Address to ISA Council

by Gerard Barron, CEO & Chairman of DeepGreen Metals
Member of the Nauru Delegation

Madame President, Members of the Council, Mr. Secretary-General, Ladies and Gentlemen.

Madame President, congratulations on your election as President of Council. Please know you have our full support.

My name is Gerard Barron and I am the CEO and Chairman of DeepGreen Metals. I truly appreciate this opportunity to share with the International Seabed Authority our perspective on the unique role marine metals and all of us gathered in this room can play in making sure this planet remains a livable place.

[Introduction to DeepGreen & our role in developing state participation]

First, I would like to introduce DeepGreen. Most of you know DeepGreen through our subsidiary Nauru Ocean Resources Inc (NORI). In 2011, NORI pioneered a pathway for developing states to directly participate in marine mineral development from the international seabed area. Through NORI, the Republic of Nauru – a small Pacific Island Country, became a Sponsoring State. This was the first time a developing state had partnered with a corporation to access the minerals of the International Seabed Area and in so doing will help to accomplish UNCLOS' vision of sharing benefits with developing states arising from activities related to the mineral resources in the Area. The Republic of Nauru is a nation with few natural resources on land and unlike many of its South Pacific neighbors, Nauru has not been blessed with marine minerals in its Exclusive Economic Zone. Nauru's participation as a Sponsoring State allows access to development opportunities that would otherwise not exist.

Not long after NORI became an ISA Contractor, Nauru's Pacific Island neighbor, Kiribati, reached out to us and asked if DeepGreen could also partner with them. In 2015, Marawa Research, a state-owned company, signed an exploration contract with the ISA.

We are proud of the relationships we have with our Pacific Island developing state partners. It is an honor to work alongside them to realise the full potential of what marine minerals have to offer.

Another important partner who shares our vision is Maersk, a global energy and the world's largest shipping company who is collaborating with DeepGreen, and who is a shareholder of DeepGreen.

Of the many pillars, dimensions and opportunities of our industry, today I would like to focus on just two: climate change and the need to electrify the world's transportation fleet.

[Global warming of 1.5°C and low-lying islands]

More extreme weather, rising sea levels, coral bleaching and die-offs, collapsing fish stocks. The consequences of 1°C of global warming are already here. For low lying island nations that rely on the oceans for survival—like our sponsoring states, Nauru and Kiribati—this is an existential threat. Our friends and partners don't just stand to lose their livelihoods, they stand to get erased from the world map.

As a global community, we are now in a desperate scramble to keep global warming to a 1.5°C rise. This is very, very hard—perhaps already impossible. According to IPCC policy recommendations, by 2030, our carbon dioxide (CO_2) would need to fall by 45%

from 2010 levels and reach ‘net zero’ by 2050. This requires rapid and far-reaching transitions in land, energy, industry, buildings, transport and cities.

It is very hard, but it is absolutely worth giving it everything we’ve got—because if we fail and let the temperatures rise by 2°C degrees, by 2100, expected global sea level rise would be 10 cm higher than what is projected for 1.5°C rise and instead of 70-90 percent decline in coral reefs, we would lose virtually all of them (>99%).[1]

Unwittingly, all of us in this room, find ourselves right in the middle of this scramble. The decisions we make about ocean metals can make a massive difference. Let me explain.

[The climate change bill of producing metals]

We have 30 years left to transition the global economy away from fossil fuels—and we have to do it while at the same time aggressively reducing our CO2 emissions.[2] We need to build thousands of new renewable power plants and a billion of electric cars. This new green electric infrastructure requires a massive new injection of base metals. Where will these metals come from and at what CO_2 cost?

To illustrate the choice in front of us, I’ll focus on the electrification of the global car fleet. There are 1.2 billion cars around the globe today. Let’s say we do everything we can to reduce car use —such as walking, biking, carpooling and increasing our use of public transit—and we manage to keep the global car fleet down to just one billion despite our population increasing to 9.8 billion by 2050.[3] Frankly, this would be a miracle but for simplicity let’s work with these numbers for now.

[1] IPCC Report 2018 https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/
[2] Based on policy recommendations in the IPCC Report 2018 https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/
[3] https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html

A billion electric cars means we need to build a billion new electric vehicle batteries. If these batteries are roughly as advanced as Tesla's[4], we will need 56 million tonnes of nickel, 6.6 million tonnes of manganese and 7.1 million tonnes of cobalt. Electric vehicles batteries and electric systems will also need 85 million tonnes of copper. Where are we going to get these millions of tonnes?

I don't need a crystal ball to confidently predict that we will not be getting them from recycling—not for the first billion of batteries: This is a completely new demand, so we don't have an existing stock of electric vehicle batteries we can recycle. Can we recycle these metals from somewhere else?

- You cannot take nickel and manganese out of existing steel structures.
- Apple is not going to give up the cobalt and copper in their iPhones and Macs. They want to recycle that metal back into their own products. By the way, it would take more than 1,000 iPhones to get the cobalt needed for a single EV battery.[5]

Let me be clear about this: We absolutely should recycle every single electric car battery we ever build. But recycling won't decrease the demand for base metals until we build up a stock of billion new batteries that we can recycle.

So if the first billion does not come from recycling, then where? Traditional mining industry is the obvious answer for most people. However, it's not clear that the mining industry can rise to the occasion, with supply deficits expected to emerge for nickel, cobalt, copper in the coming 3-10 years. But let's say the land mining sector does rise to the occasion and develops hundreds of new mines—more mining for cobalt in the Congo, more mining for nickel in the tropical Indonesia and Philippines and the Amazon. What's the CO_2 bill we are going to run up?

- Every kg of nickel comes with 23 kg of CO_2.
- Every kg of cobalt comes with 7 kg of CO_2.
- Manganese comes with 2 kg of CO_2.[6]

[4] Assuming NMC 811 battery chemistry and 75KWh battery size
[5] iPhone is 130 grams and 5% cobalt = 6.5 grams. NMC 811 75 KWh battery needs 7,100 grams of Co or 1,092.

If we add up the bill, we are looking at the CO_2 bill of over 1,800 gigatonnes. Our total global emissions last year were 37 gigatonnes.[7] By producing metals from land ores, we would be adding a total of 50 more years worth of carbon emissions – this is at the time we are trying to halve and then get to net zero.

Producing metals from land-based ores is CO_2 intensive. The mining industry can become more efficient in how much energy they use, they can bring in more renewables into production—all of these things can and will help. But for nickel and copper, ore grades of operating mines have been falling for decades. This means larger amounts of ore must be processed to obtain the same 1 kg of metal. This means more energy and more capital needs to be spent to get the same amount of metal out. Grades are expected to continue falling and cancelling out any energy efficiency gains. Land-based miners are already running faster just to stay in place.

[Climate change bill of going to the oceans]

So what's the alternative? What happens if we go to the oceans? I'll focus on polymetallic nodules in the Clarion Clipperton Zone as this is what we at DeepGreen know best.

First, it's important to understand the size of the CCZ resource. Even if we set aside half of the CCZ into Areas of Particular Environmental Interest, there would still be enough

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[6] Environmental Implications of Future Demand Scenarios for Metals: Methodology and Application to the Case of Seven Major Metals, Appendix 4: Impacts per kg of metal, https://onlinelibrary.wiley.com/doi/full/10.1111/jiec.12722

[7] https://www.globalcarbonproject.org/carbonbudget/18/publications.htm

metals in the CCZ nodules to electrify the global car fleet two times over. So there is enough metal in the CCZ nodules alone to solve our one-billion-battery problem.

Second, the most important thing to understand about nodules is something we say casually to describe them - they are “polymetallic.” This ore contains all the four metals we need for car batteries and the grade for each of them is at par or better than what we see on land. It’s like having three high-grade ore bodies in one.

This means we have to process much less ore, spend much less energy to get the same amount of metal compared to land-based ores. Indeed, our life cycle sustainability analysis shows that with current technology, we will emit less than 2 kg of CO_2 for every kg of metal we produce from nodules. If all the metals came from nodules, we would end up with a CO2 emissions bill that is 7 times smaller than if we sourced them from land.

Nodules also contain almost no deleterious elements and 100% of the nodule material is usable. This means that if done right, nodule processing plants will generate no toxic tailings or waste. You’ll never hear about a nodule plant releasing toxic mud that could fill 5,000 Olympic pools and burying over 150 people alive—as very sadly happened in Brazil recently due to the failure of a tailings dam.[8]

So we can get all the base metals we need to make a billion electric cars from nodules at a fraction of the climate change cost compared to land metals. Going to the oceans *seems* like an obvious choice—and yet, I must admit, it is *not* obvious.

[The perils of going to the ocean]

As we are discovering first hand through our own offshore campaigns as well as work by fellow contractors, the bottom of the ocean is a fascinating dark, quiet kingdom.

[8] https://www.nytimes.com/interactive/2019/02/09/world/americas/brazil-dam-collapse.html

By land standards, it's a very scarcely populated world—the most we have found is 300-1,000 organisms per square meter compared to more than 200,000 organisms you typically find in a square meter of soil on land. But it's a world we will disturb when we go down to collect the nodules.

There is plenty for us to worry about: We worry about organisms that live in our mining zones because they will lose hard nodule surfaces some of them need to survive. We worry about the noise and the light our nodule collection system would bring into the environment that has been quiet and dark for millions of years. We worry about the seafloor sediment that our collection machines will kick up—how far will it travel? how long will it take to resettle? what happens to the organisms living on nodules if they get covered by sediment? what happens to the nutrients in their environment?

There are obvious precautions that are already being taken: Setting aside a network of large Areas of Particular Environmental Interest at the regional CCZ level. Setting aside no-take zones in our own mining areas. We are studying the environmental impact of different technological solutions for nodule collection. We are looking at optimizing our collection patterns and engineering designs to reduce sediment plumes. There are many easy and not so easy things we can do to minimize the disturbance and reduce the obvious risks to deep ocean populations and biodiversity. But we must also acknowledge that our understanding of deep oceans is still evolving.

[The difficult choice]

As a global community, we are racing against the clock. If we don't reduce CO_2 emissions in a significant way and quickly, our friends and partners in Kiribati and Nauru lose their land and that's just the tip of the impact iceberg that awaits us—including devastating impact on the oceans.

So the choice in front of us is, go with “the devil we know”, the onland mining industry, OR take the metals out of our oceans? Dig ourselves deeper into the carbon hole by mining low-grade ores onland with all the terrible but known associated risks OR reduce the carbon impact of the green transition by collecting high-grade nodules on the ocean floor with all the still-to-be completely quantified risks?

I would not be standing in front of you today if I didn’t believe going to the ocean was the better alternative.

[Transitional resource & short-lived ocean metals industry]

Personally, I get very uncomfortable when people describe us as deepsea miners.
At DeepGreen, we don’t think of ourselves as developing a mining business. We are in the transition business—we want to help the world transition away from fossil fuels with the smallest possible climate change and environmental impact. This is the global public good we hope to create.

We also believe that we must transition and then stop. To us, the end-game is clear: we need a circular economy where we recycle all the base metals. Our role at DeepGreen is to inject just enough low-impact base metals into the system for us to be able to close that metals loop. And then we should stop taking metals out of our oceans—or our land, for that matter.

[Our role]

Helping address climate change, arguably the most pressing global challenge of this century, is a good use of the common heritage of mankind.

You, the distinguished members of the Council, along with the Assembly, have an incredibly important task to achieve: finalize the rules that will govern these resources in a commercially and environmentally responsible manner as currently scheduled—that is: July 2020.

The responsibility on the shoulders of companies like DeepGreen, is then to make sure we do it right and keep the ocean chapter of metal production as short as it takes to transition away from fossil fuels and avoid the catastrophic impacts of climate change.

Thank you.