

## A Market Note

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### Trades Mentioned

- Buy Alphamin Resources (AFM:TSX)

### Quote

*Amateurs think about how much money they can make. Professionals think about how much money they could lose. ~ Jack Schwager*

## The Tin Age...

Tin is *the* metal that the future is going to be built upon... Not copper, not nickel, not cobalt, not unobtainium... Tin, the stuff that old cups, heartless robots, and conspiracist headwear is made from.

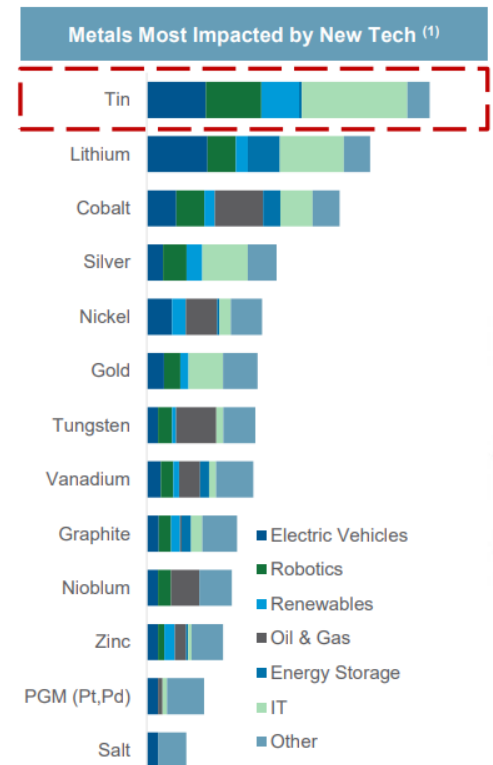
This alloying metal is making a comeback in a big way. I say come back because it was roughly 5,500 years ago when Sumerians discovered that a little tin mixed with copper created bronze. A development which was so revolutionary that a 2,000-year epoch was named after it.

Research conducted by MIT (funded by Rio Tinto) found that this unassuming metal will be the most impacted, the most critical, to “New Tech”. Things like:

- EVs
- Renewable energy
- Robotics
- AI / IoT / Big data
- Energy storage
- Computation

Yet, despite the expected future demand for this alloying metal, there’s very little new supply set to come online to meet it.

Ironically enough, one of the big reasons for this lack of foresight from the mining industry is that tin is boring, or at least it’s thought to be... It was primarily used in canning before aluminum came along. And now roughly 50% of tin goes to soldering, where it’s mixed with lead.



Source: Rio Tinto commissioned MIT survey

Miners lost interest in the metal decades ago. Tin’s price sagged while more obviously compelling metals like lithium, cobalt, and nickel dominated interests... Soldering isn’t sexy stuff, I get it. But it’s *precisely* this growing need to solder — to join two different types of metal together — that’s starting to bend tin’s demand curve from linear into something more resembling of a hockey stick.



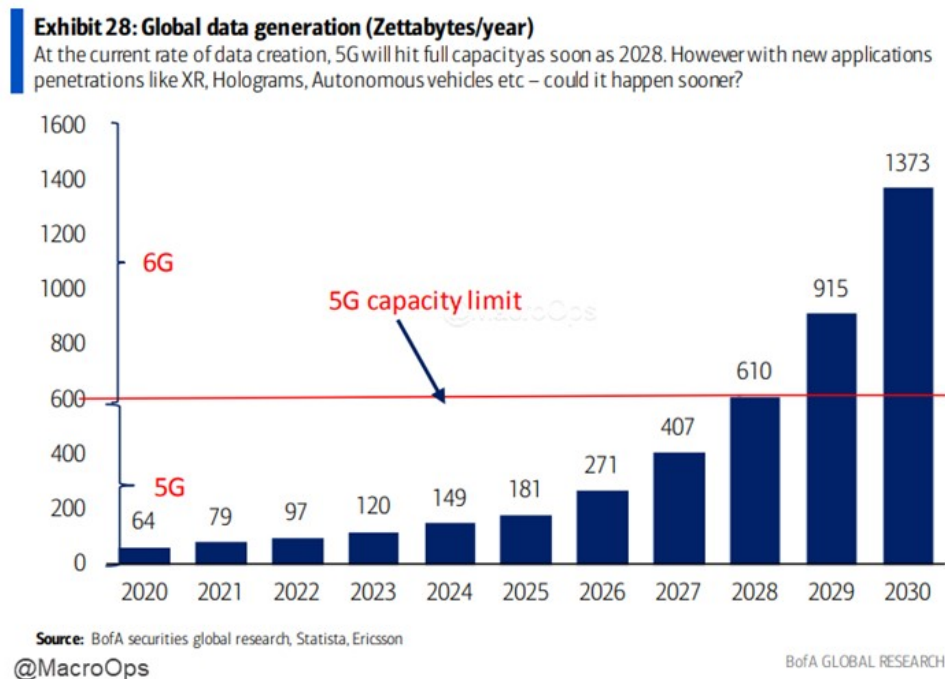
There are a few big reasons for this, which we’ll talk about. But here’s the most important one.

***The world is still massively short of computing power...***

Remember what we talked about in [Underwriting the Future](#) and again in [A Hungry World?](#)

- **90% of the data available in the world today was generated in the last 2 years** – and it is expected to grow to 180 zettabytes (that is 21 zeros) by 2025. To put a zettabyte into context, storing just one requires 1,000 data centers or about 20% of the land area of Manhattan. ~ Westfield Capital Management
- A single autonomous vehicle will generate and consume 40 TB of data for every **8 hours of driving and 1 million autonomous cars will generate as much data as 3 billion people.** ~ Intel
- **AI servers will require six times the amount of DRAM and twice the amount of SSDs** compared with standard servers. ~ Micron CEO Sanjay Mehortra

Et cetera, et cetera...



The market, and humans in general, tend to be bad at envisioning wildly different futures. When we make predictions about what’s down the road, we tend to just extrapolate what’s happening right now well out into time. This is usually the smart thing to do. Trends tend to persist.

But, occasionally, there are *step-function* changes in our reality and the way our world works. When trends shift from linear into exponential and we arrive at vastly different outcomes as a result.

Well, it's still a high conviction call of ours that we're very much in the early days of the exponential rise in (and demand for) computing power.

*While Moore's Law scaling challenges have shifted more of the burden (and value) to software, AI changes the paradigm because 1) compute matters again and there are little to no scaling limitations to the problem set (the more data, the better the outcome), and 2) creates a new virtuous demand cycle, much like the combustion engine did for oil. With cloud, compute has been centralized but there are still limited feedback "loops" to PCs and smartphones. AI creates a new feedback "loop" and should push more compute intelligence to the edge for key mobile and automotive applications in particular. ~ UBS*

This matters for tin because semiconductors — and really anything with electrical connections — need soldering, which means they need tin. Without it, electrons don't flow, data doesn't get stored, phones don't work, Tesla batteries don't charge, and so on...

This brings us to our next big inbound demand boost catalyst... Dumping lead.

The EU Restriction of Hazardous Substances (RoHS) directive that came into effect in 2006 requires that the lead content in electronics to be under 1000ppm. And it calls for the full elimination of lead in solder by 2030. Similar regulations have also been passed in Japan, Korea, China, and a growing number of US states.

Woodmac, a consultancy, estimates that a “global alignment to the 2030 EU standard could add a further 20 kilotonnes per year (kt/a) to [Tin] demand by 2030. But even before such legislation, electronics manufacturers are already voting with their feet in adopting lead-free solders.”

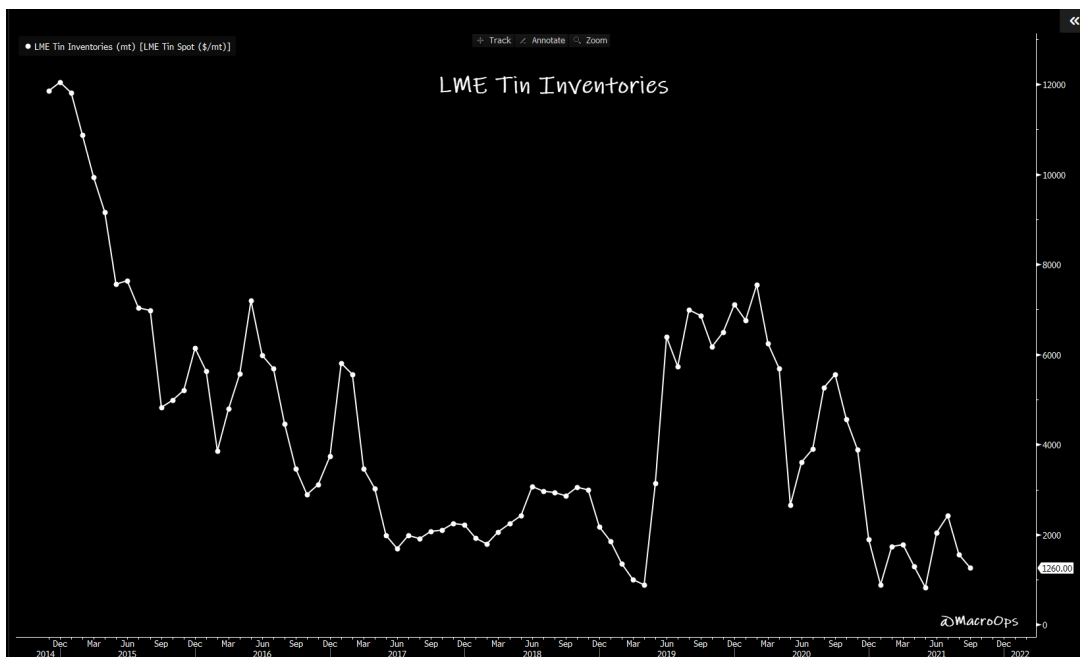
On the other side, we have supply.

The list of the top global exporters and producers of tin reads like an intro to a war crimes tribunal. The market is dominated by the likes of Myanmar, Rwanda, the Republic of Congo, Nigeria, China, Russia, Indonesia, and the shifty Australians...

This, of course, means there's ESG risk associated with supplies. China, Indonesia, and Myanmar together account for over 60% of the global mine supply.

It also means there's heightened supply risks stemming from geopolitical instability. We saw this recently with a short-lived supply crunch earlier this year stemming from the military coup in Myanmar where it's speculated the country has already burned through all of its high-grade near-surface material.

The supply-demand situation is becoming increasingly fraught. LME Tin Inventories are nearing all-time lows. While **the pipeline for new tin projects is almost non-existent.**



The market is responding by driving prices to new all-time highs. LME TIN futures currently trade at around \$36,000. The International Tin Association's Full Mine Cost projections for 2025, call for an equilibrium price of at least \$30,000/t.

A \$30k/t tin price would translate to big profits for the best-positioned mines. And we think the tin price will ultimately settle much higher over the coming years due to



the exponential growth in demand for compute and thus soldering. Oh, and there's also the added kicker which is that tin was recently recognized as potentially key in reducing thermal runaway in Lithium-ion batteries, which could very well turn into another big demand source...

Alphamin Resources Corporation (AFM:TSX) - monthly



Alphamin Resources Corp (AFM:TSX) is our favorite way to play this theme. A Collective member turned us onto this one. He's one of the smartest macro players I know, and I know a few. I'm poorer for not taking every trade he's ever pitched me. But I digress...

AFM is one of the newer entrants into the tin mining scene, hitting the market just over 2-years ago. You can read their investor deck [here](#).

Their operations are based in the DRC. Their Bisie mine, which moved into production in 2019, is one of the highest grade/lowest cost tin mines in operation, approximately 4x higher grade than other tin mines around the world.

The company has had to jump through some flaming hoops to get to where it is today. Early on during its exploration process it had to contend with doing business in a hot warzone and has since had to battle through major bridge collapses, amongst other hurdles.

But it now looks as though the rough ride is behind them. And it's time for them to reap the rewards of their work, and daring.

The company's current market cap is \$1.12bn (CAD). Management has guided for Q3 record high EBITDA of \$53mn, 56% higher than the previous quarters, due to increased production and tin pricing.

AFM recently moved to a net cash position and is looking to further delever its already lean balance sheet. Management is striking the right balance between funding further exploration and returning money to shareholders.

The company currently produces ~11,000 tons of tin a year. EBITDA margins are over 50% with \$25k per tonne (it's much higher at current prices of \$36k/t). But let's be conservative and say the average tin price is \$27k next year. That's 11k x 27k / 2 which gives us \$148mn in 2022 EBITDA and a multiple of 7x. Which is cheap for a competitively advantaged miner in a grossly undersupplied space.

But the real kicker with AFM is the optionality that comes in the form of striking "tin" in their Mpama North and South Deposits . If management proves to be successful in its exploration strategy (which initial signs indicate is likely) and is able to replenish reserves and keep production at full capacity in the years ahead, then the upside earning potential of AFM rerates materially higher.

| Alphamin's 2021 Exploration Objectives  | Logic  | Exploration Progress at 5 August 2021 <sup>(1)</sup>  |
|---|--|---|
| <b>1</b><br><b>Mpama North Mine:</b><br>Open at depth – drilling down plunge      | <ul style="list-style-type: none"> <li>✓ One of the world's <b>highest grade</b> tin mines <sup>(2)</sup></li> <li>✓ <b>Mineralisation open</b> at depth</li> <li>✓ <b>Best mineralisation</b> so far at depth</li> </ul>  | <ol style="list-style-type: none"> <li>1. Mobilised 3x drill rigs to site in July 2021</li> <li>2. 16,000m diamond drilling step out extension in 2021</li> </ol>   |
| <b>2</b><br><b>Mpama South Deposit:</b><br>Declare Maiden Resource by end 2021    | <ul style="list-style-type: none"> <li>✓ <b>High grade intercepts</b> from first 3 phases drilled</li> <li>✓ <b>Mineralisation</b> style similar to Mpama North</li> <li>✓ <b>Adjacent deposit - 750m south</b></li> </ul> | <ol style="list-style-type: none"> <li>1. 2x drill rigs completed 12,300m diamond drilling of 16,800m Maiden Resource programme</li> <li>2. Drilling to end August for maiden resource but to continue on step-out</li> </ol> |
| <b>3</b><br><b>13km Bisie Ridge under license:</b><br>At least one more discovery | <ul style="list-style-type: none"> <li>✓ Drill targets with magnetic/structural/soil geochem <b>characteristics similar to Mpama North and South</b></li> </ul>  | <ol style="list-style-type: none"> <li>1. Completed &gt;60% high density soil sampling campaign</li> <li>2. Structural Experts engaged for H2 2021 drill testing</li> </ol>   |

We talk a lot about the importance of seeking out opportunities with multiple [conditional edges](#). In a game that entails a lot of embedded randomness and unknowns, we want to stack as many edges, tailwinds, conditions in our favor as possible. And we want those opportunities coupled with convexity, so both our probability of being right as well as our payout if so, are much higher than average.

Alphamin Resources Corporation (AFM:TSX) - daily



Alphamin Resources fits this bill to a T(in). It operates in a space with a near-record low in inventories and almost zero planned new supply. Meanwhile, the secular demand picture has structurally shifted with Tin transitioning from being a boring afterthought to becoming the most critical input into new technology. So important that the US made it a strategic asset in 2018 while it doesn't produce any tin of its own.

AFM is an under-the-radar operator in this budding space. An operator that has weathered a good deal but who is now positioned as one of the lowest cost and highest-grade producers of tin in the world. One that is potentially sitting on decades of high-quality tin reserves and which we can buy on the cheap, with the stock trading in a strong technical uptrend, and in a space that hardly anyone is talking about...

We'll be putting on this trade tomorrow and sending out an alert when we do.

Your Macro Operator,

Alex