Okay, today everyone we're joined by Michael Walsh.
He's the MD and CEO of MTM, critical Metals.
This is the company looking to revolutionize the way metal
recovery happens through its proprietary flash,
dual heating technology.
The company still pre-revenue, but it's moving faster.
Commercialize the scalable low carbon process
that targets high value metals from both awe
and waste streams.
Rare earths are a key focus,
and I'm sure a lot of you know that that's a space
of growing economic and strategic importance.
And the technology, though,
is versatile across a whole range of, of metals and,
and certainly offers some compelling, um,
advantages over more traditional extraction methods.
So the company has a demonstration plan on the way.
There's several strategic partnerships already in place
and there's a fresh capital raise underway.
So this is a perfect time to unpack the M two MTM story
rather and, and have a, a closer look at it.
Before I, I welcome Michael to the screen.
Please remember, as always, none
of this is financial advice in any way, shape or form.
And if you do have any questions, you've got that Slido link
and, uh, be sure to make use of it.
So all that said and done, Michael, good to see you.
Yeah, thanks for having us, Andrew. So
I'll let you kick off with, just walk us through some,

the big picture stuff with some slides here.
Sure. MTM yeah, we're listed on the A SX
and we also have a, a listing in the US on the OTC
and we're focused on commercializing a metal recovery
technology that has applicability in both metal recovery
from waste streams like gold rich printed circuit boards,
or gallium rich semiconductor waste.
And also improving how problematic minerals are processed,
including lithium concentrate processing, rare earth element
concentrate processing and, and several more examples.
So two discrete business units, waste
and mineral processing.
Mm-hmm. Right now we're primarily focused on the,
the waste side of things
'cause it's, it's more in our own control in terms of, uh,
formulating our destiny and mm-hmm.
I'll get onto the business model shortly.
We're primarily a US focused company whilst the head office
is in Perth, in western Australia, we have all
of our operations are outta Houston, Texas.
That's where the technology was originally born out
of Rice University.
Quite a famous chemistry, uh, university in Houston.
And we've got the global exclusive license for this tech
for all metals and mineral oars.
And I should mention that we are already in discussions
with some major players like Veta.
They're essentially like the Rio Tinto of India.

They produce Illumina and copper and different commodities,
but for them they've got a red mud tailings problem.
Red mud is the residue left over when you turn
bulk site ore into Illumina
and it globally,
there's about 180 million tons generated every year.
Our technology, which we've demonstrated to veta,
we can effectively find a use for the entirety
of the red mud by removing the iron.
And then what that does, it makes it suitable as a,
a clinker replacement in cement.
So you effectively get rid of the entire red mud tailings
and you also get an iron chloride product
that you can sell from it.
So it's a, it's quite a,
an attractive opportunity given the, the size of the market.
And that all, pretty much all Illumina players like Alcoa
and all the Brazilians, they all have the same issue in that
red mud is a big problem
and these guys are being forced by the,
the governments to do something about it.
Yeah. We also off check agreements
Proposition to, to take a waste stream that's a problem
and, and be able to monetize it, I suppose.
Yeah. And we're fortunate actually,
vedante are being forced by the Indian government
to do something about it.
Mm-hmm. Because cement
and Illumina are both major industries in the particular

part of India that Vedante are operating in.
Right. And, uh, in terms of external validation,
we do also have a great, um, association now
with a company called Indium Corporation out of New York.
They're a major player in gallium and germanium
and other specialty metals for the electronics industry,
including semiconductors.
And we've got a, a waste material
that they produce in their refinery process
that's very rich in gallium and germanium.
That's like the init value
of the materials over $800,000 a ton.
So very attractive waste material.
And we've also got supply agreements now locked in
with two major US recycling companies
for this printed circuit board waste.
Mm-hmm. Mm-hmm. And just to try
and articulate this business model, so two business units,
we're building it around the urban mining
or the waste recycling.
This includes the gallium germanium semiconductor waste
that we already have a, a supply agreement under underway on
and the electronic waste gold, copper platinum group,
metal rich printed circuit boards.
And I sent said, we've already got now two supply agreements
with two big collectors of that printed circuit board waste.
And on the mineral processing side,
that's more of a secondary focus.

We have been dealing
with several rare earth element companies,
mining companies over the past 12 months.
And we're hopefully soon be, we'll be able
to announce partnerships with some of those players.
We did recently announce that,
but an MOU with meteoric resources,
they've got a ionic play project in Brazil.
And our proposition is to sit at the end of their
existing flow sheet and remove the waste
rare earth from their material, the lanum
and serum, which don't have any value.
And effectively you, you remove over 50% of the mass of
that em rec product, mixed, rare earth element carbonate.
If you can remove 50% of the mass, the value
of the material goes, goes way up
and you're, you're shipping less, uh, waste around to China,
whereas it undergoes downstream processing.
Mm-hmm. Mm-hmm. And as mentioned, we've got MOUs of vedante,
we've also got discussions with lithium companies.
So there's several mineral processing applications
where the pitch is to significantly improve
how the traditional flow sheets are conducted.
And that primarily relates to not using sulfuric acid
and not using the fossil fuel burning rotary kilns.
But right now the focus is on this high value gallium
germanium feedstock and the goldrich e-waste.
And I should say that we are in the process
of establishing our first commercial plant.

We secured a site about two months ago in Houston, Texas,
and this site is, it's quite large, it's over 10 acres,
and it's a preexisting,
formerly operating hazardous waste incinerator site.
So it's got all the permits we could need.
So as soon as we saw that available, we, we jumped on it
and that's now how we're gonna be getting into production.
We hope by early Q1 next year, we hope
to be commissioning the plant at the end
of this calendar year.
Yep. And the reason we've been able to accelerate
that schedule is, is being able
to secure this particular site.
Mm. And just to briefly go through the history
of the technology, it was originally developed
with sponsorship from the Department of Defense, uh,
who this Dr. James tour outta Rice University.
He's quite a famous scientist.
He has done a lot
with the Department of Defense over the years.
And they were at the time, interested in graphene this kind
of supercar material.
He was able to make graphene using this method called flash
dual heating, basically electrical energy
that rapidly heats feedstocks where the,
the feedstock actually gets the
current directly passed through it.
And that technique

for graphene was put into a private company called Universal
Matter, and those guys are now in commercial
production in Toronto.
Mm-hmm. And subsequent to that, the DOD also went back
to tour and asked, can this method be used
to pull the rare earth elements out of coal fly ash
and red tailings?
This is where the, the kind of metal side
of the business became of interest to tour.
And he quickly realized it's, it's a much,
much bigger market than graphene, or it could be.
So then he started studying different ways
of extracting metals,
including gallium from semiconductor waste, gold
and copper from printed circuit boards, uh,
lithium ion battery, black mass waste.
So the, the stuff that's left over
after a Tesla battery is at the end of its life, he was able
to pull the nickel and the cobalt from that.
So it's got this wide range of applicability.
And during that time, he instead,
it is not just pure heating anymore,
he added some chemistry.
So we're adding some catalysts, we're adding some chlorine
and, and carbon to get the desired chemistry.
And what we're really aiming
to do is improve these techniques of power metallurgy
and hydrometallurgy, which from a high level,
you could argue they're very non-selective.

When you use, say hydrometallurgy, you're dissolving all
of the atoms in your fee stock into your solution.
So then you have to, to spend effort
and time to pull out the unwanted ones.
Whereas our technique, we're effectively only targeting,
say, lithium within APO mean mineral, and we use temperature
and chemistry to effectively distill off
that particular metal and keep the unwanted stuff behind.
So it's a much more elegant solution compared
to these traditional techniques.
And
Can I just dig into that a little bit?
Michael is one, one of the interesting things in just going
through some of your material is that you often come across,
uh, processes and they're very specific.
And this one, as you've touched on,
is very wide applicability.
So it's really just in tweaking, you know, the current,
the conditions and the chemistry around it can really be,
really be applicable to a whole range of, of,
of different metals, which is, which is fascinating,
but also, um, it, it has some, uh,
economic benefits in terms of, uh, you've,
you mentioned some of the asset requirements
with traditional techniques which aren't required here,
but also in terms of the energy burden Yeah.
As, as well is, is, is that something you can expand on?
Yeah, sure. I'll bring up a quick example here.

Might be very legible,
but if you look at the left hand side, so one
of the actual first applications when I was originally
getting involved, I, I was a consultant to the company
and I had a lot to do with lithium flow sheets in my
previous life as a chemical engineer.
And one of the most problematic
and energy intensive steps in nearly all
of mineral processing is what's called calcination in this
odine conversion from the hard rock
or SPO mean, which is primarily mined in Western Australia,
and then it's converted into lithium carbonate
or hydroxide in China.
The hard part, the calcination
and the conversion is done in China mainly
because of how energy intensive and nasty the process is.
Mm-hmm. And the first step is really the,
the most energy hungry where you cook at at 1200 degrees
Celsius in a rotary kiln for three, three and a half hours.
Yeah. So you can think that amount of time
and energy is, is quite substantial.
Yeah. And the big lithium companies have been trying
to get rid of that step for almost decades now.
Yeah. In particular the, the,
the western world players like Al
and we, we got a sample from a West Australian mine
and we were just trying to initially beat that time,
so do the ation effect in less time.
And we did, we, we were able to use just the flash heating

and in say, achieve
that same effect in about 10 minutes versus, you know,
three hours in a kiln.
So that's what really initially piqued my interest.
But then the real breakthrough che,
when we added the chemistry aspect as well,
so we added chlorine
and we were effectively making lithium chloride
directly from that spot immune concentrate.
Mm-hmm. So in theory then,
if you look at the flow sheet at the bottom,
you could potentially in just three steps achieve
what the traditional flow sheet does in dozens
and dozens of steps, including all the impurity removal,
the acid roasting
with sulfuric acid, get rid of all of that.
And this is, we were in quite detailed discussions with one
of the big lithium companies at the time,
and that just has gone on pause
and it's on ice for the moment
because of the, the issues that company's having just
with the lithium sentiment.
But this is just one example of
how it could potentially revolutionize these traditional
very CapEx and opex intensive flow sheets.
Then on the, the right hand side is a similar example for
where we treated monocyte concentrate.
Monocyte is the main, uh, source

of light rare arts, um, currently.
So neodymium and predium are the two valuable rare arts in
that monocyte mineral, and the rest is just waste.
And the traditional flow sheet is, is really complicated.
It's highly simplified shown here,
but it again,
it uses sulfuric acid baking in a kiln long
times and loss of acid.
The issue that these guys were having is
that when you use sulfuric acid with this, um, gypsum,
or sorry, this calcium rich ore,
you generate gypsum tailings, which is one issue.
Second is it rare earth sulfates
that you make are very insoluble in water so
that you need a lot of water to get them to go into the
solution for your water leaching step.
So these guys were looking at ways to try
and change the chemistry away from sulfuric acid
to something like chlorine.
And this is what we were actually using as our main reagent,
and we effectively chlorinated all the railroads,
we turned 'em into railroad chlorides.
Mm-hmm. And then you effectively,
because we're doing this distillation
and we're leaving the unwanted stuff separate, we
effectively could remove a, a big chunk of that, get rid of
that water leaching step, get rid
of the impurity removal steps, get rid
of the acid baking steps.

And again, we hope to be able to publicly announce some
collaborations with rare earth mining companies quite soon.
We've done a lot of test work to date,
and meteoric resources is the first one that we've been able
to publicly announce.
And that's, that's actually a separate application.
It sits at the end of their
aren taking their midstream product
and effectively enriching it or refining it.
So there's lots and lots of different
mineral processing applications.
Michael, is there, um,
is there a downside to this approach?
Is it something that's, you know, the, the, the flow sheet
as you call it, is shorter,
but is it, is it less efficient overall
or is often I ask only
because often there's trade offs, you know,
and it really depends on what you wanna optimize for.
Is, is, is that the case with this technology?
We, we, at this stage, the honest answer is we don't know
because we're at the, we're in the process
of actually getting it to bigger scales.
Right. Um, until we have
that real life data from the bigger scale, we,
we can't honestly answer that question.
But the, at this point, all the indications are
that it's gonna be at least 50% less opex

to energy and reagents.
Right. And probably even more in terms
of overall footprint and CapEx.
But we won't be able to really quantify that
until we've got real life data.
And we, we will have that, we hope early next year we're,
we're building this, uh, commercial scale plant in,
in Texas as I mentioned.
And that will then give us the real life data
that we can truly do an apples to apples comparison.
But fascinating, all indications are Yeah.
It's gonna be substantial.
And assuming, assuming everything goes to plan, is, is
that something that's easy to scale up at least, you know,
not, not everything's easy from the outside.
Um, so I, I, I, I didn't, I, you know,
what I'm really getting at here is assuming everything goes
well do to accelerate, um, that, is
that a relatively straightforward kind of process
or is it something that you'll need to sort of go
to a larger commercial scale to see if it works at, at, at,
at, at different scales?
Yeah, no, good question. So we're,
we're calling our first commercial plant, the,
the rev one design and rev one, it's gonna be modular.
So if we need the,
the name plate capacity we've been saying is one ton per day
per line, in reality,
we think we can get five tons per day from

that same footprint in CapEx.

Right. Just, we've had some recent innovations in what we,

we can actually squeeze through the, the reaction system.

Interesting. So each line says five tons per day,

and if we want more capacity,

we just bolt on a second modular line.

That's up to a point we want.

Uh, maybe 10 might be the kind of theoretical maximum Yeah.

Before that's kind of maxed out.

We do have a rev two design that's for a much,

much bigger type throughput

and a fully continuous, uh, design.

But we won't be prototyping that until

next year, middle of next year.

But we do have it on paper already,

but we think for the high value waste streams,

we don't need those much, much bigger scales.

Yeah. The bigger scales will would be for the red mud

and these mineral processing where the,

the ultimate aim will be about 10 tons per hour is the,

the kind of ambition design capacity.

Wow. And we think we can, we can get there with the,

with the continuous design. Interesting. Rev two.

Thank you. But we wanna walk before we run.

So we're gonna get Rev one Bulletproof

in this first facility.

Mm-hmm. And we could easily fit, you know,

probably 20 lines in this existing building

without any problem.

Right. And then there's, there's much

broader expansion capability around the wider sites.

It's like 10 acres in total.

Wow. Okay. And it's in the

site's in a really good location.

It's right off a major interstate, highway 65.

It's just outside the main city of Houston.

And beside a, a major Dow chemical chevron kind

of refinery complex.

So all the labor

and, uh, supplies we could ever need is, is on the doorstep.

It's also very close to the Port of Houston.

Yeah. Yeah. It looks perfect.

And we do have ambitions to try

and acquire similar pre permanent, formally

or currently active waste sites, uh,

in at least five additional states across the us.

This was, um, kind of recommended

to us when we're currently talking to the Department

of Defense and the Department of Energy

for some substantial grants.

And the grants would go to support this broader strategy

of setting up local to where the e-waste is available

in these, uh, different states like Florida, uh, Louisiana,

Nevada, Virginia.

And this is what these guys wanted to hear in terms of the,

the justification for these big chunky grants.

So that's, anyway, that, that's bubbling away in the

background, trying to get more of these pre permanent sites.
I just touch on that. It, interestingly enough, we spoke,
it was a MedTech company yesterday, was talking about some
of the, the benefits of of, of government grants.
I is what, what strings are for want of a better term?
What strings are attached with some
of these potential grants?
Or is it more just government looking to sort
of stimulate an area or an industry they think is sort
of strategically important or economically important
and they're just sort of, you know, for
the greater good of the industry?
Or is there other components to it?
Yeah, it's, it's kind of a, a mix.
So there's at least six individual grants
that we're currently targeting.
One, for example, with the Department of Energy, it's like,
it's over a hundred million USD type quantum.
Wow. And that one in particular is, is
for accelerating onshoring of manufacturing,
particularly for critical metals.
So that's, it's, it's a pure grant.
It's, there's no real strings
and it's not like a low interest finance.
It's, it's, it's a pure grant.
Uh, one of our peer type companies, iion X, they've also had
very successful grant applications
with the Department of Defense.

And again, that was all about accelerating the
onshore manufacturing.
It's, I think it's called the Industrial Base Acceleration
Program, or IAS
and they that, so that particular one is
for the greater good onshoring of metal,
uh, critical metals in particular.
Then with the DOD, there are several that are
specific to say gallium.
Yeah. There's ones for rare earth element separation,
and there's separate one with the Defense Logistics Agency
who have all this electronic waste from
all the bases globally.
Mm-hmm. And there are theories of sending hard drives
and other stuff to, I suppose you you'd call 'em, uh, yeah.
Unfriendly countries.
So there's a, a, a, they have a stockpile of E-waste
and they, the proposition is
that it's like a $32 million grant where you would build
local recycling, metal recycling centers near this, uh,
stockpile, which is, it's spread out around the us.
So that, that's, that's just some example.
There's also another one for antimony.
So they're very concerned about antimony rare
earths and gallium right now.
Yeah. Yeah.
It makes sense stuff in the, in the headlines
and for various Yeah.
Strategic and geopolitical reasons. So it's fascinating.

Yeah. And we've heard that the DOE had a lot of money
under Biden allocated to fund, like windmill projects
and, and solar projects.
But now Trump has pulled pretty much a hundred percent of
that, and he said it all needs
to go into critical metals. Mm-hmm.
Yep. Yep.
And then mania, I think I've already mentioned, we,
we are now speaking to big players like Ante Indian Corp.
They're at New York. We have the supply agreements locked in
for the, for the first plant, for the Goldrich e-waste.
And we've got several, at least eight other companies
that we're talking to across mining
and recycling that we, we will hope
to be putting out news on soon.
And as mentioned, yeah, we've got several non-dilutive
funding opportunities.
So this main message from this slide is that there's,
we have been very, I suppose, consistent
with putting out news and, and that's not gonna stop.
It's probably going to actually pick up, we've got plenty
of news forthcoming.
We've got a big backlog of feedstocks
that we've been meaning to test.
We've had a lot of inbound interest.
So we've got different types of mining companies
and other recycling companies wanting us to look at
removing the metals from their particular type of feedstock.

So there's a lot of test work related news to come.
We'll also hopefully be soon putting on a heavy hitting US
advisory board a lot with links to the DOD.
So we think that'll be a, we're, we're basically trying
to re rebound ourselves as a, as a real US focused company.
And there's a lot of peer companies
who are in the same bracket, like IX
and Miro t with the same type of US metals, industrial tech
that have had a lot of success over the last,
say, two years.
Right. And yeah, India.
Yeah, they, they're probably our most key partner right now.
They, they've got this gallium germanium,
indium waste from their various
refineries that they have globally.
And just to put the material into perspective,
a typical gallium
or germanium in,
in an ore body is at like PPM level parts per
million or grams per ton.
So like between 50 and 150.
And that's where the world's gallium
and germanium originally comes from the,
it's a minor byproduct
of either bulk site oars or zinc oars.
Hmm. And the material we've got access to is it's orders
of magnitude higher in concentration.
It's like 150,000 pp m gallium, and 180,000 germanium.
So it just puts that into perspective.

There's a lot of, say early exploration companies out there
putting out gallium rock chips
and calling them significant if they,
if they're more than 50 ppm.
So this is tries to underline the, the high value nature
of this particular feedstock.
Yeah. Uh, yeah.
The, the Dante, I think I've spoken about
what the proposition there is,
but there's huge amounts of this red mud globally,
and currently it's all sitting in tailings dams and look
At the size of it. Wow.

Yeah. Even in Western Australia here, there's,
there's major like football, field size, tailings dams
that the government, uh, have been, I suppose, trying
to get Alcoa to do something about for decades now.
Yeah. Yep. And it's, it's, it's, uh,
considered a hazardous waste 'cause it's very caustic.
It's like pH 13. Wow.
And one of the, one of the parts
of the FJH process is we remove that sodium,
which is the cause of the ity.
And that's, that's effectively how it then can be used as a,
a green cement additive.
Ah, okay. And then as mentioned, yeah,
we've got these two major recycling companies
as our initial suppliers.
We've also got other guys we're speaking

to about additional supply.

Mm-hmm. And we, we have secured

over a thousand tons per annum.

That's why, even though we we're saying one ton per day

capacity, we think we can get

to at least five tons per day from that same equipment.

That's why we, we signed up additional waste over, you know,

over, uh, one ton per day.

Yeah. A access to feedstock does not seem

like a, a problem.

No, definitely not. Look, in the,

in the US there's only about 10% of the e-waste is recycled

and majority is landfill.

And the small fraction

that is recycled from metals is shipped over

to smelters in either Europe or Asia.

Yeah. And these guys have a big monopoly.

They only pay for the, they pretty much only pay

for the gold and the copper content.

Mm. And they have a, their buy sell spread is huge

that they make all the margin

and these recyclers know it, but there's no other option.

So yeah. Our pitch to those guys also, the will pay you more

for the init value of the metals,

and you don't have to have transport costs

or any tariff related issues if you keep the materials in

country pitch.

And then a said this good pitch. Yeah.

And I suppose this is just, again, to underline the,
the news flow that's forthcoming.
We do hope to be commissioning this plant by,
by December bumping motors
and doing the wet commissioning hopefully January, February.
So putting feedstock through mm-hmm.
And then all going to plan wanna be in commercial production
in the, uh, the second quarter.
Okay. So that's the ambition right now.
Yeah. Yeah. And that's pretty, this hasn't been updated
for a while, but the, as of the last quarterly,
we did have 10 million Aussie in the bank,
and we've, we've just about to raise 50 million
because we had a lot of interest
and we thought it was prudent given the,
the recent uptake in the share price
and also the, just the choppiness
and uncertainty in the markets.
We thought it was the right time to pull the pin on on that.
Right Now, given we had, we had a lot of inbound interest.
Yep. And we, the ambition was
to do a fully institutional type raise to try
and more, I suppose, institutionalize the register.
And we, we've, we've achieved that now with,
with this current raise.
Yep. So when we, when we come out,
we have a proforma about $60 million in the bank,
and this hopefully now will tell the market
that we're not come raise for a long time.

Yeah. Yeah. And so, and should

Allow us to accelerate the plans.

Uh, I was gonna ask. Yeah.

So it does that and it also,

or just gives you a nice, a nice long runway.

Do, do you have a rough sense of the runway?

It kind of gives you, with your current aspirations?

Well, ideally we'll be producing cashflow

by H one next year.

And, you know, in an ideal world, we wouldn't have to raise

probably, you know, for two years and maybe never again,

but, we'll, that's obviously quite wishful thinking,

but that's, that's the ambition Interesting.

To get into cashflow by H one. Yeah.

Although, I mean, I don't suppose you'd be, it's,

it's gonna depend on the share price

and I, I pe people on here will be sick of me saying it.

I just, I just underline the point here

because I know that, that you often get

pushback for these kinds of things.

But if you've got a million people knocking on your door

saying, we want access to this,

and the only limiting factor is cash,

and you know that there's a good ROI at the other end of it,

then, you know, maybe you shouldn't be

hesitant in raising capital.

Yeah, no, exactly. And especially given how uncertain

and unpredictable the whole world is right now.

Yeah. Yeah. So we thought it was right time

and we, we did have a lot of inbound, so we

that's decided to Yeah,

Yeah. Yeah.

Fascinating. Do these things when it, when it's being

offered and not when you're desperate

Abs. Absolutely.

Yes. Yeah.

Can I ask you about the original li

with the license agreement with Rice University?

What, what entailed in that?

Is there a revenue split

or just an ongoing set fee, or how does

Yeah. Um, so

it was originally put into MTM on NTM at quite a

low valuation.

So it now seems very cheap.

So I think it was something like 250 grand cash

as consideration, plus maybe 500 grand

worth of equity.

And then, uh, there's an additional royalty

on I think the top line once,

but it's only once free cashflow goes, goes

above 50 million Australian dollars and it's 1%.

So it's very modest. It's

Like a hell of a deal.

Yeah. No, it's very, uh, very modest.

And we, we've got a great relationship with Rice.

We've, we're doing ongoing, uh, development with them kind.

We're, we're sponsoring some of their additional patents
that they're working on that's further strengthens the
overall flash dual heating patents.
We, so there's about six overarching head patents.
And then since then, MTM has been adding our own sub
patents on the scale up.
Mm-hmm. How we're doing the scale up. Mm-hmm.
So yeah, we're very well protected, we think.
How about the IP behind it?
I mean, as you said, and I might be wrong on this,
but this is very recent tech,
I think 2017 it came out of Rice.
Um, yes. And it's great to have IP protections around it.
And again, without naming certain geopolitical, uh,
i identities, like sometimes ips aren't,
aren't respected in some jurisdictions as well as others.
Is that a concern? Is this something that's easy
to reverse engineer
or is it just one of these scenarios where,
which is often the case in fact with, with new techs,
with big op option optionality
and opportunity, is that the pie is big enough to, to sort
of, um, uh, allow for, for multiple winners here, but Yeah.
What, what, what are your thoughts on all of that?
Yeah, no, we, uh, we've got a good strategy around that.
Um, so we, we would be very selective
with both the companies that we deal with
and also the countries.

So we obviously wouldn't be selling
any equipment into China.
Mm-hmm. Um, based on my previous life at one
of the world's biggest kind of mining tech, uh,
equipment suppliers, we had a policy, you know,
that any brand new inventions were
you pretty much not sold into the Chinese market
for at least five years.
Mm-hmm. And because literally it would only take about three
or six months to copy.
Right. So we we're gonna be very selective, both
with the clients and the countries that we deal with.
We generally, for the, for the time being,
we've got enough on our plate just to focus on the,
the United States secondary focus is Europe
because of the size of the E-waste market is,
is even bigger than the United States.
And then we do have plans to get into the likes of Japan
and Korea and Taiwan, where there's also huge amounts
of electronic waste available. What
About Australia? We,
oh, sorry, I didn't mean to interrupt.
I was just gonna say in the US the expansion rate on these
data centers is quite enormous.
Yeah. And, uh, they,
there's something like every three years they have
to turn over the electronic grid, they come become obsolete.
Wow. So there's this huge tsunami of e-waste that's, um,
upcoming and guys like Amazon are gonna be forced

to do something about it from an ESG perspective.
So mm-hmm. We're targeting the likes of,
we're gonna be targeting the likes of Amazon
and the big data center guys to become one
of their potential, um, solutions for, for e-waste.
And just, I'm sorry. I'm sorry, Michael.
I think it's a slight delay here. No worries.
I don't mean to keep cutting in, um,
just on the ESG component,
because I mean, you mentioned sort
of the change in administration there and that, and,
and just in general it feels from an investor's perspective,
the ESG mandate is perhaps wa being watered down somewhat,
which, you know, and not to make any commentary on it,
but I, I I guess is, is a lot of the drive for this, um,
well, how much of the drive of this is ESG
and how much is it that like just it makes economic sense in
and of itself, in other words, even if there was no ESG uh,
concerns whatsoever, is there an economic rationale that
that, that helps sort of stand this up on its own?
Yeah, a hundred percent. We're definitely not pitching
this to any of the, um, like feedstock guys as a,
as an ESG type proposition.
It's all about improving the economics. Right.
So it's, it's all about, you know, 50% less opex,
hopefully this similar
or more CapEx that's the high level pitch to these guys.
Yeah. And the sentiment in the us like we were in Washington

a couple of weeks ago getting letters
of support from some congressmen for, for these DOD grants.
And we all, we met four congressmen from Texas,
including Ted Cruz,
and they all were high on their list or critical metals.
They all knew or mentioned rare earth,
even though I don't think any of them knew
what rare earths actually are.
But it's all high on their agenda, rare earth elements.
'cause Trump keep men keeps mentioning it.
And yeah, The, the set, the Trump has pulled a lot
of money from, as I mentioned, the the DOE
and Biden's Inflation Reduction Act.
And he's pulled it out of the kind of ESG projects
and put it told them to put it into critical metals.
So there's definitely a huge push for onshoring
and including speeding up permitting for mining.
But even Trump can't solve some of the, the crazy permitting
red tape that, uh, some of the states have.
So yeah, recycling definitely is seen as a, in,
in particular by the DOD as a,
rather than we're having a 10 year timeframe on a, on a mine
to maybe get into production,
you can get metals outta waste much, much quicker.
'cause it's above ground. The
metals have already been discovered.
Yeah. And it's just a matter of
getting them out economically.
So we we're definitely not pitching it as any way to do

with ESG, even though there is ESG benefits as mentioned in
that rare earth element example.
Yeah. Yeah. Fascinating. Fascinating.
Um, I, I might have cut you off there.
Please, please continue. Otherwise,
I've, I've got more questions.
No worries. I was just gonna say that this,
the another tick for me
before I, uh, officially agreed to join as CEO was
that a company has already scaled the heating part
of this tech up, and
that's this universal matter outta Toronto.
Mm-hmm. So that is a very impressive facility,
which I visited probably about last August.
And yeah, so the,
someone out there has already scaled this heating tech up,
and it's why I think we've managed to,
it's taken them like four years.
We, we've managed to achieve, to get
to this their same scale pretty much in, in about a year.
So we've, I suppose, standing on, on their shoulders a bit,
getting the benefit of a lot of the, the teething
and scale up the pains that they would've gone through.
But yeah, that's how we've managed to get things done
so quickly, I think.
Yeah. So 60 million cash in the bank
or soon to be, yeah. Um,
It will be after tomorrow. Yeah.

Yeah. So, so what, what, what's, what's the sort of,
I mean, as you said, part of it is just sort of, you know,
striking while the iron's hot,
but in terms of the, the wishlist or the shopping list
or the, you know, the expenditure priorities,
where are you looking to sort of spend that initially?
Are we bulking up the team
or is it in the, the, the CapEx associated with the,
the plant or, or Yeah.
What are the thoughts there?
Yeah. Um, so it's primarily, yeah,
we're gonna grow the team in the US
as rapidly as we can mm-hmm.
And get, um, also start purchasing these feed stocks.
These high value feed stocks get a good buffer underway
for both the gallium germanium material
and also the printer circuit board waste.
Yep. And outside that, we're also gonna try
and get these additional sites at least options on these
five additional sites.
Mm-hmm. And I think that then will allow us to more
easily convince the DOE in particular that we're,
we justify for these huge grants.
And, but yeah, it'd be growing the team getting feed stocks
and just accelerating, putting more bodies
to the, to the problem.
Yeah. Effectively,
Uh, this might be too early to ask this, so let me,
let me know if that's the case,

but do you, do you have a, a rough sense of what sort
of the fixed cost base might look like?
Uh, you know, at least for the, the, the, you know,
near term to medium term to sort of get you
to that, that next leg?
Well, uh, so our
burn right now without any CapEx associated is about,
it's only about one and a half to 2 million a quarter.
Oh, right. And that will ramp up, that's Ozzy
that will ramp up now as we build out the team.
Yeah. And the CapEx for, for one line, um,
for the first plan is also quite modest,
where our current estimates are sub 10 million Australian
for just equipment and excluding any side costs.
Wow. But the, the burn, probably if we achieve the,
the new org chart that we're targeting by say, the end
of the year, the, the burn probably might triple okay.
But it won't, it's nothing too crazy off
A low base. And then, uh,
yeah, it's off low base
and we also, as I mentioned, we do have to be producing cash
by H one next year.
So be producing saleable products from this,
what what we're hoping is five tons per day plan.
So Yep. We've, uh, there's, there's a note going around
that Petra Capital have initiated,
their analyst has put quite a lot of effort into putting a
stab at a financial model.

We've, we've got a lots of constraints in terms of
what we can put out to the market, but Mm.
The, uh, Petra, we've guided him as to
what the business model could look like.
And yeah, it's, uh,
he's been quite conservative in the numbers,
but it, it does, the,
the economics are, are really compelling.
Mm-hmm. Even just for one, one line
of e-waste, gold rich e-waste.
Interesting. Um, one of the other considerations, Michael,
so you guys are very much going down the path of we'll build
and operate the plant ourselves.
Um, makes a lot of sense. Yeah.
Um, the other option, um, that, that some companies take,
particularly if it is, you know, um, very widely applicable
and there's a, a, you know, trying to, um,
I guess best leverage a first mover advantage for, for one
of a better term though, it might just go
with a pure licensing kind of model.
In other words, you know, you'll,
you'll allow other companies to run with the technology
and share in any upside that they're able to deliver.
Have you, I'm sure you have thought about that.
So in terms of what,
what are your thoughts on, on that specifically?
And, and, and why, why not go that route?
Yeah. Um, so if I just go back to this
business model slide, what was it?

The definitely on the e-waste,
initially it's gonna be build on operate
where we purchased the feedstock and we own the plant
and we, we bought, we bear the opex,
but we also own the full economics of what we're selling.
Yeah. Yeah. And then for the mineral processing, we see
that more as a, a licensing arrangement
where we say license, we sell the equipment to,
to Vidant as an example.
And then we charge 'em a technology fee
and ideally like a royalty fee per ton
of material processed.
Mm mm And if we can even say get 5%
or even 1% of the, the global, uh,
red mud production globally, eventually, I mean that's,
that could be a huge annuity,
even if it's like a hundred bucks per ton type fee.
And then subsequent to that, if there, we are looking at, if
we go to Europe, for example, it may be a case
where we license the recycling side of the business to a,
a trusted partner in Europe.
And, but right now the, it's all about build on,
operate in the US and potentially once we get
that first client bulletproof and design
and repeatability,
then we can look at replicating that in Europe.
But with a, with a kind of a, an already existing say waste
handler or collector in Europe.

Yeah. Under a licensing arrangement. Yeah.
There's lot, lots of different models under,
under review right now. Yeah.
Interesting. And same thing,
we're looking at Taiwan as well.
'cause there's a lot
of gallium semiconductor wafer waste mm-hmm.
Obviously available in Taiwan.
So that's, uh, that's something
we're trying to crack into as well.
Fascinating. Um, one of the other questions I had for you,
is there much pretreatment required of the feedstock?
Yeah, it depends on the feedstock. Yeah.
So For bring up this block flow diagram.
So the incoming feed treatment will differ
for the feedstocks, but the core reactor
generally speaking won't change.
What, what changes is the recipe,
the temperature set points, the reagents that are used,
if any, and the amounts of chlorine that are used.
Mm-hmm. So the recipe say if you're baking a cake will be
different for the each, whatever your objective is.
Is it to remove impurities metals or is it to remove
and recover valuable metals?
That'll be a function of the feedstock,
then the backend, it won't really change.
It's just condensing the,
the the vaporized metals and, and collecting them.
Yeah. Whereas on the printed circuit boards

will have a different pre-treatment compared
to say the mineral concentrates.
The mineral concentrates,
generally speaking, have to be dried.
'cause they generally come in at about 20% moisture.
We have to take that down to 10% moisture.
And then some of them also require some additional grinding
just to get the particle size a bit smaller.
Whereas the e-waste,
generally we have a plastic removal step just off the shelf,
um, system where we effectively cook the plastics off
as a syngas and collect that.
And then the, the metal rich char from
that cooking process is, is what the feed is
to our FJH process.
Hmm. And we are very clear to the engineers that
we only want to be taking process technical
risk in our own reactor.
Everything else is off the shelf.
Someone has already figured out how to make, say,
plastic removal from e-waste work.
So we don't wanna be reinventing the wheel.
No, absolutely not. Yeah. Make it makes perfect sense.
And so I go, this,
this question will also be an answer of it.
It depends, but, but in, at least in terms
of the initial f um, focus.
What, what, what, what are the big variable costs?

Is it, is it as simple as electricity or,
or chlorine doesn't cost much, I don't guess.
And, and chlorine is actually quite cheap in Texas
'cause it's so widely prevalent in, in Houston
and the, the enormous petrochemical, refining
and chemical refining industry there.
Yeah. Uh, so yeah, the, in terms of the opex, our current
estimates, and it's varies a bit,
but not hugely, it's about 1500 bucks a ton type opex.
And that includes all the, the, uh, electricity,
which is about one third, and then the reagents is
probably fif Yeah.
The, the remaining part
and very minor element of, of, uh, labor.
But yeah, primarily it's one third electricity,
the rest is catalyst chlorine.
In some cases we need, we add carbon as well to,
to enact what's called carbo chlorination.
It's just, it just promotes the reactions that we want to go
to the, the right hand side of the,
the equation, if that makes sense.
So, uh, yeah, but initially we were, I was skeptical
of the potential energy consumption,
but when I realized the amount of time that we're
reacting these materials is a lot less
than the traditional techniques.
Overall, quantum of energy should be a lot less.
Also, these chlorination reactions
we've actually recently figured out as well.

They're, they're what's called XO thermic means once you get
the system up a temperature
and the chlorine sticks to the target metal,
it's actually gives off heat.
Mm. So we, we effectively only heat the system up
to the desired temperature.
And then generally we don't have to put in much more energy
to get the reaction to happen
because it gives off its own heat.
Its own heat. Yeah. So we have not worried about energy
costs at all, especially in Houston.
I think it's six or 7 cents a kilowatt hour or energy.
Yeah. Well, well beyond my first year, uh,
chemistry training, which was many, many decades ago.
But it, it does sound fascinating.
Um, um, I'll, I'll, I'll ask you this, Michael,
because there's a lot of, I'm sure naive
and very repetitious questions you get from, from investors
who have just a lot of this stuff
outside of their wheelhouse.
What's mm-hmm. What are the questions that you don't get
that someone from your background
and expertise would imagine would be more prevalent if,
if people did have that experience?
In other words, you know, what, what are, what are some
of the, the things that, that the investment class
is missing or not fully appreciating
or you're just surprised

that you're not getting more questions on?
That's a very good question. Yeah.
I suppose, so when I first got involved, I was a,
a consultant and MTM the board were looking for advice
before they acquired this tech.
And the board was either accountants or geologists.
So my, my background is in mineral processing technology
and chemical engineering in general.
So the, the initial things I were, I was originally asking,
was it specifically about how is this energy applied
to the feed stocks?
How do you get electrical energy to go through a feed stock?
Didn't make sense to me. Mm-hmm.
Uh, also, how are you able to,
as claimed, how are you able to vaporize only metals
that you want and leave the unwanted stuff behind?
How physically can that happen? Yeah.
So these were some of the more technical things
that concern me.
And then, um, also the, I was very skeptical
of being able to, uh, get reliable, consistent quality
waste feedstocks.
Um, but luckily we've, let's go to the team slide.
What answer that question for me is we've got a guy,
Steve Ragle, he runs our US operations.
He's, he's a chemical engineer as well,
but he's been nearly 40 years in, in waste.
And he spent 25 years of the biggest company in the world,
waste Management Incorporated.

He was running their global recycling division.
So what he doesn't know about waste
isn't kind of worth knowing.
And it's through his relationships, he's managed
to secure these feedstock supply agreements.
And the wording of those supply agreements is critical to
incentivize these suppliers
to give us a very consistent high caliber feedstock.
And it's the way you get the contracts written
to give penalties basically if they don't give you, um,
a material that's got a particular metal content.
Gotcha. So it's, his,
his expertise in this area has been invaluable, I suppose,
for how quickly we've been able to get our heads
around this, that side of the business model.
Yeah. And that, that was originally
what I had skepticism on, how do you get a,
'cause the printed circuit boards are, you know,
probably a different one in each, each company has a
different one and they change every year.
So how do you get a consistent supply?
The key is cooking that plastics off.
That's, that's the, that's the first key step.
But once you do that, the metal rich material
that's left over is pretty consistent.
And we've found off the shelf technology to do
that plastic cooking step for us, as, as I said.
So that gave me a lot of credence.

And then the queries about the technology,
how do you get electricity?
And that's actually part of the secret sauce.
We, we won't be writing down exactly in the patents
because we don't wanna give away the real
secret sauce of Yeah.
The materials of construction
and the geometry of this reactor.
Also, how the electricity is applied.
That's all part of the secret sauce that, um, it's,
it's in-house ip,
but it, it won't be written down in a patent so that the,
the chances of someone being able to replicate it is, uh,
is very low in, in my opinion.
Yeah. I, I have to ask, I mean,
how did MTM secure all of this kind of stuff?
You know, a a a, a Perth base, relatively small operation.
There's, there's a technology that's got a lot of, um,
strategic and economic importance.
I mean, it seems, seems like quite the coup. Yeah.
Is it just right place at right time, or
No? Uh, it comes
back to, so this Dr. James tour,
his lab is very focused on only doing, I suppose, research
and his PhDs generally, he wants them studying things
that have some commercial outcome
and not just purely for research.
Yep. So he's had,
he started several over 20 companies, most of 'em private,

but one of them went into a
an A SX shell about seven years ago,
and it was a flash memory technology
and it, it was, came from his lab
and they put it into a, a shell on the A SX.
And it's the guy who did that original Ven.
So the guy that he found who had the shell,
and there's a, an Israeli tour is Israeli background,
and it's through this Israeli investor who
found the Australian guy who had the shell.
And that wee bit was quite a success.
It went over a billion dollars, I think last year
during that a Oh, that was
Wee bit We've spoken to we Kobe Yeah. Couple times.
Okay. Yeah. Well, yeah. Yeah.
Kobe, so Kobe
is obviously Israeli and Yep.
They're, they're part of this investor network.
And there's a, a gentleman here who the board at MTM knew
and tour went back to this particular Australian guy
to say he's got this new technology, he thinks
that the A SX would be perfect for,
because of the interest in metals and mining on the A SX.
Yep. And so they were effectively looking for a shell.
And through the MTM board, knowing this Australian guy
and the fact that tour trusted him, he saw
what he he could do at wee bit.
Yeah. And Tour still has all

of his wee bit shares in seven years.

He hasn't sold any. Oh,

Really? Wow.

Yeah. He's also one of the major,

he's got like 20 million shares in MTM as

Well. Okay.

So, anyway, that it's, it's through

that original wee bit connection

and how successful that was, that Touro went back

to this guy to look for another shell.

MTM was a shell, it was ev at the time was, you know,

sub 4 million bucks, I think.

Yep. Because it was an early stage explorer,

the sentiment towards rare earth,

early stage exploration really dwindled and came off

and the company was looking for a new way

to reinvent itself.

And that's, and we also a avoided an A SX re compliance

by a acquiring a tenement in Western Australia

with an option for the tech.

That's how we avoided the Ah, yes.

The As SX re compliance,

where the only winners are the lawyers.

Yes. And you go into suspension Yes.

Pay lawyers thousands of dollars to do reports

and prospectuses and yeah.

So anyway, that, that's, that's the genesis and the history.

That's fascinating. Um, listen,

we're coming to the end of it.

Um, uh, I've, I've pretty much answered all my questions.
It's been such an, a fascinating conversation.
Um, what are, what's the sort of final message you'd like
to leave people with?
You know, what's, what's the, what are the big things
to keep in mind for people tracking progress?
Uh, just that we do have a huge amount of news flow
that's gonna be forthcoming.
We think we've got several really catalyzing news events
such as these binding supply agreements that we hope
to be able to publicly announce soon.
Once we get a binding supply agreement, we think
that's gonna be another rerate potential, hopefully,
because it's really just underpins the, the,
at least the gallium germanian business model.
Yeah. And that, that's, that's, we hope in the next month
or two, uh, we will be appointing some heavy hitting DOD
type people on an advisory board that's coming.
And then there'll just be lots and lots of test work.
Feedstock test works on anti a antimony based material.
So yeah, lots of critical metal focused test work news,
and yeah, we really are ambitious is
to get into cashflow producing territory
by H one next year. So
Yeah, it's not, it's not far away.
Look forward to, yeah. We, well, maybe should Go
Ahead. Sorry. We're not like, uh, some
of these texts that like,

uh, you know, silex that they're planning
to be in commercial production by 2035 or something.
That's uranium literally, you know,
That's Yes. Lot
more, uh, difficult challenges with that, but yeah, no,
because of this e-waste is so readily available,
we think we will be cash flowing by H one next year.
Fascinating. Fascinating. Well, let,
let me ask you this then, as a, as a, sorry,
as a final question this time promise it's final.
Um, what are the, you know, for want of a better term, the,
the state, the keep awake at night factors
for you le leading the company?
I mean, there's, there's always, you know,
know the devil's in the detail with all of these kinds
of things, but what, what are the sort of the, the big
risk factors that you are, you are most attuned to?
Yeah. Um, I suppose the primary job originally as a,
a chemical engineer is scaling up
what a chemist normally develops in a lab to commercial,
much, much bigger scale.
Yeah. So that's always in my DNA. Yeah.
So I think we've, we've significantly scaled up from where
Rice University originally began,
like very humble beginnings in terms of scale.
Mm-hmm. And I think the true commercial mineral processing
scale 10 tons per hour, that's what really
I think is gonna be a technical challenge to achieve.
But it's, we do have a design as mentioned,

and it's,
we've got the best engineering company I think
you could imagine on the job.
So we, I think we'll eventually get there.
But even at the rev one design scales, we'll,
we'll be in commercial,
we'll be having a really viable commercial business.
But yeah, what's keeping, I suppose the, me
concerned about the future,
maybe this is like five years down the track, is
how do we get to these humongous scales to compete
with the mineral sauce, the incumbents in the
mineral processing space. But everything else Great.
Great though. Yeah. Yeah. True. Yeah. Yeah,
Yeah. Yeah.
Um, okay, I'll, I'll let you go Michael.
It's been a fascinating conversation.
We really do appreciate your
Time. Oh, thanks Andrew.
Yeah. We'd love to touch base another year
or so too. See how things are going.
You anytime. Let let me know. Awesome. Very much for Okay.
Hosting us. Good luck. Thank you. Sorry about the lag.
Thanks Andrew. No worries. Thanks Andrew. Bye.