Tivan Seabed Mining (C-Corp)

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February 2019
Madison, WI

Contents

Executive Summary

The goal for our Tivan Seabed Mining is to dominate the undeveloped world of seabed mining. The seabed is rich in metals used to produce batteries such as cobalt, nickel, copper and manganese, a 13.24 billion dollar US market in 2018, and we believe seabed mining will be a big part of our future as EV becomes more attractive to consumers.

Unlike those who have come before us, we have a unique autonomous system that effectively utilizes a customized barge, two lifts and four drones to extract the nodules from the ocean floor without using a pump or directly requiring human labor, drastically cutting costs. Under current conditions we expect the platform to pay for itself in less than 18 months. Due to the legal setup of seabed mining in international waters we'll be able to sell or lease the hardware off as well, providing a scaling effect for our company to move forward and dominate the seabed mining industry.

There also exists a pre-established framework of international laws and regulations for mining in the Pacific Ocean, specifically the Clarion Clipper Zone (CCZ). In the 70's major countries and corporations started realizing the potential wealth in the pacific and started drafting legislation. After a number of treaties, the UN got involved and created the International Seabed Authority. Mining companies are still trying to use older seabed mining methods such as dredges and pumps which are rendering the economics infeasible. We're now reaching an inflection point where rare earth metals mining is beginning to pick up, and many traditional mining spots such as in the Congo have been ramped up and are nearing their capacity. Many other Overall however we live at a moment where the legal pathway already exists but are not yet claimed by other modern companies.

But most importantly, the timing for developing such a project is nearing a perfect point for where technology will be by the mid 2020's. Not only is the metals market ripening for a significant increase in overall production, but good options for traditional mining operations are growing slimmer and the technology is reaching a critical point. With the exception of the Congo which still has significant reserves, some suppliers have resorted to reopening mines in places like California which were deemed unprofitable decades ago, or opening mines in unstable economies and governments. Seabed mining can avoid all these pitfalls while utilizing newer technologies like satellite internet or skynet, which allow for faster internet access in remote regions making remote autonomous mining more feasible

Lastly, we see a future of strong profitability for this mine. Our estimates predicts profits upwards of 5.3 million per year per platform, which represents a 4 million dollar investment excluding shipping. Our models predict a large potential upside with minimal financial risks which is why we're so excited to be able to work in our company, and why we're so excited to share this opportunity with you.

Team

Michael Zhou – UW Madison graduate in Economics and Mathematics. Michael has considerable connections to China's metal market, and is closely connected to his fathers' Xiangtan Longteng Mining Company, where we may be getting initial funding.

Thomas Hansen – UW Madison graduate in Electrical Engineering and Computer Science. I've been looking into deep sea mining for the past few years and have won small contests for sea probes, as well as have internship experience with coding and electronics in a few companies.

Timeline

Our goal is to have a working mine within the next couple of years. By 2022 we hope to be in full production and generating revenue, and our models show that once we're generating revenue it should take only about 8-14 months to become profitable.

Feb 2019 – Oct 2019

- Construct a deep water probe and begin investigating areas to apply for a license of exploration
- Begin speaking with the National Oceanic and Atmospheric Administration (NOAA) in regards to obtaining a license

Mid 2019 – Jan 2020

- Begin speaking with and connecting with investors
- Continue surveying efforts
- Apply for license to explore

Beginning/mid 2020

- Receive contact from NOAA, receive lease
- New round of funding
- Begin development of mining platform
- Finish collecting surveying data
- Develop connections with metal refiners through longteng mining

Late 2021

- Begin work on constructing and testing mining platform, locate builders and finish R&D
- Begin to finalize contacts for metal processors
- Apply for a permit for excavation

2022

- Construct and build large scale mining equipment for first mining platform
- Explore selling proprietary tech to other organizations, and explore selling custom deep sea tools to governments or research labs

2023
- Begin deep sea mining in the CCZ

2024
- Explore selling mining equipment to other prospectors in or near the CCZ
- Attempt to expand our own

Market and Industry

There are a few things to consider when looking at the surrounding industry and the metals market, such as the success of other mines, processing facilities, and equipment manufacturers. Since mining and its related equipment has been a relatively stable industry, there is relatively good data on the success of these endeavors as well as their rates of return.

Here we used data from the IndustriusCFO database to look at other mining facilities. In our case since these are companies we can't look at just Manganese, nickel, copper, and cobalt, but we can look at mines (and their related loans) that mine cobalt, manganese, and other rare earth metals, as well as traditional copper, nickel, lead and zinc mines. What we see is what you'd expect. These companies tend to have low default rates, and the more special the metal is the higher the return on investment (where in cobalt, manganese, and other rare earth metal mining companies only have a 3% default rate and have an average return on investment of 17%).

COMPANY INCOME STATEMENT [% OF NET SALES]

INCOME STATEMENT	2014	2015	2016	2017
Industry Code	2122	2122	21223	21223
Sample Size (company count)	97	97	7	9
Net Sales	**100.0 %**	**100.0 %**	**100.0 %**	**100.0 %**
Cost of Sales	**70.1 %**	**65.4 %**	**74.0 %**	**76.3 %**
Material Cost	28.3 %	25.6 %	52.1 %	35.2 %
Labor Cost	23.4 %	23.3 %	22.9 %	20.9 %
Overhead	18.5 %	16.5 %	-1.0 %	20.1 %
Gross Profit	**29.9 %**	**34.6 %**	**26.0 %**	**23.7 %**
Operating Expenses	**24.5 %**	**29.3 %**	**8.2 %**	**16.4 %**
Salaries / Wages	2.7 %	2.5 %	4.4 %	4.5 %
Rent	0.7 %	0.4 %	4.0 %	4.1 %
Bad Debt	0.1 %	0.1 %	0.1 %	0.1 %
Advertising / Marketing	0.0 %	0.0 %	0.1 %	0.1 %
Other Operating Expenses	20.9 %	26.3 %	-0.4 %	7.6 %
EBITDA	**5.4 %**	**5.3 %**	**17.8 %**	**7.3 %**
Depreciation & Amortization	3.0 %	2.7 %	5.1 %	5.2 %
EBIT	**2.4 %**	**2.6 %**	**12.7 %**	**2.1 %**
Interest Expense	0.7 %	0.7 %	3.4 %	3.5 %
Other Expense	-0.6 %	0.0 %	0.3 %	-7.9 %
EBT	**2.2 %**	**2.0 %**	**9.0 %**	**6.5 %**
Income Taxes	1.5 %	1.3 %	3.4 %	3.5 %
Net Income	**0.8 %**	**0.7 %**	**5.7 %**	**3.0 %**

Figure 1 Income balance sheet for nickel, copper, lead, and zinc mines

COMPANY INCOME STATEMENT [% OF NET SALES]

INCOME STATEMENT	2014	2015	2016	2017
Industry Code	212299	212299	212299	212299
Sample Size (company count)	7	7	7	10
Net Sales	**100.0 %**	**100.0 %**	**100.0 %**	**100.0 %**
Cost of Sales	**43.7 %**	**39.6 %**	**45.2 %**	**45.8 %**
Material Cost	17.0 %	15.3 %	18.9 %	18.5 %
Labor Cost	18.7 %	20.1 %	20.3 %	20.9 %
Overhead	8.0 %	4.2 %	6.0 %	6.4 %
Gross Profit	**56.3 %**	**60.4 %**	**54.8 %**	**54.2 %**
Operating Expenses	**45.4 %**	**45.3 %**	**32.6 %**	**36.1 %**
Salaries / Wages	3.0 %	2.7 %	4.3 %	2.7 %
Rent	0.8 %	0.5 %	2.0 %	2.0 %
Bad Debt	0.1 %	0.1 %	0.1 %	0.1 %
Advertising / Marketing	0.1 %	0.1 %	0.1 %	0.1 %
Other Operating Expenses	41.5 %	42.1 %	26.2 %	31.3 %
EBITDA	**10.9 %**	**15.1 %**	**22.2 %**	**18.1 %**
Depreciation & Amortization	2.0 %	1.8 %	5.0 %	5.2 %
EBIT	**8.9 %**	**13.3 %**	**17.2 %**	**12.9 %**
Interest Expense	1.8 %	1.6 %	4.5 %	4.7 %
Other Expense	-1.0 %	4.5 %	-2.4 %	-2.5 %
EBT	**8.1 %**	**7.1 %**	**15.1 %**	**10.7 %**
Income Taxes	5.3 %	4.5 %	6.5 %	1.8 %
Net Income	**2.9 %**	**2.6 %**	**8.6 %**	**9.0 %**

Figure 2 Income statement of rare earth mining companies

We see a slightly different story when looking at primary and later term refining and smelting of the metals. When looking at non-ferrous metal (excluding aluminum) production and processing we see a return of investment of around 6% and a loan default rate of around 6%, and this includes refiners who refine both cobalt, copper, and manganese. When looking at Primary refining and smelting of non-ferrous metal (except copper, and aluminum) we see a 6% return on investment but a 10 percent loan failure rate. Both of these sectors contain refining for all major metals we may look at in the sea bed, including nickel, copper, manganese, and cobalt.

We can also compare the balance sheets and income statements of processors. Below is the balance sheet of Primary refining and smelting of non-ferrous metal (except copper, and aluminum), NAICS code 331419.

FINANCIAL RATIOS

FINANCIAL RATIOS	2014	2015	2016	2017
Industry Code	331419	331419	331419	331419
Sample Size (company count)	28	28	46	52
LIQUIDITY RATIOS				
Quick Ratio	0.74	0.59	0.76	0.73
Current Ratio	1.33	1.18	1.50	1.47
Current Liabilities to Net Worth	177.7 %	212.7 %	89.7 %	78.1 %
Current Liabilities to Inventory	234.1 %	277.8 %	216.6 %	180.6 %
Total Liabilities to Net Worth	225.2 %	256.6 %	125.9 %	110.3 %
Fixed Assets to Net Worth	52.3 %	49.6 %	38.7 %	44.8 %
Interest Coverage	3.63	3.63	3.13	2.85
ASSET EFFICIENCY RATIOS				
Collection Period	39.19	33.11	43.13	47.78
Inventory Turnover	11.30	9.02	7.54	7.90
Assets to Sales	38.6 %	37.5 %	48.9 %	45.6 %
Sales to Working Capital	13.23	18.25	9.10	8.11
Accounts Payable to Sales	7.3 %	6.5 %	6.3 %	7.1 %
PROFITABILITY RATIOS				
Return on Assets	3.3 %	5.2 %	3.5 %	3.9 %
Return on Investment	4.4 %	17.2 %	8.0 %	6.5 %
Sales per Employee	$345,604	$882,605	$529,537	$592,556
Profit per Employee	$5,705	$16,022	$8,507	$14,294

Figure 3 Financial ratios of Primary refining and smelting of non-ferrous metals (excluding copper and aluminum)

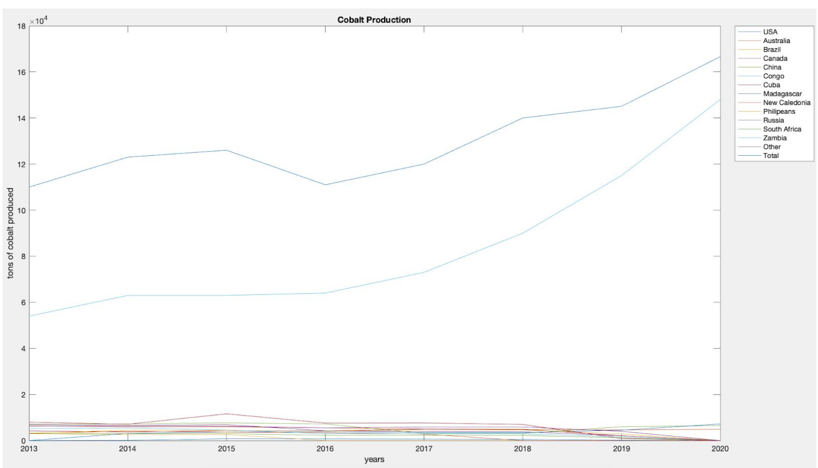
From this data, we can see a sort of impromptu value chain, where most of the value for rare earth minerals is created when the metal is mined, and it is less profitable to refine the metal. Additionally, metals such as cobalt and manganese are clearly more profitable than more common metals such as nickel, tin, or lead.

Metals Market

We're currently looking at a four metal process for retrieving marketable metals from the polymetallic nodules: cobalt, copper, nickel, nickel. Mo

Cobalt

Cobalt is the highest priced mineral we're mining for, and expected to be a large driver of profit. Last year approximately 700 million dollars of cobalt was consumed.[1] Additionally, like Nickel, the demand of cobalt is largely driven by the demand for electric vehicles. Cobalt is usually mined alongside copper and nickel mines, and the price of cobalt often follows the price fluctuations of nickel and copper. The only mine where it is the main mineral being mined is in Morocco, but this mine only accounts for 2% of the world supply and may run out of cobalt in the near future.[2,3] In China 80% of all imported cobalt is used for rechargeable batteries.[4] We saw a peak of cobalt prices in March of 2018 at 95250 usd/tonne with a number of major consumers purchasing long-term contracts, but saw a steep decline in prices as the market came back with a major surplus, primarily from Glencore and ERG.[5] Cobalt has seen a large sway in prices and production recently as well. I've used lagrange interpolation to model a possible future curve, which follows the notable trend of increased production in the Congo as well as the US and australia. China severely cut production as the price dipped, and other mines have depleted their resources and shut down.



Our production site won't come into production for a minimum of three years though, and from there we'll have a large degree of control over how much we want to produce, largely linearly proportional to our costs. Because of this we can try to position our mine to meet global cobalt demand as it becomes operational, while maximizing our profit. Looking at lithium-ion battery production, we can predict battery production will go up significantly over the next few years, driving up cobalt

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1 https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/atoms/files/mcs-2019-cobal_0.pdf

2 https://minerals.usgs.gov/minerals/pubs/commodity/cobalt/cobalt-supply-security.pdf

3 USGS Cobalt Summary 2018, https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/atoms/files/mcs-2019-cobal_0.pdf

4 https://minerals.usgs.gov/minerals/pubs/mcs/2018/mcs2018.pdf, pg 51

5 http://www.mining.com/new-study-rips-cobalt-lithium-price-bulls/

prices. I'd recommend you look at our metal purchasers section to get a better understanding of the electric car market and demand for these vehicles.

Nickel

Like cobalt, nickel prices follow battery prices. As of Feb 2019 nickel is sitting at $12450 per tonne, as depicted in the graph below, and in 2018 the US nickel market consumed 3.24 billion USD worth of nickel.[6]

There's also no reason to believe that nickel prices won't go higher as electric vehicle production goes, although since there are more veins to collect nickel from it's not expected to stay as high for as long as cobalt or other metals.

Copper

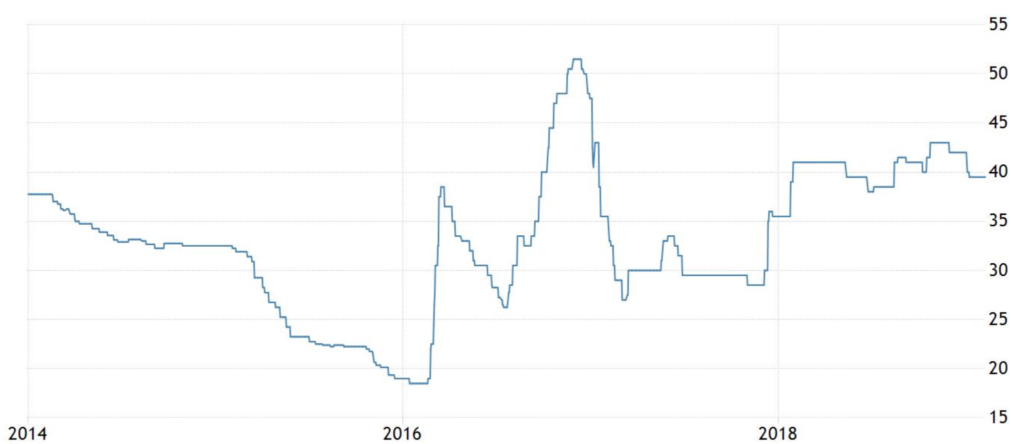
Copper is frequently used in wiring, piping, and a variety of other industries, however it's not a significant component within lithium-ion batteries and it isn't as easy to predict its future price based on battery production. We do have it's current price however and there's no reason to expect that it would deviate significantly from this baseline.

[6] https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/atoms/files/mcs-2019-nicke.pdf

Copper here is trading at 2.733USD a pound, which is 6025 USD/tonne, though in the last five years it's gone as low as 4250 USD/tonne and as high as 7276 USD/tonne. In 2018 the USGS reported an estimated $8 billion in copper traded in the US.

Manganese

Manganese is used primarily in industry, often for strengthening steels or in certain dyes. It is also used in some lithium-ion battery chemistries. Again this means it's price is not tied directly to lithium ion battery production and we wouldn't expect any sort of price increase in the near future. Unfortunately due to the lack of commodities markets for manganese there isn't as much good data on it, and interestingly there hasn't been domestically produced manganese ore of grade 20% or higher since 1970.[7] From the data we have we can see for manganese ore (20% manganese, 35% iron), prices have been trending up over the last five years. The US 2018 manganese market was valued by the USGS at $1.3 billion.[8]

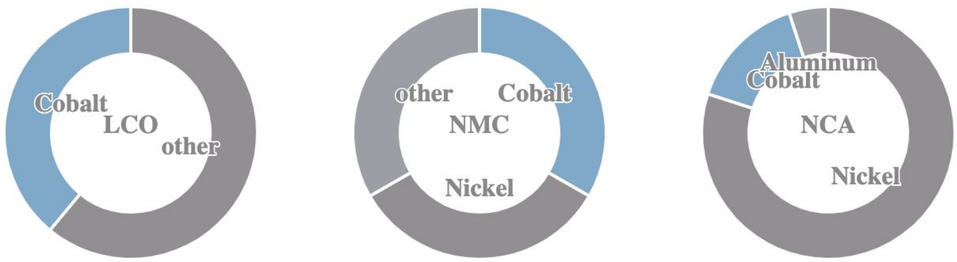


[7] https://minerals.usgs.gov/minerals/pubs/mcs/2018/mcs2018.pdf, pg 104

[8] https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/atoms/files/mcs-2019-manga.pdf

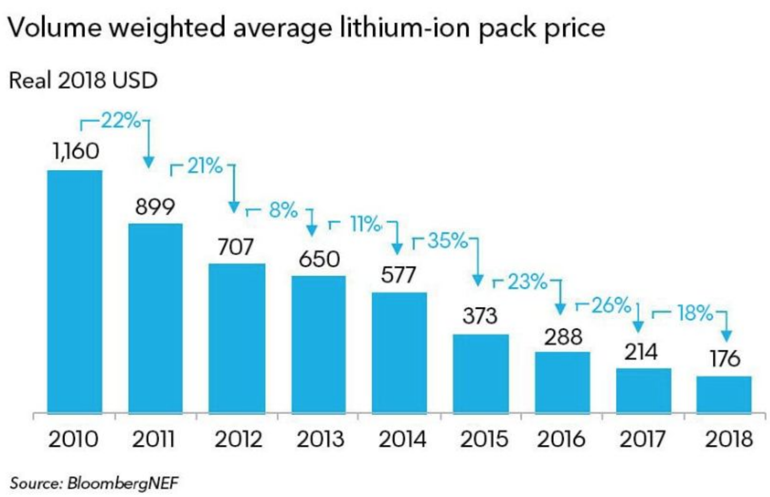
Battery Production and Demand

In the US there are a number of major industries that purchase significant amounts of cobalt, nickel, manganese and cobalt, but none are as fast growing or prominent as lithium-ion batteries. This is in large part due to the composition of batteries, which contain significant amounts of cobalt, nickel, and manganese. Below are 3 types of lithium-ion batteries. NCA are used in Teslas and a number of electric vehicles, NMC are used in other brands of electric vehicles and tesla walls/power grid storage, and LPO are used in a number of electronic devices.

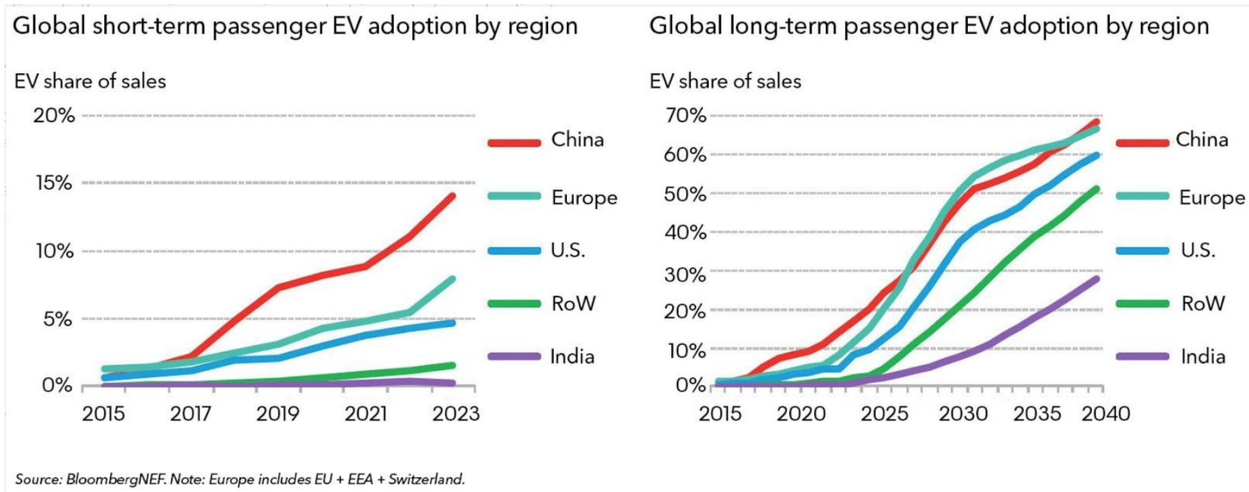


The most prominent EV forecast produced is BloombergNEF, the most recent being written for the 2019 year and is where the following data and images originate from. The report suggests that by the mid 2020's we can expect electric car production to have increased by three-fold, and will continue to rise, significantly increasing the demand for cobalt, nickel and manganese.

There are two major factors behind this push. One is governments are stepping in and either mandating or subsidizing electric vehicles, the most notable large markets of course being the EU and China. The other is that electric vehicles are becoming better, and as the price for batteries falls the products will become more popular among consumers.



Lastly it's important to note that even in the regions where EV adoption is being pushed there is significant room for the market to grow, and thus significant room for people to continue purchasing new cars that utilize cobalt-nickel and manganese batteries.



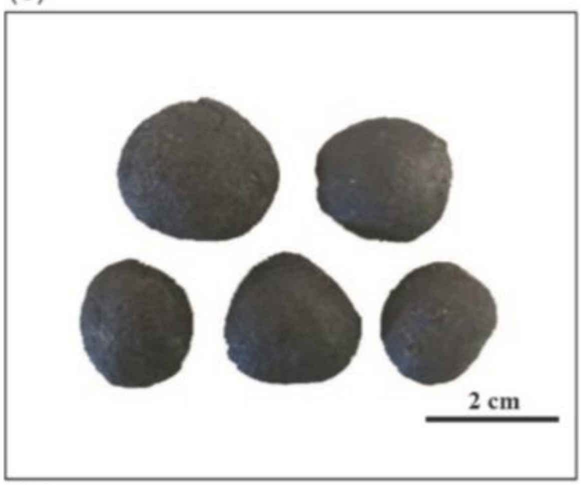
Seabed and Revenue Expectations

There are a number of different ways metals present themselves on the seabed, such as crusts or near deep sea vents. We'll being going after polymetallic nodules, also known as manganese nodules. These metals present themselves as small, potato sized chunks of metal that form over the course of millions of years. At depths of around 3-5km below the sea level, manganese combines with oxygen to form manganese oxide, which coagulates together and claims a variety of other rare earth minerals with it.

Figure 4 Image showing a large abundance of nodules in the Peru Basin at a depth of 4km

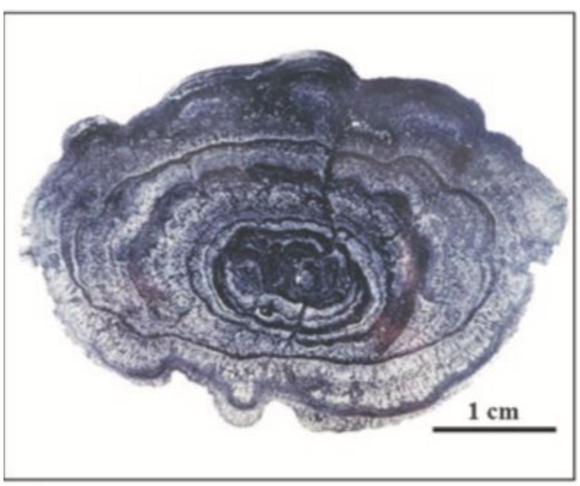
Below we can see two separate nodes from the CZZ, where the first two are examples of the outer shape, while figure 3 is a cross section of the metal.

(C)



(E)

Figure 5 Two nodules picked up from the CZZ; (e) nodules are spherical, (c) is shaped more similarly to a disk.



(F)

Figure 6 Here we can see the cross sections of a CZZ node, where the rings are generated as it sat on the ocean floor collecting nearby floating metal atoms.

As the price of metals used in batteries like cobalt increase, we expect to see the profitability of our venture increase as well. That said, using late-2018 prices we can approximate the total revenue (disregarding the cost of processing) below. From here we can assume the total revenue per kg of metal brought back to the surface would generate approximately 1.041 USD/kg. This leaves considerable room for profit even after processing and electrolysis costs take a cut of the profits.

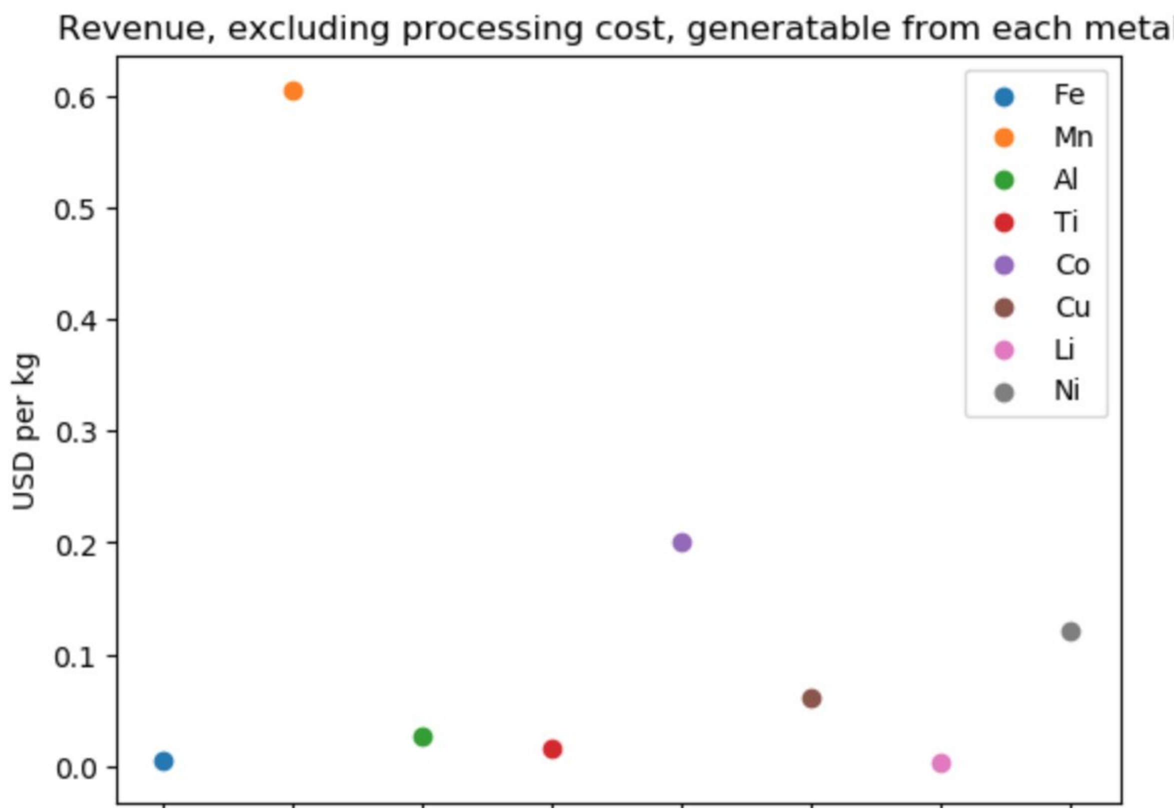


Figure 7 Data gathered from passage "Composition, Formation, and Occurrence of Polymetallic Nodules by T. Kuhn, A. Wegorzewski, C. Ruhlemann, and A. Vink. Prices were observed from online resources and do not include processing costs.

Extraction Process

The first process we are looking at going through is surveying different areas for metal densities, in particular the US-2 zone in the CCZ. We plan to do this by building a deep-water probe to take images, readings and collect samples from the bottom of the ocean.

The second phase we'll have to embark on is extracting the metal nodules from the sea floor. Similar to other concepts, our process for collecting the polymetallic nodules will rely on a large platform above sea linked to the sea floor by a cable and 'anchor', which serves a few basic functions. On the seafloor, we will have a couple underwater 'drones', which may communicate using ultrasonic waves, but primarily they will collect the nodules and bring them back to the anchor. Here they'll be able to climb back up, drop off the load, and return down. A likely environmental issue the

International Seabed Authority (ISA) will bring up would be the possibility for mixing colder bottom temperature water with the warmer water on the surface, negatively impacting the natural currents, a concern they brought up with Nautilus Minerals. This issue was mitigated by Nautilus minerals by pumping up the nodules in a tube, emptying it on ship, and then pumping the water back down to the sea floor in a separate tube, and the issue may be solved the same way in our design with minor increases to complexity and start up cost.

Revenue and Costs

Mining

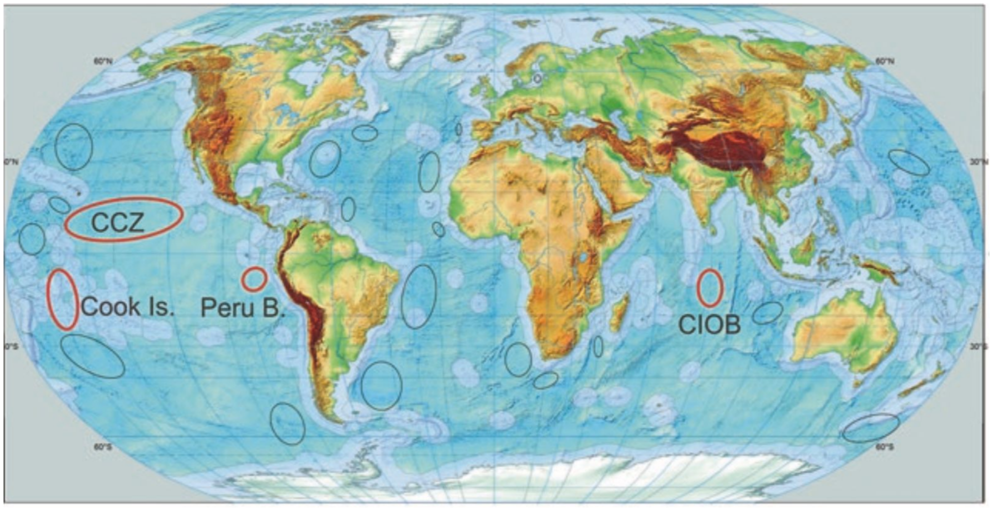
Our process is highly reliant on the relative profitability of our system and equipment, both because it will result in the success of our own personal plots but will pave the market for other permit holders to purchase and use our equipment, a potentially more profitable and stable market.

Focusing in on an autonomous mining solution, we’ve been able to develop an approximate cost and profitability sheet, based on our own cost calculations of researching and developing the machinery and data from the ISA. From the calculations below a single mining structure would produce over 7.5 million usd a year, paying for itself within 17.6 months with an investment of 18.6 million usd to pay for R&D, the mining platform and drones, as well as the shipping barge to move the ore back to the coast and all other costs. Multiple platforms would save additional money on shipping making the project more lucrative. A site owner would most likely own multiple platforms to fully develop a mining plot, and they could expect ~450k in revenue per month year over year per platform.

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Nodule Extraction**			**Shipping Nodules**			**Refining Nodules**			**Cost Structure**		
2	Mas per area	9.7	kg/m2	Transport Ship	3500000	usd	Cost to build	100000000	usd	Revenue (1 drone)	30.4853386	M usd/yr
3	Escavation speed	1080	m/hr	Payment length	10	yrs	Lease length	10	yrs	Costs	139.7448613	M usd/yr
4	Max Load	8000	kg	Ship cost 10 ye	350000	usd/yr	Cost of 10 yr lease	10000000	usd/yr	Dry ore for 4 drones	146529.636	tonne/yr
5	Width of Collector	2.5	m	Wages	210000	usd/yr	Maintanence	750000	usd/yr	Revenue of 4 drones	121.9413544	M usd/yr
6	Collection Time	0.3054600993	hr	Ship Mainetance	262500	usd/yr				Max Revenue	145.1114329	M usd/yr
7	Time up	1.025	hr	Shipping cost	822500	usd/yr	Cost per year	10750000	usd/yr			
8	Time Down	0.4166	hr	Number of truck	0					**Max profit 4 drones**	**5.366571646**	**M usd/yr**
9	Unload Time	0.166	hr	Truck shipping across US/China			**Refining Nodules %**			Mine profit all revenue	3.7	%
10	Total time per load	1.913060099	hr	Move to Truck	0	usd/yr	Cost per tonne	832.195846	usd/tonne	Profit on mining divisi	74	%
11	Total time minus coll	1.6076	hr	Truck shipping	0	usd/yr	Percent to refining	0.95	%	Monthly profit	0.4472143038	M usd/yr
12	R&D	3490000	usd	Unload truck	0	usd/yr	Cost to refine tonn	790.5860537	usd/tonne	**Time till ROI**	**17**	**months**
13	Platform cost	3500000	usd	**Total shipping**	822500	usd/yr	**Cost per year**	**137855861.3**	**usd**			
14	Platform Maintenance	262500	usd/yr	Total shipping	0.8225	M usd/yr	Cost per year	137.8558613	M usd/tonne	Min required capital	15.19	M usd
15	Lifts on platform	2		Rail and/or Port			Portion for mining	41.6097923	usd/tonne	Time till profit	2	yrs
16	Drone cost	150000	usd	Rail distance	20	mi	(Want between 60 and 100 before shipping)			Capital requirement	16.6825	M usd
17	Drone Maintenance	11250	usd/yr	Price per mile	1200000	usd						
18	Drones per lift	2		Transport over	2400000	usd/yr		**Key**				
19	Number of drones	4		Wages	420000	usd/yr			Value doesn't affect profitability/ROI significantly			
20	Total Hardware costs	4100000	usd	Port unloading	130000	usd/yr			Has a more meaningful effect on profitability/ROI			
21	**Extraction mech costs**	1066500	usd/yr	**Total transport**	3772500	usd/yr			Has a potentially concerning effect on profitability/ROI that			
22	Num of trips per drone	4579.051125		Total transport	3.7725	M usd/yr						
23	Ore per drone	36632409	kg/yr									
24	Num trips max all dror	21796.46678										
25	**Ore per year max drone**	174371734.3	kg									
26												

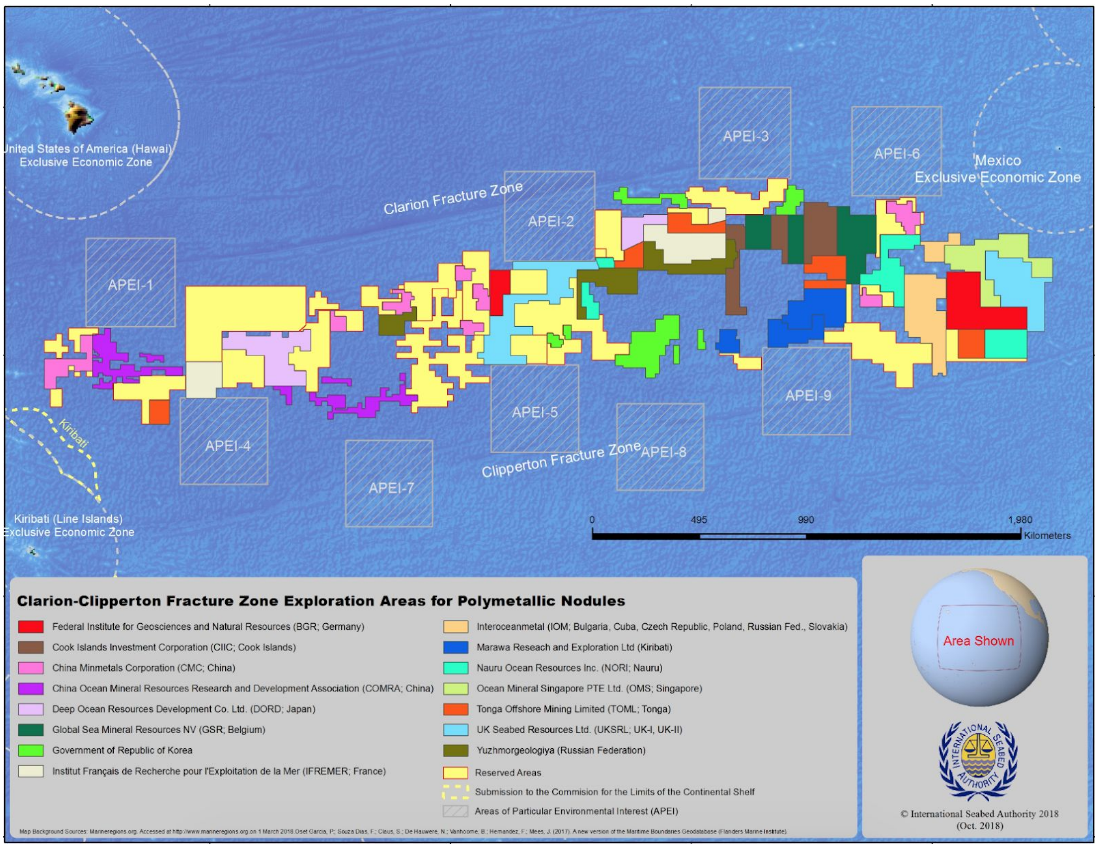
Seabed Mining Equipment Sales

The second, and possibly most important portion of our revenue model comes from leasing out mining equipment. The way the CCZ and other seabeds are set up is a large number of companies are able to lease out certain plots and hold these plots (sometimes for decades). This means there are around 30 companies reserving plots in the world's oceans who would be willing to develop these plots if there were a profitable way to do so.



Above is a map of the globe, where circles represent areas of interest for seabed mining (and red circles represent areas of interest specifically for polymetallic nodules).

Just looking in the CCZ, here are the companies which have reserved spots as of 2019 in the ISA



These are all companies or countries with considerable financial backing that we would be able to sell our system to as it is proved feasible. Sales would likely take the form of a lease, creating another market to further generate millions per year in revenue in the first few years of launching.

Competition

Due to the nature of the industry, there are a number of companies that hold mining rights for the CCZ and other parts of the ocean, however few that have made any strides to break into the market. One example of this is a subdivision of Lockhead Martin, which through their subsidiary Ocean Minerals Company (OCMO) have held onto two of the US plots, however have not made any progress in mining them.

Our most immediate competitor would be the Canadian company Nautilus Minerals (NUS), which is most actively pursuing deep sea mining. Their current project is off the coast of Papua New Guinea which is intended to mine gold and coper from the sea floor. Although we will be mining coper they are going after a different portfolio of minerals, as well as they're not a US company and are less able to go after US plots.

We're hoping to use our position to go after rare earth metals such as Cobalt and Manganese in the Pacific, specifically the CCZ and similar areas. Once we have a working system, we want to lease out equipment to other companies to mine their plots of seabed. We intend to lease and not sell equipment to maintain dominance in both the data acquired from the drones that mine, as well as put us in a better position for the future where we may sell sea surveillance technology to governments, prospectors, weather stations, and more. Leasing out equipment has the auxiliary benefit of dividing R&D costs among not only ourselves but also our lease holders, and helps to concentrate engineering talent in regard to sea bearing drones within our own company.

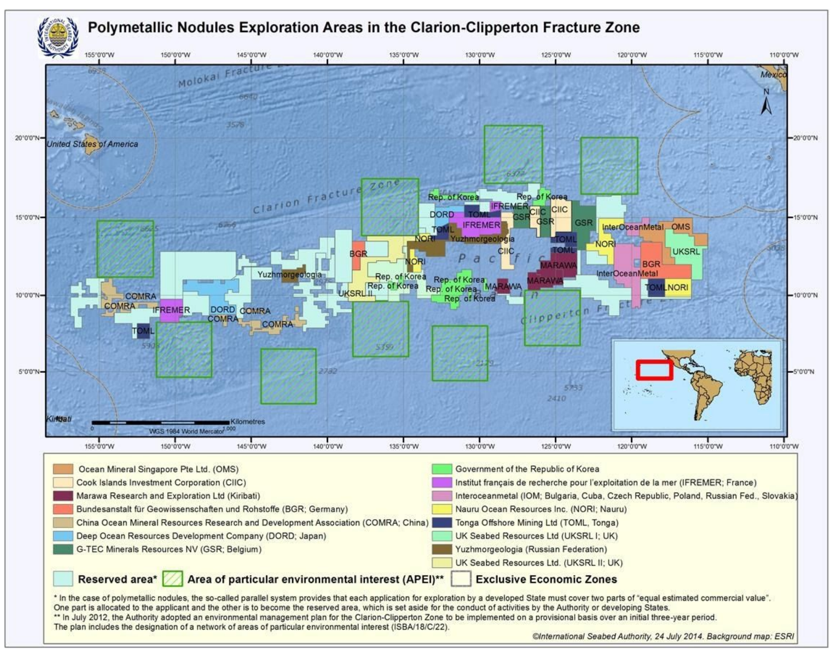
Long Term Plans

As we move farther into the future, it becomes less clear exactly what steps will be the best for us to take. That said after setting up our initial profitable mine, we plan to move forward in two areas. The first is we want to begin leasing or selling mining equiptment to other license holders in the CCZ. There are an estimated 29 licenses for plots of seabed, and we want to sell our platforms to many of these holders. This would provide a second revenue stream, and if we lease the hardward it will provide a steady revenue stream even in down markets.

The second area we plan to move into after the initial profitable mine is developing surveillance systems for the sea. Here we would be more of a competitor to companies like SailDrone, who develop drones that sail around the sea and collect weather data.

Legal

The governing body for the seafloor in the UN is the International Seabed Authority, which is a UN council stationed in Jamaica. The ISA allows for exploration without a permit, however you must lease a plot to begin mining operations. Applications cost 250k USD to apply for and take approximately a year to complete. The council meets twice a year, once in March and again a few months later. From page 248 of The Law of the Sea, "prospecting is essentially free, requiring only notification to the authority of the board areas where it is being carried out and a written undertaking to observe the Convention rules on environmental protection and co-operation in programmes for training personnel from developing



states. Two or more prospectors may be active in the same area simultaneously. No exclusive rights arise from such notifications (LOSC. Annex III, art. 2)"

The US is an observer state of the ISA however, and abides by the laws from the Deep Seabed Hard Mineral Resources Act (DSHMRA), and is not beholden to the ISA. This said it may be advisable to send them the written letter as well.

The US is not technically part of the ISA however, and instead has its own plots of seabed in the CCZ (clarion clipper zone). The US is allowed to lease these out as it wants, and this process is largely controlled by the NOAA. The NOAA does not publish guidelines on how they accept applications for leases, however companies may apply for a lease which lasts one to two decades, at which point they must re apply and demonstrate why they need the land. Currently there are 4 zones the US has, US-1 through 4. A subsidiary of Lockheed martin has two of these plots, while a Belgium company has another. We'll be going after the area surrounding USA-1, 3 and 4, which is not leased out by anyone at this time. Pertinent to US companies, rules and operations are specified in the Deep Seabed Hard Mineral Resources Act (DSHMR Act) in section 105, as well as 15 CFR 970.515. The law states that all other international legal obligations come first, and the organizations we must notify are listed in section 103(e), requirements are outlined in 103(c), permit specifications are in section 103(g), and an environmental impact must be determined in section 109(d). These permits extend over 20 years and have a smaller fee of $100k as specified in 15 CFR 970.208 (b). Additionally we will have to pay for an independent environmental report. Lastly, applications are submitted through the NOAA but are reviewed by other government agencies, including the state department.

The full text may be found here: https://www.govtrack.us/congress/bills/96/hr2759/text and the rules written by the NOAA may be found here:
https://www.law.cornell.edu/cfr/text/15/part-970