	Minsur* (Peru)	25,075	31,843	*27.0%*
3	PT Timah (Indonesia)	45,700	26,500	*-42.0%*
4	Yunnan Chengfeng (China)	16,500	17,000	*3.0%*
5	Malaysia Smelting Corp (Malaysia)	22,400	16,400	*-26.8%*
6	Thaisarco (Thailand)	11,300	12,100	*7.1%*
7	EM Vinto (Bolivia)	7,100	12,100	*70.4%*
8	Jiangxi New Nanshan (China)	10,100	11,600	*14.9%*
9	Aurubis Beerse (Belgium)	9,000	9,800	*8.9%*
10	Guangxi China Tin (China)	10,100	9,200	*-8.9%*

Memes :)

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