

A large industrial facility, likely a battery manufacturing plant, with a worker in an orange suit and white hard hat standing on a metal platform. The facility features large, curved, metallic walls and a large pile of dark, granular material in the foreground. The lighting is dramatic, with strong shadows and highlights.

## The Metals Company Q3 2022 Update: Unlocking the World's Largest Estimated Undeveloped Source of Battery Metals

15 November 2022

## Forward looking statements.

This presentation contains “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, that relate to future events, TMC the metals company Inc.’s (“TMC” or the “Company”) future operations and financial performance, and the Company’s plans, strategies and prospects. These statements involve risks, uncertainties and assumptions and are based on the current estimates and assumptions of the management of the Company as of the date of this presentation and are subject to uncertainty and changes. Given these uncertainties, you should not place undue reliance on these forward-looking statements.

Important factors that could cause actual results to differ materially from those indicated by such forward-looking statements include, among others, those set forth under the heading “Risk Factors” contained in TMC’s Annual Report on Form 10-K for the year ended December 31, 2021, which was filed with the Securities and Exchange Commission on March 25, 2022, as well as any updates to those risk factors filed from time to time in TMC’s subsequent periodic and current reports. All information in this presentation is as of the date of this presentation, and the Company undertakes no duty to update this information unless required by law.

### **Regulation G – Non-GAAP financial measures:**

This presentation contains certain non-GAAP financial measures which are provided to assist in an understanding of TMC’s business and its operational performance. These measures should always be considered in conjunction with the appropriate GAAP measure. Reconciliations of all non-GAAP amounts to the relevant GAAP amount are provided in the Appendix to this presentation.

## HIGHLIGHTS

# Historic project development milestones achieved since last update.

### Q3 results

- Net loss of \$27.9 million and loss per share of \$0.12 for Q3 2022 compared to a net loss of \$36.7 million and \$0.18 per share in Q3 2021
- Lower net loss mainly attributable to a decrease of \$5.9 million in non-cash share-based compensation as significant stock options were granted prior to the September 2021 Business Combination, lower environmental program costs of \$3.2 million following the completion of NORI Area D baseline campaigns and decrease in professional and other fees of \$2.9 million mostly due to the Business Combination taking place in 2021, partially offset by the increase of \$3.7 million in pilot mining test costs.

### Cash

- Total cash of \$66.9 million at September 30, 2022
- \$8.7 million cash used in operations in Q3 2022 vs. \$10.4 million in Q3 2021
- We believe that our cash on hand will be sufficient to meet our working capital and capital expenditure requirements for at least the next twelve months from today

### Financing

- In Q3 2022, the Company completed a private investment in public equity (PIPE) financing and raised \$30.4 million in gross proceeds
- In October 2022, the SEC declared effective TMC's \$100 million universal shelf filing on a form S-3 registration statement effective

### Milestones

- **NORI Receives ISA Recommendation to Commence Trials:** In September, we announced that the International Seabed Authority (ISA) had completed its review of the Environmental Impact Statement (EIS) and Environmental Monitoring and Management Plan (EMMP) submitted by our subsidiary, NORI, and recommended that it proceed with its forthcoming collector test.
- **NORI Collector Test Monitoring:** In October, we announced that a multidisciplinary team of independent scientists from leading research institutions around the world and industry-leading contractors commenced the next phase of an extensive environmental baseline and impact monitoring campaign in preparation for NORI's pilot nodule collection system trials in NORI Area D area of the Clarion Clipper Zone (CCZ).
- **First Nodules Collected from Seafloor in Historic Trials:** In October, we announced the successful collection of an initial batch of seafloor polymetallic nodules delivered via riser system to the surface production vessel in what represents the first integrated collection system test conducted in the CCZ since the 1970s.
- **Successful Conclusion of Integrated Pilot Collection System Trial:** In November, we announced the conclusion of the historic integrated system trial in the CCZ. The trial achieved all significant pilot production milestones, with engineers remotely driving the pilot collector vehicle over 80 kilometers of the seafloor, collecting ~4,500 tonnes of nodules and lifting over 3,000 tonnes of nodules up a 4.3-km riser system to the surface production vessel, Hidden Gem. The Allseas-designed pilot nodule collection system achieved a maximum sustained production rate of 86.4 tonnes per hour and is expected to reach an estimated average production rate of over 200 tonnes per hour after pilot system goes through upgrades and optimizations in preparation for NORI's Project Zero.

# Agenda.

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OUR VALUE PROPOSITION

**Our resource alone can supply U.S. demand for nickel, cobalt and manganese.**



= Approximate raw material requirements of one million electric vehicles<sup>1</sup>

**Eagle Mine**

137,000t Ni / 3,700t Co Total Resource

Only U.S. miner of nickel or cobalt reaching end of life 2025<sup>2</sup>

\*Nickel concentrate (11-14%) exported for refining



**Talon Metals**

135,000 t Ni / 3,500 t Co Total Resource

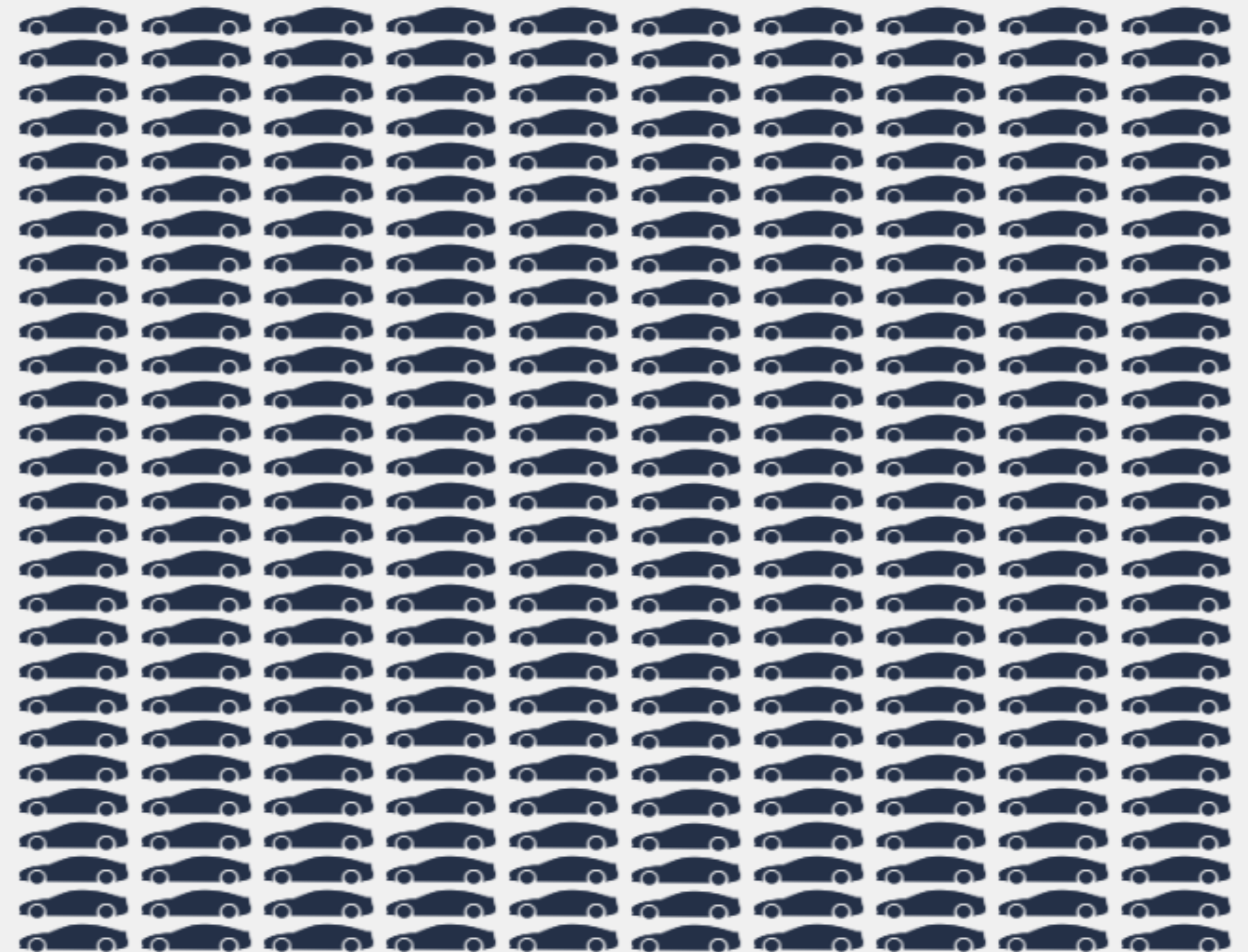
Unpermitted Tamarack project in Minnesota, enviro. review in 2023<sup>3</sup>

\*Nickel concentrate (13%) likely exported for refining



**The Metals Company**

15,700,000 t Ni / 2,400,000 t Co / 13,300,000 t Cu / 350,000,000 t Mn Total Resource  
 Estimated *In situ* quantities of nickel, copper, cobalt and manganese equivalent to the requirements of 280 million vehicles or the entire U.S. passenger vehicle fleet<sup>1</sup>



<sup>1</sup> Assuming 75kWh batteries with NMC811 chemistry and nodule resource grade and abundance, "Where Should Metals for the Green Transition Come From?", Paulikas et al, LCA white paper, April 2020. Calculation based on estimated contained value of nickel.  
<sup>2</sup> <https://lundinmining.com/site/assets/files/3640/2017-04-26-eagle-ni-43-101.pdf>  
<sup>3</sup> <https://talonmetals.com/wp-content/uploads/2020/08/Talon-Tamarack-PEA-Update-12Mar2020-Final.pdf>

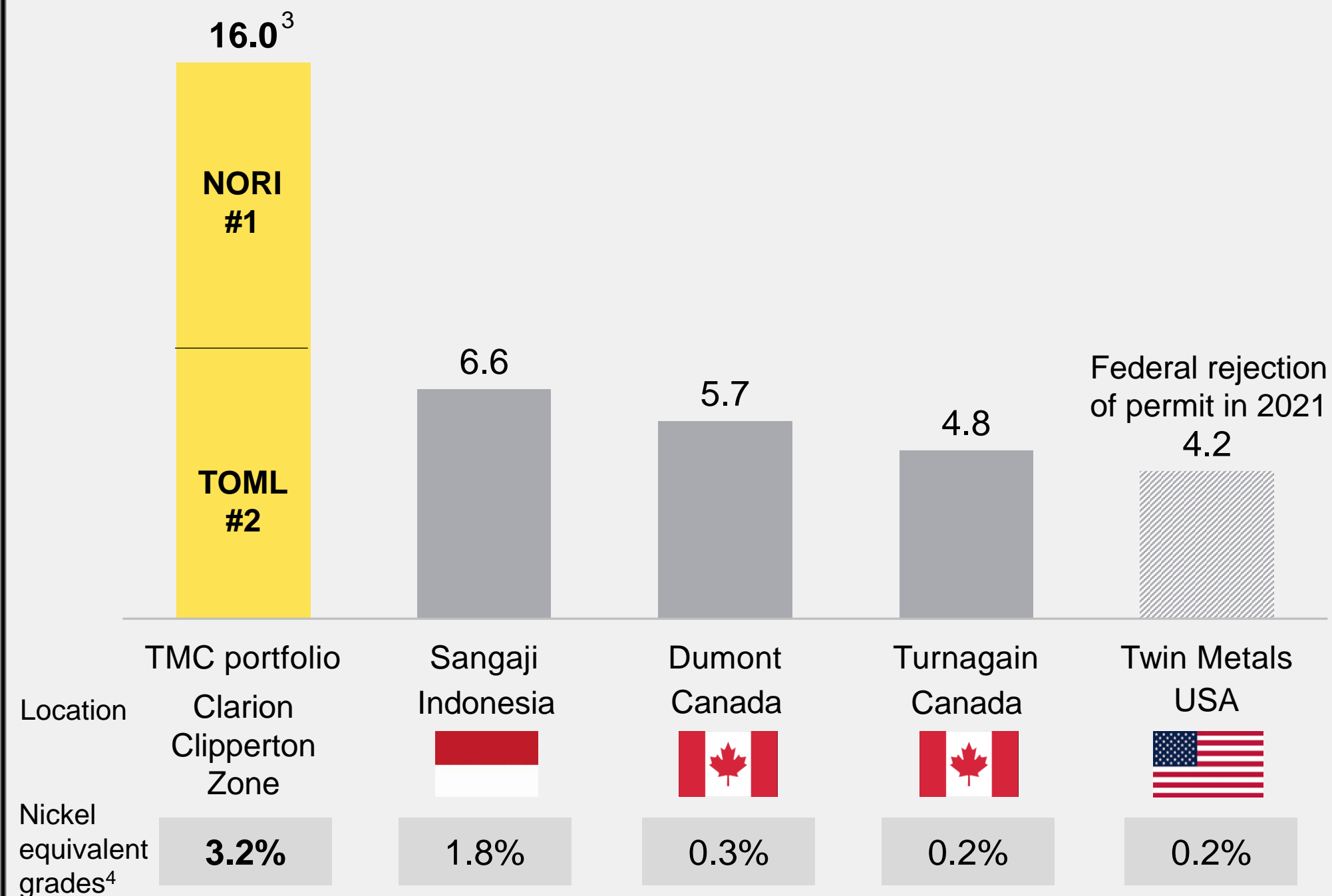
## OUR VALUE PROPOSITION

**TMC: #1 and #2 largest undeveloped nickel projects on the planet, and the alternative to Russian- and Chinese-controlled supply.**

### World's largest nickel projects – 2022

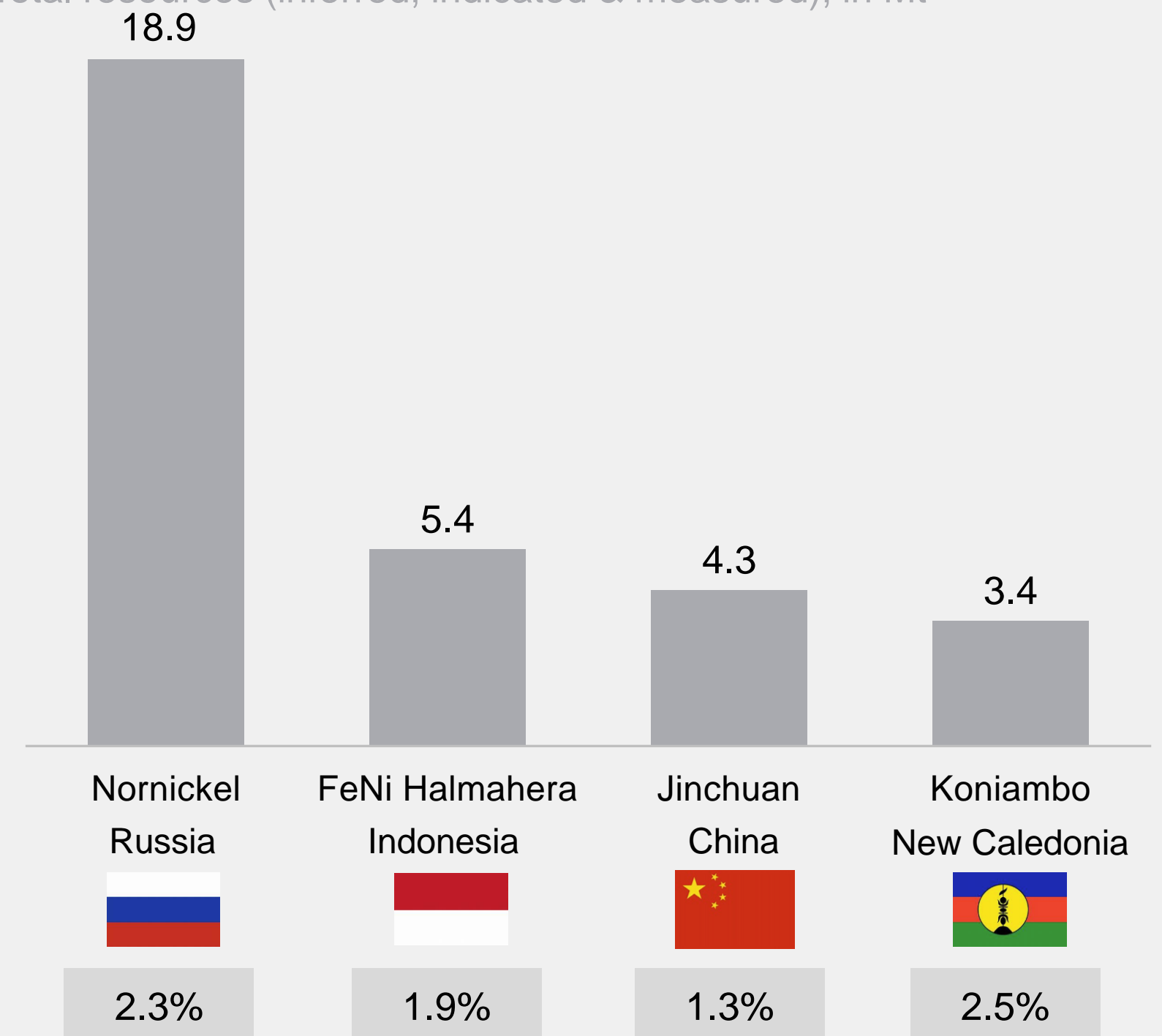
Total est. resources (inferred, indicated & measured), in Mt<sup>1</sup>

**MINING**  
[DOT]COM



### World's largest nickel operations ranked by resource

Total resources (inferred, indicated & measured), in Mt<sup>2</sup>



<sup>1</sup> <https://www.mining.com/featured-article/ranked-worlds-biggest-nickel-projects-2022/>

<sup>2</sup> Global Nickel Industry Cost Summary, Wood Mackenzie, August 2020; inclusive of reserves. Asset Reports for FeNi Halmahera, Jinchuan and Koniambo.

<sup>3</sup> Canadian NI 43-101 Resource Statement for full field financial model (internal DeepGreen development scenario).

<sup>4</sup> Nickel equivalence calculation uses NORI-D Model price deck as stated in NORI Initial Assessment available at [investors.metals.co](https://investors.metals.co).

## MARKET UPDATE

# Potential for nodules in focus in the U.S., as Indonesia mulls OPEC-style battery metal cartel.<sup>1</sup>



### Letter from U.S. Secretary of Energy Jennifer Granholm responding to Senator Lisa Murkowski (R-AK) on polymetallic nodules, July 2022:

“DOE believes that the environmental, social, community, and national security issues pertaining to marine minerals need to be accurately compared to the impacts of onshore resource extraction, processing, and utilization throughout the world...In light of global demand for critical minerals, it is reasonable to expect that exploitation of these resources will at some point occur...DOE is continuing to work with interagency partners to **consider all potential sources of critical minerals for the supply chain including the role that seabed nodules could play in the future.**”



### Innovative agreement will have union workers processing critical minerals from seafloor nodules for production of electric car batteries, Sept 2022:<sup>2</sup>

“UAW and The Metals Company (TMC) announced that they have entered into a labor neutrality agreement to bolster the critical mineral supply chain and to lay the groundwork for sustainable production of electric car batteries while creating a path to more good union jobs in the United States...building large-scale metals processing infrastructure and mineral supply chains in the United States **will enhance national and economic security.**”

<sup>1</sup> <https://www.afr.com/companies/energy/indonesia-eyes-opec-style-cartel-for-battery-metals-20221031-p5budd>

<sup>2</sup> <https://www.globenewswire.com/en/news-release/2022/09/30/2525942/0/en/Innovative-agreement-will-have-union-workers-processing-critical-minerals-from-seafloor-nodules-for-production-of-electric-car-batteries.html>

**MARKET UPDATE**

**Major news coverage  
of TMC and nodules in  
the last three months.**

The logo for The Wall Street Journal, consisting of the letters 'WSJ' in a large, black, serif font.

TMC Gets Approval for Pilot  
Deep-Sea Mining Project  
Sept 2022

The logo for the British Broadcasting Corporation (BBC), consisting of three black squares with white letters 'B', 'B', and 'C' inside them.

Should we mine the  
deep sea?  
Sept 2022

The logo for The New York Times, featuring the text 'The New York Times' in a black, serif font.

Battle Over Deep-Sea Mining  
Takes on New Urgency as  
Trial Run Winds Down  
Nov 2022

The logo for ABC News, featuring the letters 'abc' in white inside a black circle, followed by the word 'NEWS' in a black, serif font.

Lit: America's Future  
Sept 2022

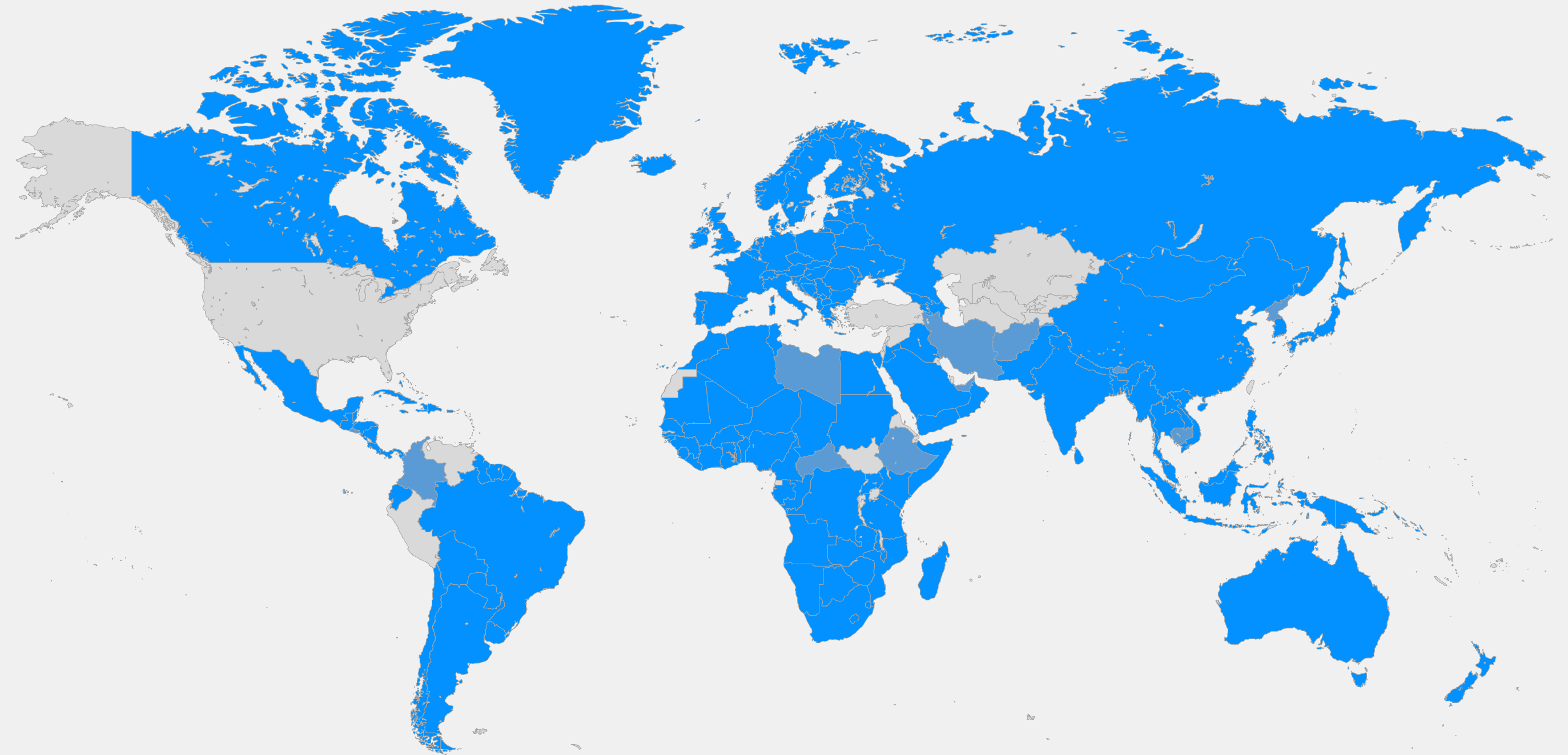
## REGULATORY UPDATE

# Regulated by the International Seabed Authority established in 1994 by UNCLOS.

**UNCLOS Parties**  
**UNCLOS Signatories**



- The International Seabed Authority (ISA) was established in 1994 by the United Nations Convention on the Law of the Sea (UNCLOS) and regulates seabed minerals beyond national jurisdiction.
- Issues Exploration Contracts to qualified applicants who are sponsored by a State Party to UNCLOS.
- 19 polymetallic nodule contracts issued to date to a mix of state-backed, state-owned and commercial contractors.



## REGULATORY UPDATE

**While some states raised concerns, most statements recognized the ISA's obligation to finalize regulations.**



*During Part III of the ISA's 27<sup>th</sup> Session, the majority of participating states expressed their continued support for negotiating robust regulations that ensure the protection of the marine environment, and were concerned by the position taken by France calling for a 'ban' on exploitation activities.*



### **Closing Statement by ISA Secretary-General, Michael Lodge, 11 November 2022:**

“Each chapter of the Convention is an integral part of the whole. Its provisions reflect the ecological unity of the ocean and are carefully designed to respond to the interests of all States Parties, including developing States Parties. It is not legitimate to pick and choose different elements depending on the circumstances and the need to appease particular constituencies... Significant progress has been made in one year and that is already **clear evidence of the overwhelming support demonstrated by States Parties** and observers in fulfilling the vision of Part XI and the 1994 agreement.”

### **Statement by Te-ara Henderson on behalf of the Cook Islands to ISA Assembly, 10 November 2022:**

“While we are still seeking to better understand the new position of France, it is our initial view that this new position undermines basic principles of international law, and is therefore **untenable and irreconcilable with** multilateralism, cooperation and **good faith in the implementation of our collective UNCLOS treaty obligations**... The Cook Islands, like other delegations, seeks to better understand the implications of France's new position on continuing to advance, in good faith, the work of the ISA. In this respect, we seek further clarification from France on its continued role in the ISA - as a Council member, as a Sponsoring State and as a Contractor in the Area.”

## REGULATORY UPDATE

# ISA roadmap targeting final exploitation regulations by July 2023.



## Timeline

2014

ISA commences work to develop exploitation regulations

July 2020

ISA stated goal for adoption was delayed due to COVID

9 July 2021

Government of Nauru (Sponsor of NORI) submitted a 2-year notice

Dec 2021

In-person ISA meetings resume in Jamaica, after a nearly 2-year hiatus

March 2022

ISA meetings to address regulations, financials and standards & guidelines

July/Aug 2022

ISA meetings to address regulations, financials and standards & guidelines

Oct/Nov 2022

ISA meetings to address regulations, financials and standards & guidelines

March 2023

ISA meetings to address regulations, financials and standards & guidelines

July 2023

ISA meetings to address regulations, financials and standards & guidelines

**July 2023**

**Deadline for ISA to adopt final exploitation regulations**

2H 2023

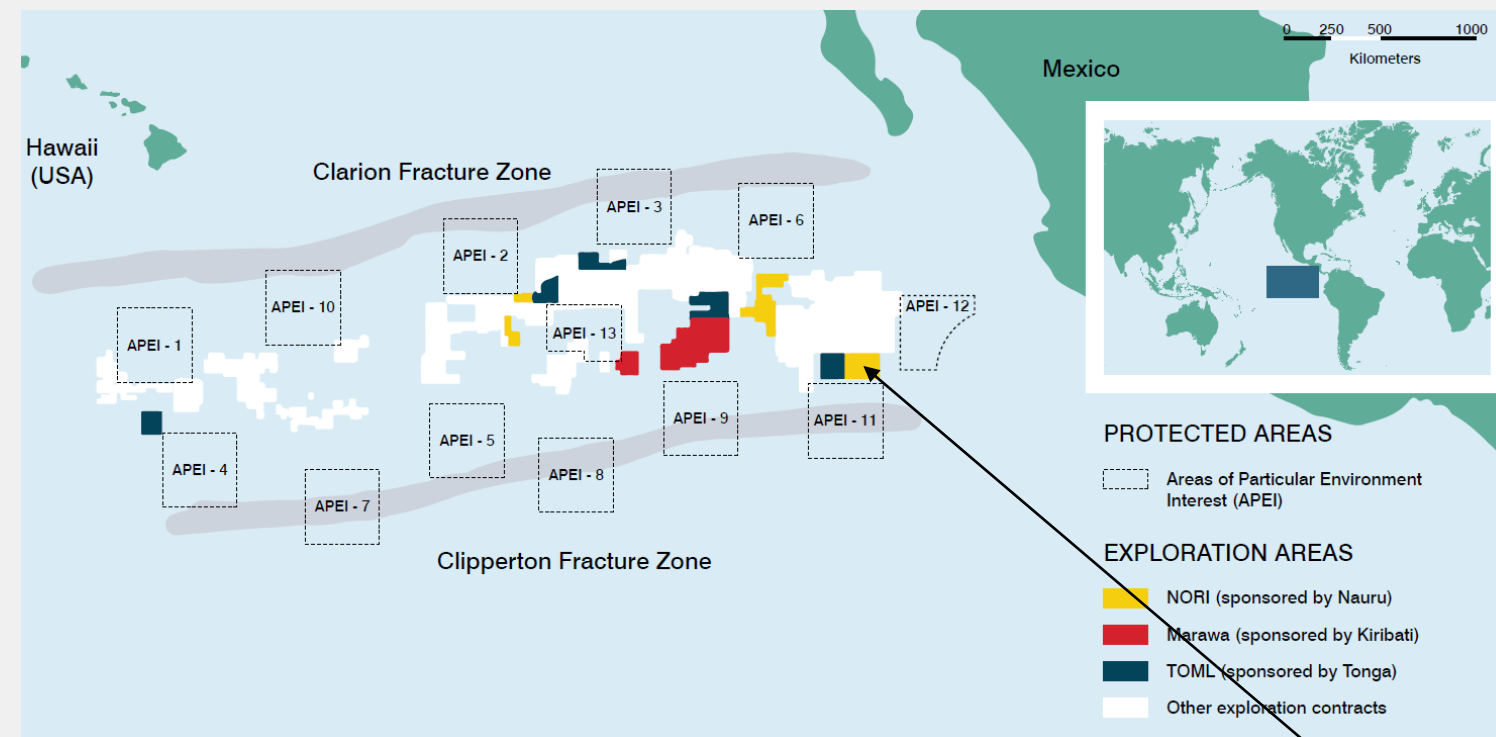
Estimated timing for completion of NORI-D application for ISA exploitation contract

2H 2024

Estimated timing for exploitation contract to be granted by ISA, for NORI-D area

## NORI-D PROJECT UPDATE

# NORI-D project at a glance.



	NORI (A,B,C,D) <sup>1</sup>	NORI-D <sup>1</sup>
ISA Exploration Contract Grant	2011	
Sponsoring State	Republic of Nauru	
Contract area, km <sup>2</sup>	74,830	25,160
Nodules, wet tonnes - estimated	866	356
Nickel, % - estimated	1.3	1.4
Copper, % - estimated	1.1	1.1
Manganese, % - estimated	29.5	31.2
Cobalt, % - estimated	0.2	0.14
Project status		Mid-PFS
Exploitation contract application <sup>2</sup>		H2 2023
Earliest start of production <sup>2</sup>		H2 2024

### Resource

- The estimated largest and highest nickel-equivalent grade undeveloped nickel project on the planet
- Contained metals (Ni, Cu, Co, Mn) well matched to the critical mineral requirements of the energy transition
- NORI-D as the 1<sup>st</sup> project (closest to shore, 41% of estimated NORI resource and 22% of total estimated resource)

### Products & project economics

- NiCuCo matte and Mn silicate as intermediates produced from reduced scope onshore metallurgical plant (Project Zero)
- Ni sulfate, Co sulfate, Cu cathode and Mn silicate as main products from full scope onshore metallurgical plant (Project One)
- +60% expected EBITDA margin / 2<sup>nd</sup> lowest nickel C1 cash cost on a by-products' basis at full scope steady state production on NORI-D Project One

### Project partnerships

- Strong focus on leveraging partners' expertise, reuse of existing assets and access to capital to get into production
- Allseas as offshore production partner for Project Zero and beyond
- Epsilon Carbon as likely onshore production partner for Project Zero

### Capital spent

- Approximately \$250M spent on NORI property since 2011 to get to mid-PFS on NORI-D

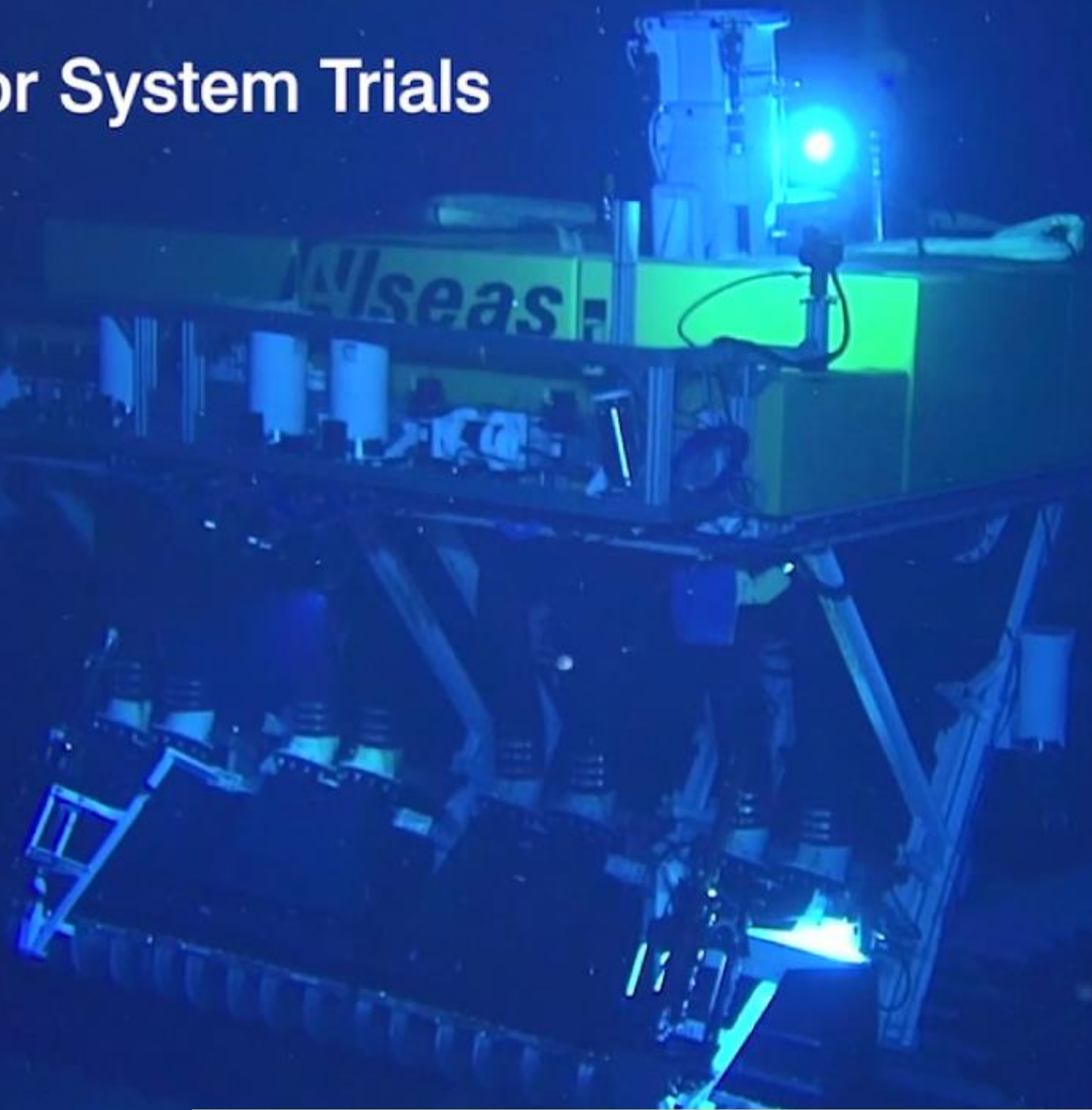
### Valuation of NORI-D project

- US\$6.8B NPV for NORI-D at CRU long-term prices (Feb 2021)<sup>1</sup>
- US\$15.9B NPV for NORI-D at current prices (November 11, 2022)<sup>1</sup>

<sup>1</sup> SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, 17 March 2021. NORI-D resource - 11 Mt inferred @ 1.4% Ni, 1.1% Cu, 0.1% Co and 31.0 % Mn and 15.6 kg/m<sup>2</sup> abundance, 341Mt Indicated @ 1.4% Ni, 1.1 %Cu, 0.1% Co and 31.2% Mn and abundance 17.1Kg/m<sup>2</sup>, 4 Mt Measured @1.4% Ni, 1.1% Cu, 0.1% Co and 32.2% Mn and 18.6 Kg/m<sup>2</sup>.

<sup>2</sup> Subject to availability of funding and ISA granting an Exploitation Contract.

# Pilot Collector System Trials



Video available here: <https://vimeo.com/771306099/c2c8def3c6>

## NORI-D PROJECT UPDATE

# Key objectives of NORI-D Pilot Collection System Test and Monitoring Campaign.

Objective #1:

**Demonstrate integrated pilot system capable of collecting and lifting nodules**



✓ First successful integrated pilot system test in CCZ since 1970s

Objective #2:

**Collect ~3,600 wet tonnes of polymetallic nodules**



✓ 4,500 wet tonnes collected  
✓ 3,021 wet tonnes lifted

Objective #3:

**Test pilot system performance to inform future system optimizations and upgrade**



✓ 86.4 t/h production rate  
Performance data acquired to be used to upgrade and optimize pilot system into Project Zero system with a targeted average production rate over 200t/h

Objective #4:

**Monitor and survey pre-, during- and post-test environment**



✓ Pre- and during surveys complete  
- Post-test surveys ongoing

NORI-D PROJECT UPDATE

**~3,000 tonnes of nodules  
inside the hold of Hidden Gem.**





# TMC / NORI Environmental Monitoring Program

Video available here: <https://vimeo.com/766832381>

## NORI-D PROJECT UPDATE

# Giving the regulator and key stakeholders eyes and ears into future operations.

With our digital twin, a mix of sensors and cloud-based AI, we will optimize the environmental performance of operations by applying environmental constraints and limits to the mine planning process.

The iterative nature of an adaptive management approach also means that the predictive and protective capabilities of the AMS will gradually improve over time as more information enters the system.



## NORI-D PROJECT UPDATE

# Sediment plumes: activists' speculation vs. published research.



## SPECULATION

### Deep-Sea Mining Statement

Signed by 653 people as of Nov 1, 2022

Organized by Deep-Sea Conservation Coalition

- “the production of large, persistent sediment plumes that would affect seafloor and midwater species and ecosystems well beyond the actual mining sites;
- the resuspension and release of sediment, metals and toxins into the water column, both from mining the seafloor and the discharge of mining wastewater from ships, detrimental to marine life including the potential for contamination of commercially important species of food fish such as tunas”

## RESEARCH

### Research published and field studies conducted in 2021-22

- Peer-reviewed research on seafloor and midwater plumes published by MIT and Scripps<sup>1</sup>
- Field observations of seafloor plumes conducted in May 2021 by BGR and GSR in their respective exploration contract areas in the CCZ<sup>2</sup>
- Plume modelling performed for TMC by DHI, one of the world's leading experts, using actual metocean data from NORI exploration area in CCZ and settling properties of sediment from NORI-D<sup>3</sup>

### Midwater plume

<10% of entrained sediment from the return of seawater used for nodule transport dilutes to natural background levels within a few hundred meters of the outlet.

### Seafloor plume

92-98% of plume from pilot nodule collector vehicle rose only 2 meters above the seafloor.

“It’s quite a different picture of what these plumes look like, compared to some of the conjecture,” says study co-author Thomas Peacock, MIT.



<sup>1</sup> Ouillon, R., Kakoutas, C., Meiburg, E., & Peacock, T. (2021). Gravity currents from moving sources. *Journal of Fluid Mechanics*, 924, A43. doi:10.1017/jfm.2021.654; Muñoz-Royo, C., Peacock, T., Alford, M.H. *et al.* Extent of impact of deep-sea nodule mining midwater plumes is influenced by sediment loading, turbulence and thresholds. *Commun Earth Environ* 2, 148 (2021). <https://doi.org/10.1038/s43247-021-00213-8>; <https://news.mit.edu/2022/sediment-deep-sea-mining-0921> (Sept 2022).

<sup>2</sup> First test of a manganese nodule collector in around four kilometers of water: research consortium successfully completes monitoring of environmental impacts in the Pacific, BGR press release, May 12, 2021

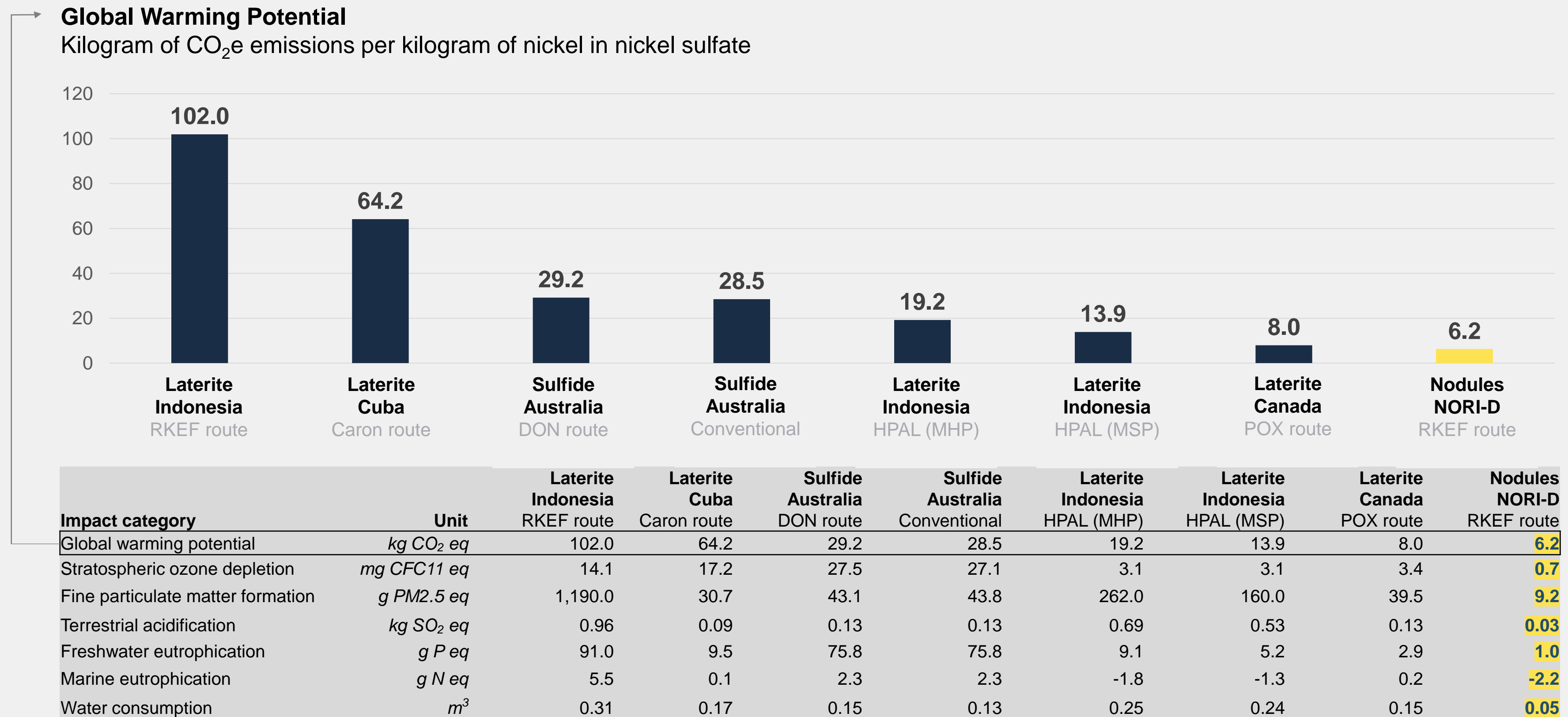
<sup>3</sup> NORI Environmental Impact Statement for Collector Test Study, July 2021

## NORI-D PROJECT UPDATE

# Benchmark Minerals LCA: Nickel from NORI-D shows lowest impact.

Results are undergoing third party verification

Lowest impact value

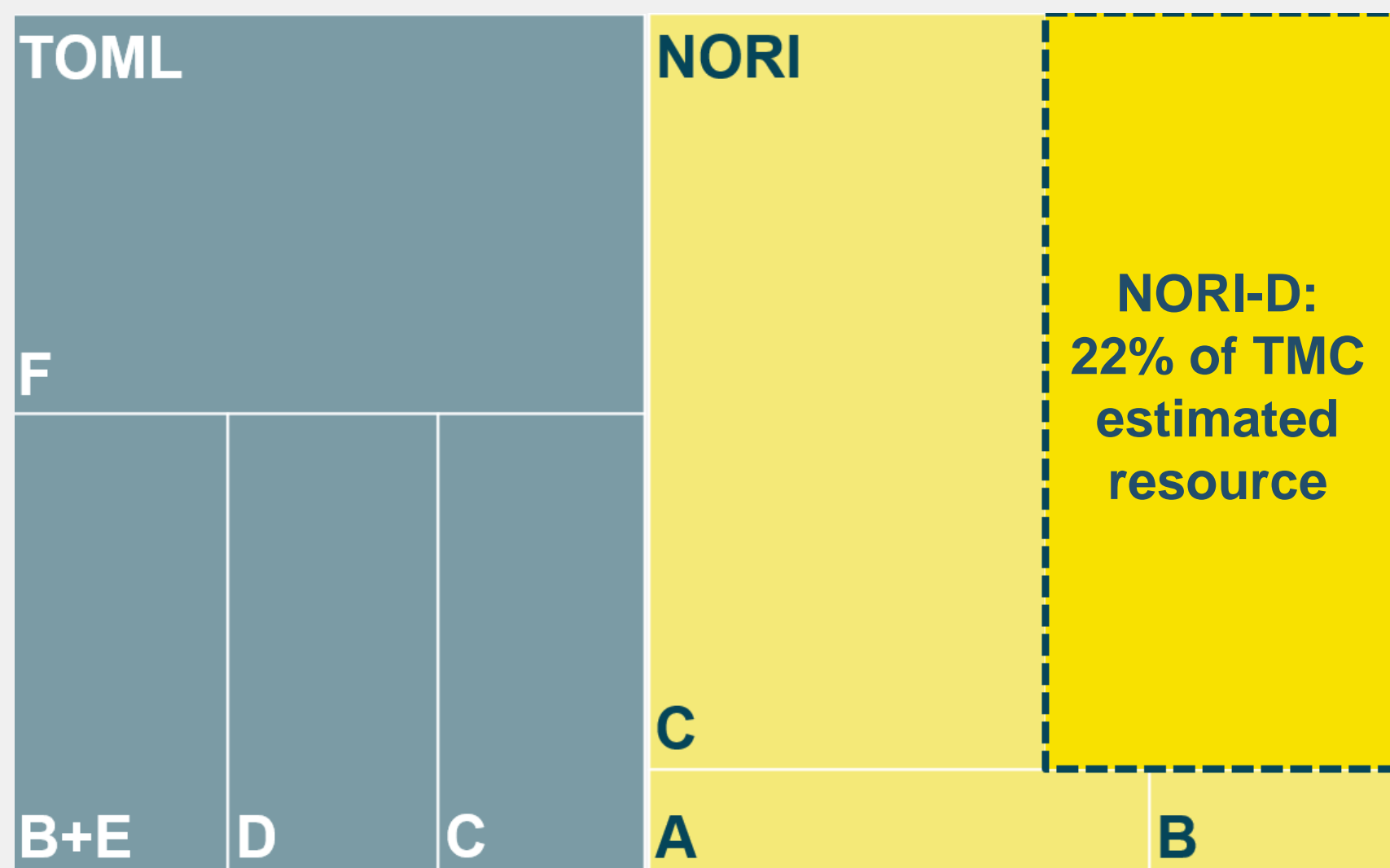


Source: Independent lifecycle assessment (LCA) completed by Benchmark Mineral Intelligence in Nov 2022. Lifecycle from mine to end-product format (battery-grade nickel sulfate, cobalt sulfate, copper cathode and manganese silicate) Nodules from NORI-D (RKEF route) also found to be the lowest impact option for copper. Cobalt from the DRC is lowest impact in GWP and water consumption; cobalt from NORI-D are lowest in all other assessed impact categories.

## NORI-D PROJECT UPDATE

**Based on SEC-compliant Initial Assessment, NORI-D project estimated at \$6.8 billion NPV (est. \$15.9 billion using current metal prices).**

← Estimated resource 1,634Mt (wet)<sup>1</sup> →



## NORI-D Financial Model<sup>2</sup>

\$ billions unless otherwise noted

Prices			
	CRU forecast	Current price	Increase
Nickel	\$16,106/t	\$26,856/t	67%
Copper	\$6,787/t	\$8,522/t	24%
Cobalt	\$46,416/t	\$51,955/t	12%
Mn silicate	\$4.53/dmtu	\$5.75/dmtu	27%

Project economics—cumulative over project life			
<b>Total revenue</b>	<b>\$95.1b</b>	<b>\$136.4</b>	<b>37%</b>
Nickel	44.0	73.6	
Copper	12.7	15.9	
Cobalt	10.4	12.4	
Mn silicate	27.2	34.0	
<b>Total OPEX</b>	<b>37.5b</b>	<b>37.5b</b>	<b>0%</b>
<b>Total EBITDA</b>	<b>57.3b</b>	<b>98.6b</b>	<b>72%</b>
<i>EBITDA margin</i>	<i>60%</i>	<i>72%</i>	<i>12 pts</i>

<b>NPV</b>	<b>\$6.8 billion</b>	<b>\$15.9 billion</b>	<b>+134%</b>
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NORI-D NPV at various nickel prices (other assumptions held constant including other metal prices at current)	\$45,000/t	\$26.7 billion
	\$35,000/t	\$20.7 billion
	\$25,000/t	\$14.7 billion
	\$15,000/t	\$8.7 billion

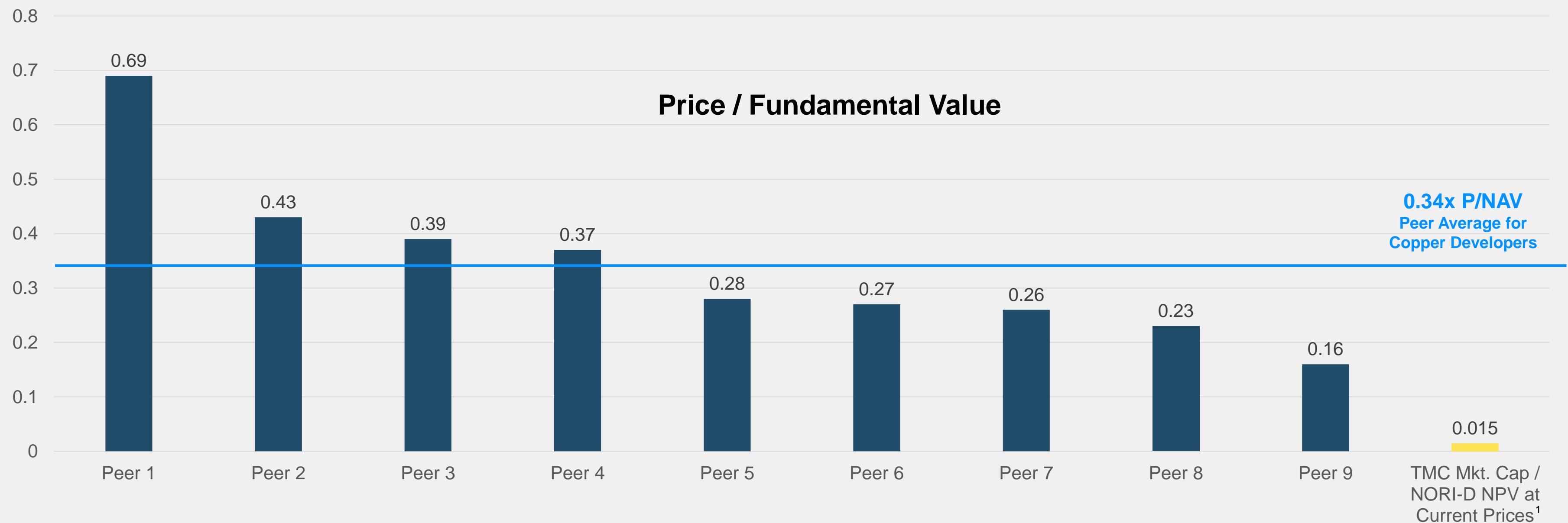
General rule of thumb: every \$10k/t change in nickel price equates to \$6 billion change in NORI-D NPV

<sup>1</sup> Canadian NI 43-101 Resource Statement for full field financial model (internal DeepGreen development scenario).

<sup>2</sup> Canadian NI 43-101 and SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, March 2021. 'Current price' scenario is internal-only, as of November 11, 2022. NPV at January 1, 2021, assuming 9% discount rate.

## NORI-D PROJECT UPDATE

**TMC trading at ~20x lower multiple than average for copper developers, using NPV for NORI-D alone (22% of total estimated resource).**

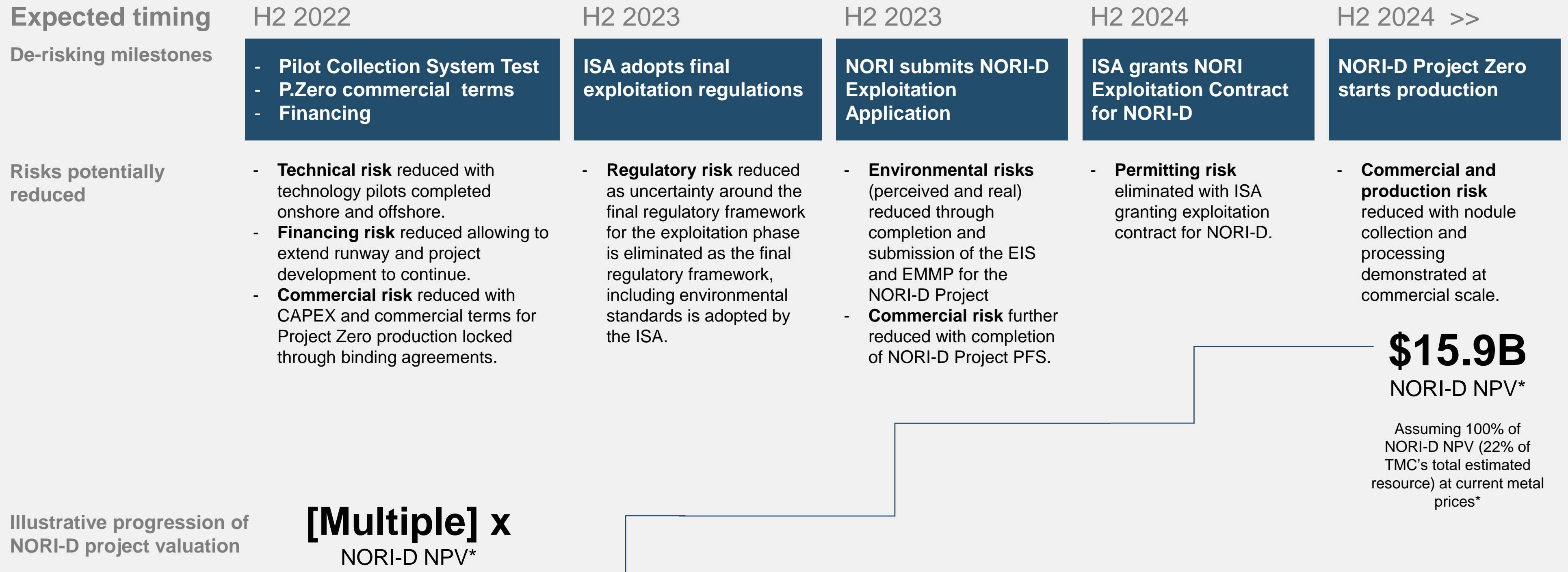


Source: [https://wp-solgold-2021.s3.eu-west-2.amazonaws.com/media/2022/10/SolGold-Cornerstone-Transaction-Investor-Presentation\\_2022-10-12.pdf](https://wp-solgold-2021.s3.eu-west-2.amazonaws.com/media/2022/10/SolGold-Cornerstone-Transaction-Investor-Presentation_2022-10-12.pdf) . Peer group includes Adventus, Filo, Highland, Los Andes, Marimaca, Solaris, SolGold, Trilogy and Western. Peer market data as of October 6, 2022.

<sup>1</sup> Canadian NI 43-101 and SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, March 2021. 'Current Price' scenario is internal-only, as of November 11, 2022. NPV at January 1, 2021, assuming 9% discount rate.

## NORI-D PROJECT UPDATE

# Key de-risking milestones to unlock NORI-D project value.



EIS – Environmental Impact Statement  
EMMP – Environmental Management and Monitoring Plan

\*US\$6.8B NPV stated in SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, March 2021. Based on assumed long-term prices of Ni - \$16,106/t, Cu - \$6,787/t, Co - \$46,416/t, Mn - \$4.53/dmtu. \$15.2B NPV is internal-only scenario based on prices as of Nov. 10, 2022 (Ni - \$26,856/t, Cu - \$8,522/t, Co - \$51,955/t, Mn - \$5.75/dmtu). NPV at January 1, 2021 at 9% disc. rate.

## NEAR-TERM MILESTONES

# Major milestones achieved in the first nine months of 2022.

Completed  
In progress

### Offshore nodule collection system

- Deep-water tests of pilot collector in the North Atlantic
- Pilot Collection System Test in the Pacific (NORI-D, CCZ)
- Digital twin implementation for NORI-D pilot collection system test

### Offshore environmental & social impact assessment (ESIA)

- ISA review of NORI-D Pilot Collection System Test EIS and EMMP
- Contracts for NORI-D Pilot Collection System Test Monitoring Campaign
- [Execution of NORI-D Pilot Collection System Test Monitoring Campaign](#)
- Partnerships in place for Environmental Monitoring & Management Plan (EMMP) for NORI-D project

### Onshore processing

- Complete value-in-use studies for Mn silicate product
- Complete analysis of pyrometallurgical pilot results
- [Complete hydrometallurgical bench-scale work](#)

### Lifecycle impacts

- Complete inaugural Impact Report
- Complete comparative life-cycle analysis (LCA) study for NORI-D Project One

### NORI-D Project Zero offtakes & strategic partnerships

- Allseas: Agree non-binding commercial terms for commercial nodule collection; [agree binding terms post NORI-D pilot collection system test](#)
- Epsilon Carbon: Agree on PFS for Project Zero plant [and binding commercial terms after PFS](#)
- NiCuCo alloy/matte: share samples [and secure offtakes](#)
- Mn silicate: share samples [and secure offtakes](#)

## FINANCIAL HIGHLIGHTS

# Income statement: three months ended September 30, 2022.

(\$mm)	Q3 2021	Q3 2022	Change
<b>Exploration expenses</b>	<b>23.8</b>	<b>22.7</b>	<b>(1.1)</b>
Environmental Studies	18.6	15.4	(3.2)
Exploration Labour	0.8	1.0	0.2
Mining and Process Development	0.7	0.2	(0.5)
Pilot Mining Test System (PMTS)	-	3.7	3.7
Project development share-based compensation <sup>(1)</sup>	3.0	1.6	(1.4)
Sponsorship, Training and Stakeholder Engagement	0.5	0.5	-
Other <sup>(2)</sup>	0.2	0.3	0.1
<b>General &amp; administrative expenses</b>	<b>13.3</b>	<b>5.9</b>	<b>(7.4)</b>
Corporate staff salaries	0.9	1.0	0.1
Corporate share-based compensation <sup>(1)</sup>	6.5	2.0	(4.5)
Professional fees	2.6	1.0	(1.6)
Other <sup>(3)</sup>	3.3	1.9	(1.4)
<b>Net operating loss</b>	<b>37.1</b>	<b>28.6</b>	<b>(8.5)</b>

<sup>1</sup> The options granted in 2021 were awarded in lieu of cash bonuses to retain DeepGreen employees in furtherance of the September 2021 Business Combination. The DeepGreen Board had the sole discretion to award these options and exercised its discretion to do so, as it had not consistently awarded cash bonuses to its employees, despite multiple years of service. Some of the options were granted subject to the achievement of significant long-term performance goals of DeepGreen and remain unvested.

<sup>2</sup> Exploration expenses – other includes corporate costs associated with exploration activities.

<sup>3</sup> General & administrative expenses – other includes investor relations expenses, corporate office expenses and director fees.

2021 Share-based compensation	Units granted (M)	Total expense (\$M)
<b>Options by grant date</b>		
17-Feb-21	0.6	0.3
04-Mar-21	15.5	9.3
<b>Total share-based compensation</b>	<b>16.1</b>	<b>9.5</b>
Expenses re options granted before 2021		0.0
<b>Total share-based compensation expenses</b>		<b>9.5</b>

## FINANCIAL HIGHLIGHTS

# Cash flow: three months ended September 30, 2022.

(\$mm)	Q3 2021	Q3 2022	Change
<b>Cash used in operating activities</b>	10.4	8.7	(1.7)
<b>Capital expenditures</b>	-	0.5	0.5
Settlement of deferred acquisition costs	-	-	-
Acquisition of equipment	-	0.5	0.5
<b>Less non-recurring items</b>	(1.1)	-	1.1
Settlement of deferred acquisition costs	-	-	-
Transaction costs related to the Business Combination	(1.1)	-	1.1
<b>Free cash outflow excluding non-recurring items</b>	9.3	9.2	(0.1)

## FINANCIAL HIGHLIGHTS

## Balance sheet: as at September 30, 2022.

(\$mm)	Dec 31, 2021	Sep 30, 2022	Change
<b>Total Assets</b>	<b>133.2</b>	<b>117.2</b>	<b>(16.0)</b>
Cash	84.9	66.9	(18.0)
Accounts receivable and prepaid expenses	3.7	5.0	1.3
Exploration and evaluation assets	43.2	43.2	-
Property and equipment	1.4	2.1	0.7
<b>Total Liabilities</b>	<b>40.4</b>	<b>38.1</b>	<b>(2.3)</b>
Accounts payable and accrued liabilities	26.6	25.2	(1.4)
Warrant liability	3.1	2.2	(0.9)
Deferred tax liability	10.7	10.7	-
<b>Total Equity</b>	<b>92.8</b>	<b>79.1</b>	<b>(13.7)</b>
Common shares	296.1	328.9	32.8
Class A – J Special Shares	-	-	-
Additional paid-in-capital	102.1	116.9	14.8
Accumulated other comprehensive income	(1.2)	(1.2)	-
Deficit	(304.2)	(365.5)	(61.3)

## FINANCIAL HIGHLIGHTS

# Income statement: nine months ended September 30, 2022.

(\$mm)	YTD 2021	YTD 2022	Change
<b>Exploration expenses</b>	<b>80.2</b>	<b>40.3</b>	<b>(39.9)</b>
Environmental Studies	44.0	20.5	(23.5)
Exploration Labour	2.4	3.4	1.0
Mining and Process Development	1.7	0.8	(0.9)
Pilot Mining Test System (PMTS)	-	6.5	6.5
Project development share-based compensation <sup>(1)</sup>	30.6	7.4	(23.2)
Sponsorship, Training and Stakeholder Engagement	0.8	1.1	0.3
Other <sup>(2)</sup>	0.7	0.6	(0.1)
<b>General &amp; administrative expenses</b>	<b>41.1</b>	<b>22.5</b>	<b>(18.6)</b>
Corporate staff salaries	1.9	3.1	1.2
Corporate share-based compensation <sup>(1)</sup>	24.7	7.6	(17.1)
Professional fees	8.2	5.2	(3.0)
Other <sup>(3)</sup>	6.3	6.6	0.3
<b>Net operating loss</b>	<b>121.3</b>	<b>62.8</b>	<b>(58.5)</b>

<sup>1</sup> The options granted in 2021 were awarded in lieu of cash bonuses to retain DeepGreen employees in furtherance of the September 2021 Business Combination. The DeepGreen Board had the sole discretion to award these options and exercised its discretion to do so, as it had not consistently awarded cash bonuses to its employees, despite multiple years of service. Some of the options were granted subject to the achievement of significant long-term performance goals of DeepGreen and remain unvested.

<sup>2</sup> Exploration expenses – other includes corporate costs associated with exploration activities.

<sup>3</sup> General & administrative expenses – other includes investor relations expenses, corporate office expenses and director fees.

2021 Share-based compensation	Units granted (M)	Total expense (\$M)
<b>Options by grant date</b>		
17-Feb-21	0.6	3.8
04-Mar-21	15.5	50.7
<b>Subtotal</b>	<b>16.1</b>	<b>54.4</b>
Expenses re options granted before 2021		0.8
<b>Total share-based compensation expenses</b>		<b>55.3</b>

## FINANCIAL HIGHLIGHTS

# Cash flow: nine months ended September 30, 2022.

(\$mm)	YTD 2021	YTD 2022	Change
<b>Cash used in operating activities</b>	<b>28.3</b>	<b>46.8</b>	<b>18.5</b>
<b>Capital expenditures</b>	<b>3.8</b>	<b>1.0</b>	<b>(2.8)</b>
Settlement of deferred acquisition costs	3.4	-	(3.4)
Acquisition of equipment	0.4	1.0	0.6
<b>Less non-recurring items</b>	<b>(8.8)</b>	<b>-</b>	<b>8.8</b>
Settlement of deferred acquisition costs	(3.4)	-	3.4
Transaction costs related to the Business Combination	(5.4)	-	5.4
<b>Free cash outflow excluding non-recurring items</b>	<b>23.3</b>	<b>47.8</b>	<b>24.5</b>



Q&A.

Investor Contact  
[investors@metals.co](mailto:investors@metals.co)

Media Contact  
[media@metals.co](mailto:media@metals.co)

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# APPENDIX

## Appendix: non-GAAP reconciliation.

### Non-GAAP Financial Measures – Free Cash Outflow Excluding Non-Recurring Items

Free cash outflow excluding non-recurring items is a non-GAAP financial measure. Free cash outflow excluding non-recurring items is used in addition to and in conjunction with results presented in accordance with United States Generally Accepted Accounting Principles (“U.S. GAAP”), and free cash outflow excluding non-recurring items should not be relied upon to the exclusion of U.S. GAAP financial measures. TMC’s management strongly encourages investors to review TMC’s financial statements and publicly-filed reports in their entirety and to not rely on any single financial measure. Free cash outflow excluding non-recurring items, which is reconciled to “net cash used in operating activities”, is cash flow from operations reduced by capital expenditures excluding certain other one-time expenditures. TMC believes that free cash outflow excluding non-recurring items is a useful additional measure to “net cash used in operations” since the excluded expenditures are not a recurring expenditure of operations moving forward and free cash outflow excluding non-recurring items is useful as a measure of TMC’s ability to meet its planned operating obligations moving forward. Free cash outflow excluding non-recurring items, however, has limitations due to the fact that it does not represent the residual cash flow available for discretionary expenditures and different companies define free cash outflow excluding non-recurring items and other measures of free cash flow in different manners and, therefore, TMC’s free cash outflow excluding non-recurring items can not be compared to another company’s use of free cash outflow excluding non-recurring items or any other measure of free cash flow. TMC therefore believes it is important to view free cash outflows excluding non-recurring items as a complement to its entire condensed consolidated statements of cash flows.

A reconciliation of “net cash used in operating activities” to free cash outflow excluding non-recurring items for the three months ended September 30, 2022 and 2021 is as follows:

(\$mm)	Three months ended September 30	
	2022	2021
<b>Cash used in operating activities</b>	8.7	10.4
<b>Capital expenditures</b>	0.5	-
Settlement of deferred acquisition costs	-	-
Acquisition of equipment	0.5	-
<b>Free cash outflow</b>	9.2	10.4
<b>Less: non-recurring items</b>	-	(1.1)
Settlement of deferred acquisition costs	-	-
Transaction costs related to the Business Combination	-	(1.1)
<b>Free cash outflow excluding non-recurring items</b>	9.2	9.3

## Appendix: non-GAAP reconciliation.

### Non-GAAP Financial Measures – Free Cash Outflow Excluding Non-Recurring Items

Free cash outflow excluding non-recurring items is a non-GAAP financial measure. Free cash outflow excluding non-recurring items is used in addition to and in conjunction with results presented in accordance with United States Generally Accepted Accounting Principles (“U.S. GAAP”), and free cash outflow excluding non-recurring items should not be relied upon to the exclusion of U.S. GAAP financial measures. TMC’s management strongly encourages investors to review TMC’s financial statements and publicly-filed reports in their entirety and to not rely on any single financial measure. Free cash outflow excluding non-recurring items, which is reconciled to “net cash used in operating activities”, is cash flow from operations reduced by capital expenditures excluding certain other one-time expenditures. TMC believes that free cash outflow excluding non-recurring items is a useful additional measure to “net cash used in operations” since the excluded expenditures are not a recurring expenditure of operations moving forward and free cash outflow excluding non-recurring items is useful as a measure of TMC’s ability to meet its planned operating obligations moving forward. Free cash outflow excluding non-recurring items, however, has limitations due to the fact that it does not represent the residual cash flow available for discretionary expenditures and different companies define free cash outflow excluding non-recurring items and other measures of free cash flow in different manners and, therefore, TMC’s free cash outflow excluding non-recurring items can not be compared to another company’s use of free cash outflow excluding non-recurring items or any other measure of free cash flow. TMC therefore believes it is important to view free cash outflows excluding non-recurring items as a complement to its entire condensed consolidated statements of cash flows.

A reconciliation of “net cash used in operating activities” to free cash outflow excluding non-recurring items for the nine months ended September 30, 2022 and 2021 is as follows:

(\$mm)	Nine months ended September 30	
	2022	2021
<b>Cash used in operating activities</b>	<b>46.8</b>	<b>28.3</b>
<b>Capital expenditures</b>	<b>1.0</b>	<b>3.8</b>
Settlement of deferred acquisition costs	-	3.4
Acquisition of equipment	1.0	0.4
<b>Free cash outflow</b>	<b>47.8</b>	<b>32.1</b>
<b>Less: non-recurring items</b>	<b>-</b>	<b>(8.8)</b>
Settlement of deferred acquisition costs	-	(3.4)
Transaction costs related to the Business Combination	-	(5.4)
<b>Free cash outflow excluding non-recurring items</b>	<b>47.8</b>	<b>23.3</b>

Date: 30/05/2020  
Time: 18:20:36 UTC  
Dive No: 144

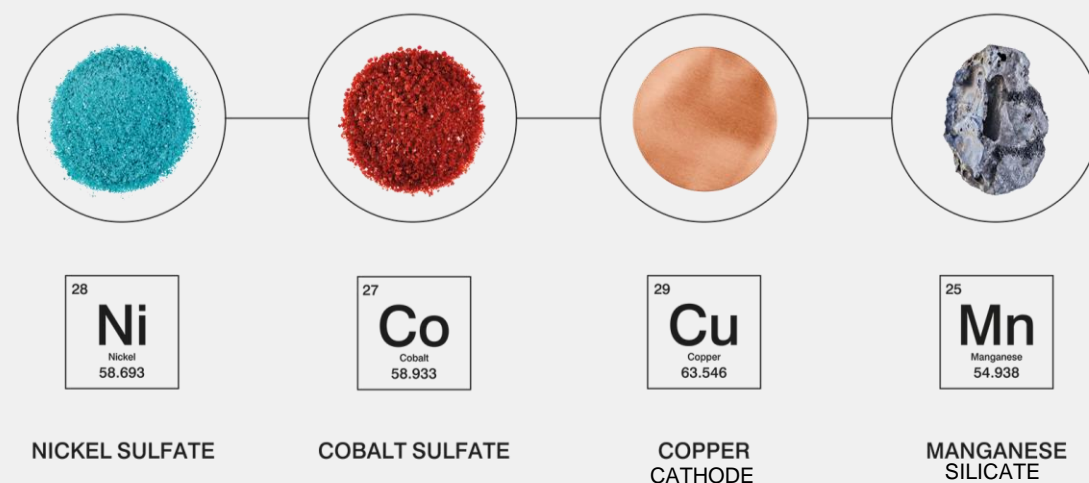
Easting : 482149.97m  
Northing: 1147003.90m

HDG: 56.92  
Depth: 4294.20m  
Alt: 1.17m

**Here is what  
a polymetallic nodule  
field looks like.**



# Abundant, secure, low production cost and low ESG cost potential supply of metals.



## Abundant

TMC is developing the world's largest estimated source of battery metals with enough nickel, copper, manganese and cobalt *in situ* to potentially electrify 280 million EVs<sup>1</sup>

## Secure

Located on the abyssal seafloor in the international waters regulated by the International Seabed Authority, an inter-governmental organization established pursuant to the United Nations Convention on the Law of the Seas

## Low production cost

Expecting to become the 2<sup>nd</sup> lowest cost nickel producer on the planet at steady state production on Project One<sup>2</sup>, reflecting high grades with four battery metals in high concentrations in a single resource

## Lower environmental and social cost

Expected 70-99% reduction of lifecycle environmental impacts, including near-zero solid processing waste, 90% less CO<sub>2</sub> equivalent emissions compared to land-based metal extraction<sup>3</sup>

## \$15.9 billion NPV for 1<sup>st</sup> project

\$15.9 billion net present value at current metal prices for NORI-D, TMC's first project representing 22% of the company's estimated resource<sup>4</sup>

## Tier 1 partners / investors<sup>5</sup>

GLENCORE



MAERSK

Allseas

HATCH

<sup>1</sup> Assuming 75kWh batteries with NMC811 chemistry and nodule resource grade and abundance, "Where Should Metals for the Green Transition Come From?", Paulikas et al, LCA white paper, April 2020. Calculation based on estimated contained value of nickel.

<sup>2</sup> Canadian NI 43-101 Compliant Preliminary Economic Assessment (PEA) for NORI-D Area, AMC, February 2021; Metals Cost Curve, Wood Mackenzie, August 2020.

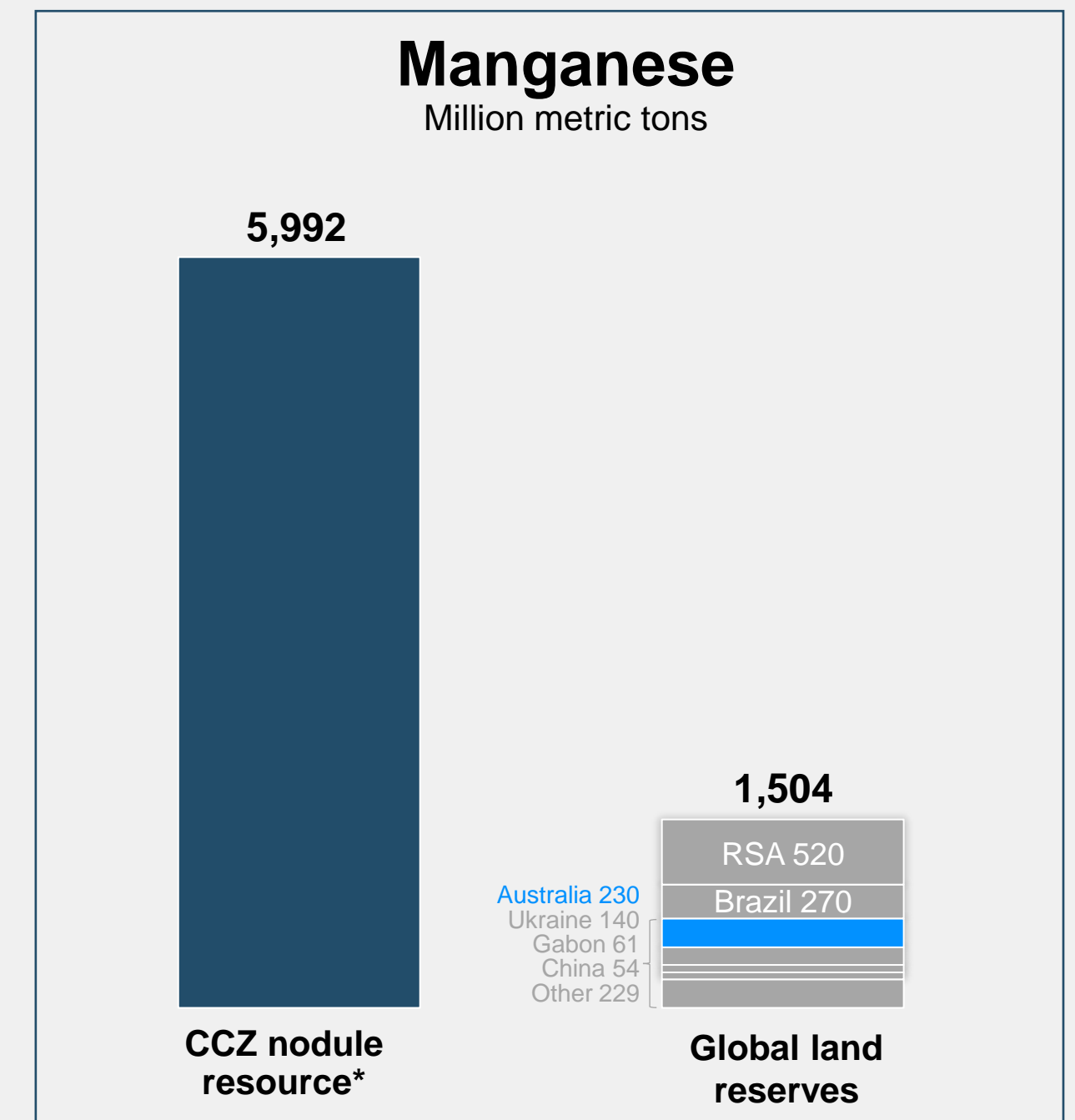
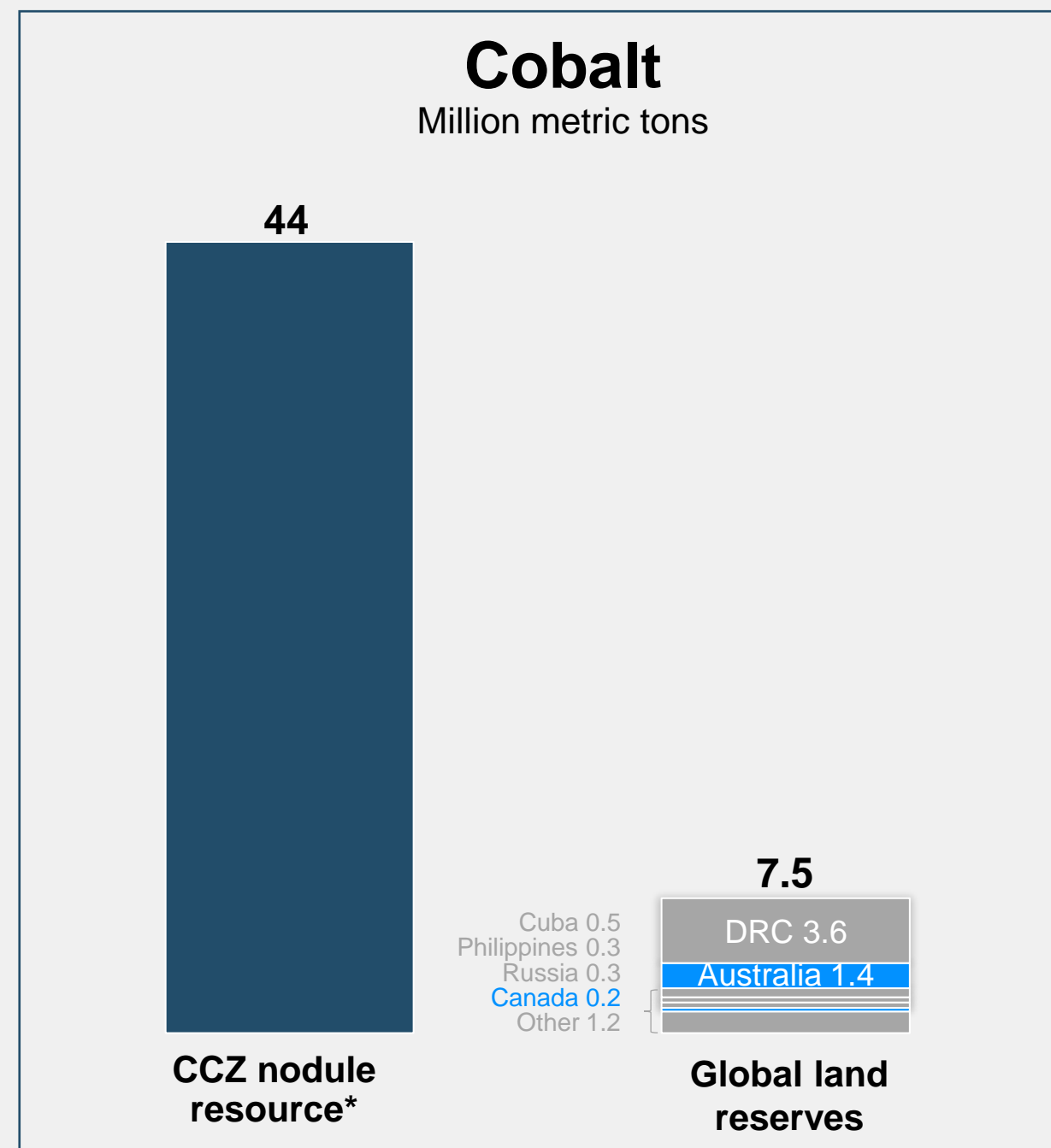
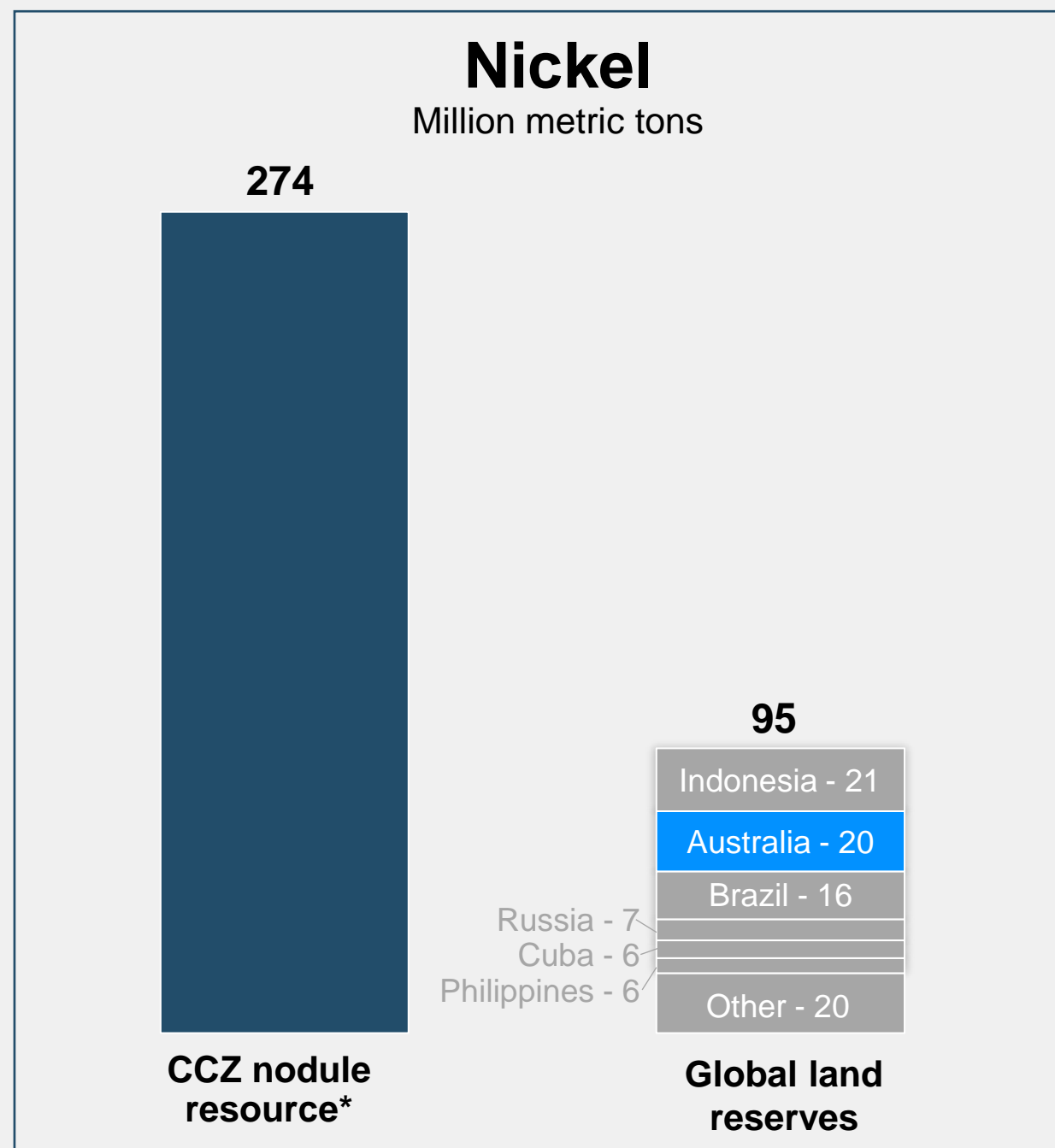
<sup>3</sup> "Where Should Metals for the Green Transition Come From?", Paulikas et al, LCA white paper, April 2020. "Life cycle climate change impacts of producing battery metals from land ores versus deep-sea polymetallic nodules", Paulikas et al, December 2020.

<sup>4</sup> Canadian NI 43-101 and SEC Regulation S-K (Subpart 1300) Compliant NORI Area D CCZ Mineral Resource Estimate and associated financial model, AMC, March 2021. Current prices as of November 11, 2022. NPV at January 1, 2021.

<sup>5</sup> Allseas, Maersk and Glencore are TMC shareholders. Our agreement with Maersk for vessel operations ended pursuant to its terms in January 2022 following the completion of all NORI Area D baseline campaigns.

# CCZ nodule resource much bigger than reserves of countries with U.S. FTAs.

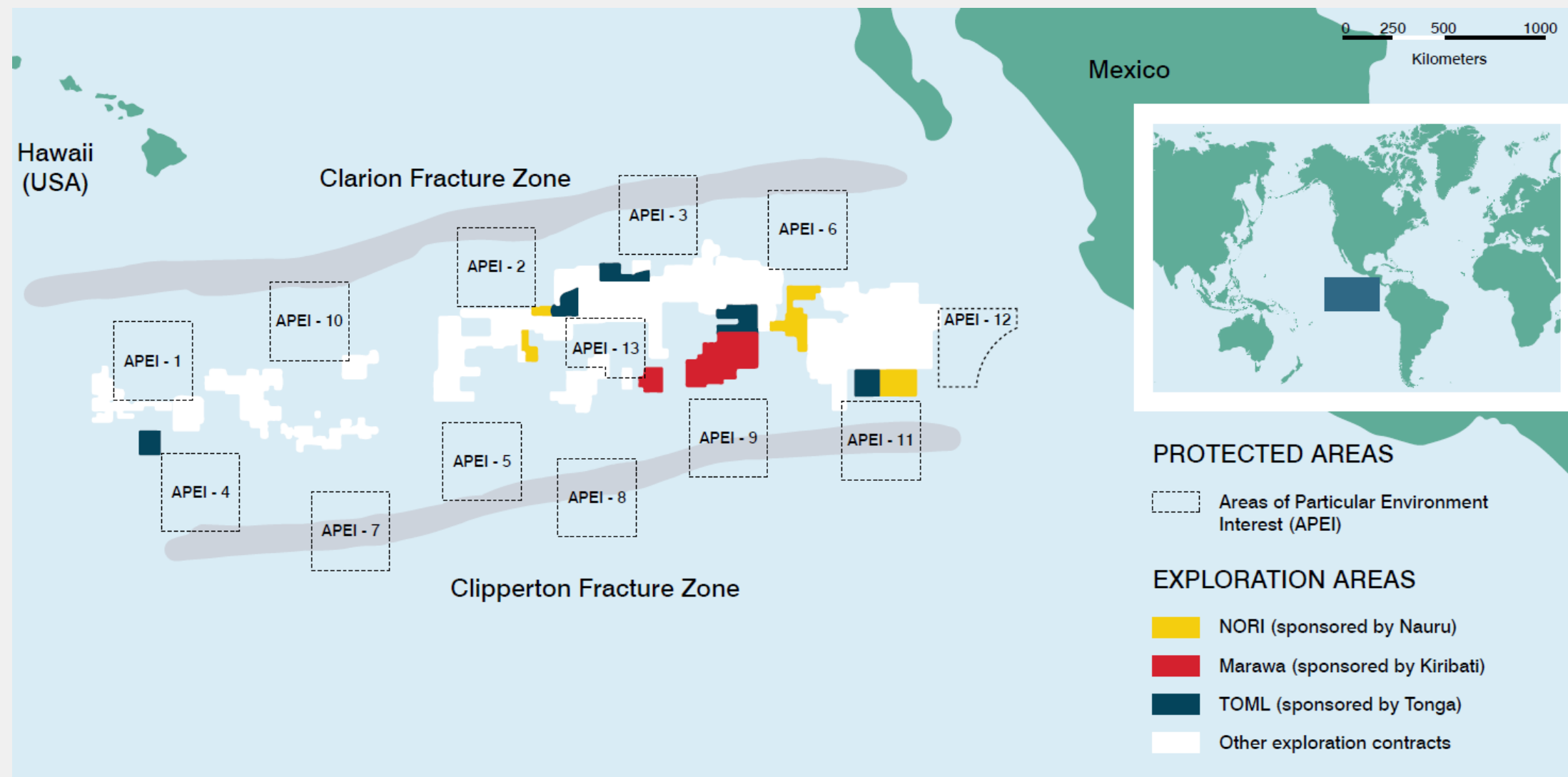
Total estimated CCZ nodule resource  
 U.S. FTA partner  
 Not a U.S. FTA partner



\*CCZ nodules = Clarion-Clipperton Zone polymetallic nodules

Source: USGS 2021 commodity summaries for terrestrial resources; James R. Hein, Kira Mizell, Andrea Koschinsky, Tracey A. Conrad, Deep-ocean mineral deposits as a source of critical metals for high- and green-technology applications: Comparison with land-based resources, Ore Geology Reviews, Volume 51, 2013, Pages 1-14, ISSN 0169-1368, doi.org/10.1016/j.oregeorev.2012.12.001 for CCZ nodules and PCZ crusts

# TMC: technical resource statements issued on NORI + TOML, with an *in situ* estimated resource of Ni, Cu, Co and Mn sufficient to electrify the entire U.S. passenger car fleet<sup>1</sup>.



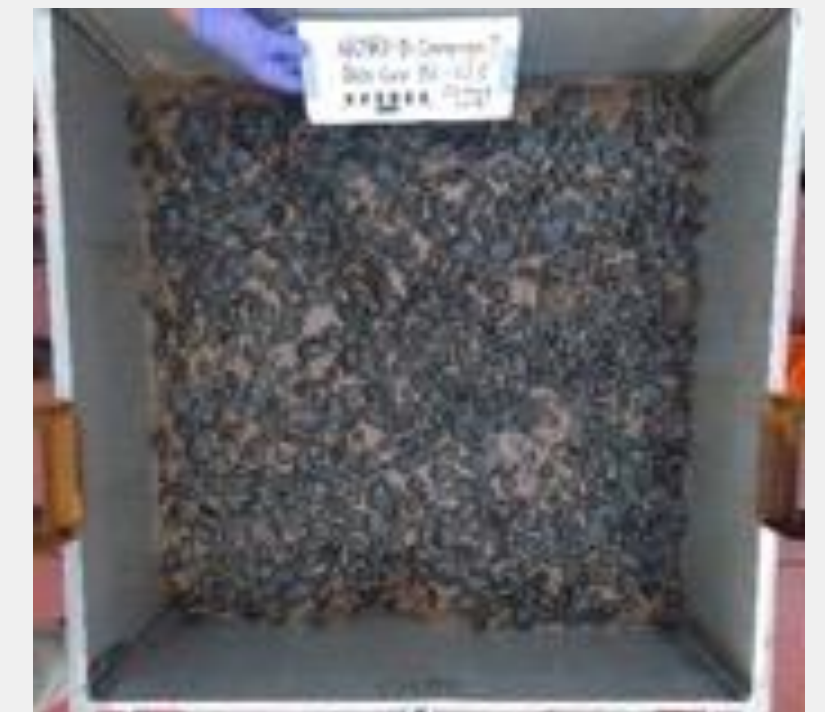
TMC exploration contract area	NORI <sup>2</sup>	TOML <sup>3</sup>	Marawa
Sponsoring State	Republic of Nauru	Kingdom of Tonga	Republic of Kiribati
Exploration area	74,830 km <sup>2</sup>	74,713 km <sup>2</sup>	74,990 km <sup>2</sup>
Technical resource statement	Yes	Yes	Work in progress
Estimated nodule tonnage	<b>866<sup>4</sup></b> million tonnes (wet)	<b>768</b> million tonnes (wet)	
Manganese	29.5%	29.2%	
Nickel	1.3%	1.3%	
Copper	1.1%	1.1%	
Cobalt	0.2%	0.2%	

<sup>1</sup> Assuming 75kWh batteries with NMC811 chemistry and nodule resource grade and abundance, "Where Should Metals for the Green Transition Come From?", Paulikas et al, LCA white paper, April 2020. Calculation based on estimated contained value of nickel.  
<sup>2</sup> SEC Regulation S-K (Subpart 1300) Compliant NORI Clarion Clipperton Zone Mineral Resource Estimate AMC, 17 March 2021. 521 Mt Inferred, 341 Mt, 4 Mt Measured.  
<sup>3</sup> SEC Regulation S-K (Subpart 1300) Compliant TOML Clarion Clipperton Zone Project Mineral Resource Estimate, AMC, 26 March 2021. 696 Mt inferred, 70 Mt Indicated, 2.6 Mt Measured.  
<sup>4</sup> SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, 17 March 2021. 11 Mt Inferred @ 1.4% Ni, 1.1% Cu, 0.1% Co and 31.0 % Mn and 15.6 Kg/m<sup>2</sup> abundance, 341 Mt Indicated @ 1.4% Ni, 1.1% Cu, 0.1% Co and 31.2% Mn and abundance 17.1Kg/m<sup>2</sup>, 4 Mt Measured @ 1.4% Ni, 1.1% Cu, 0.1% Co and 32.2% Mn and 18.6 Kg/m<sup>2</sup>.

# Resource definition: 2D resource allows effective definition through sampling and imagery.

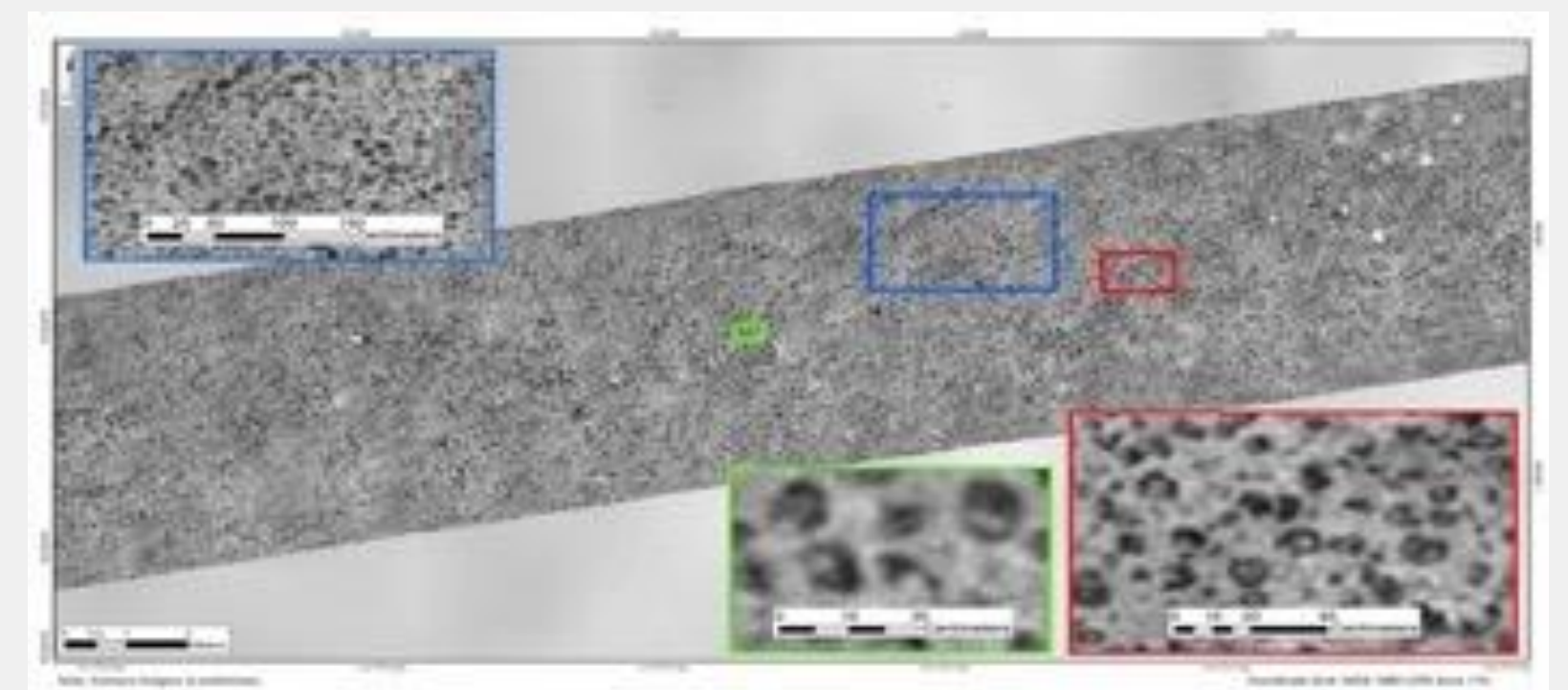
**250**  
box cores collected<sup>2</sup>  
**82,000**  
kg (wet) nodules collected<sup>2</sup>  
**13,950**  
biological samples collected<sup>2</sup>

## BOX CORE SAMPLING<sup>1</sup>



## AUV CAMERA IMAGERY<sup>1</sup>

**178,591**  
km<sup>2</sup> of high-res bathymetric survey<sup>2</sup>  
**5,439**  
km<sup>2</sup> detailed seafloor imagery<sup>2</sup>

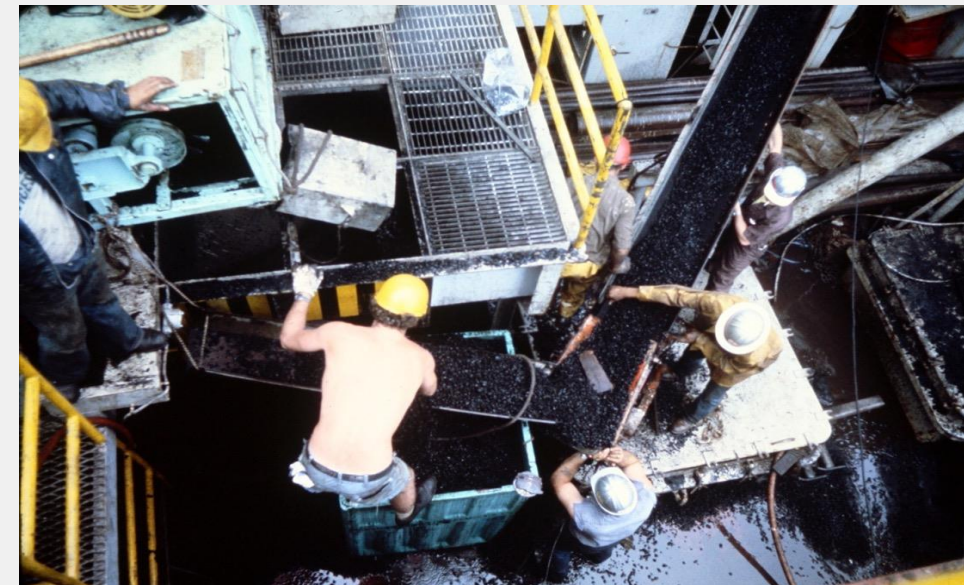


<sup>1</sup> Images from DeepGreen's resource survey offshore campaigns in NORI contract area.

<sup>2</sup> Boxcores, nodules collected, high-res bathymetry, detailed bathymetry – compiled by DeepGreen from - Canadian NI 43-101 and SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, March 2021. Canadian NI 43-101 Compliant TOML Clarion Clipperton-Zone Project Mineral Resource Estimate, AMC, July 2016 and DeepOcean NORI – D Bulk Sampling Report, 2020. Erias Cruise 6a Biological and Physiochemical Co-Sampling Report NORI area D post cruise, 2019; Erias Cruise 6b Biological and Physiochemical Co-Sampling Report NORI area D post cruise report, 2019.

# Nodule collection technology demonstrated in the 1970s.

1970's pilot testing in CCZ



**Kennecott Copper Corp**  
British Petroleum, Rio Tinto-Zinc Corp  
Consolidated Gold Fields  
Noranda Mines, Mitsubishi Corp

**Deepsea Ventures Inc.**  
US Steel, Sun Oil, Union Miniere

**Ocean Management Inc.**  
International Nickel Company  
Metallgesellschaft AG  
Sumitomo, Sedco

**Lockheed**  
Amoco Minerals, Shell Petroleum

Present Day



**Offshore Diamond Mining**  
De Beers, NAMCO, Samicor

# De-risking offshore: Pilot Collection System Test complete; environmental impact monitoring continues.



Completed  
Ongoing/upcoming



## PILOT COLLECTOR SYSTEM TEST PROGRAM 2022

January	Riser acceptance test
February	Thruster re-lift, dockside vessel commissioning, review of nodule offloading & handling test program
Feb 7	LARS load test
Feb 28–Mar 3	Thruster installation
March 2–9	Collector wet function tests in outer harbor
March 12–17	Hidden Gem dynamic positioning trials
March 18–28	Collector drive test in the North Sea
April 6–11	Deep-water test in the Atlantic
April 21–24	Riser deployment test
April 22–May 3	Jumper deployment and connection test
May 3–June 29	Transit to Mexico
June 29–	Mobilization

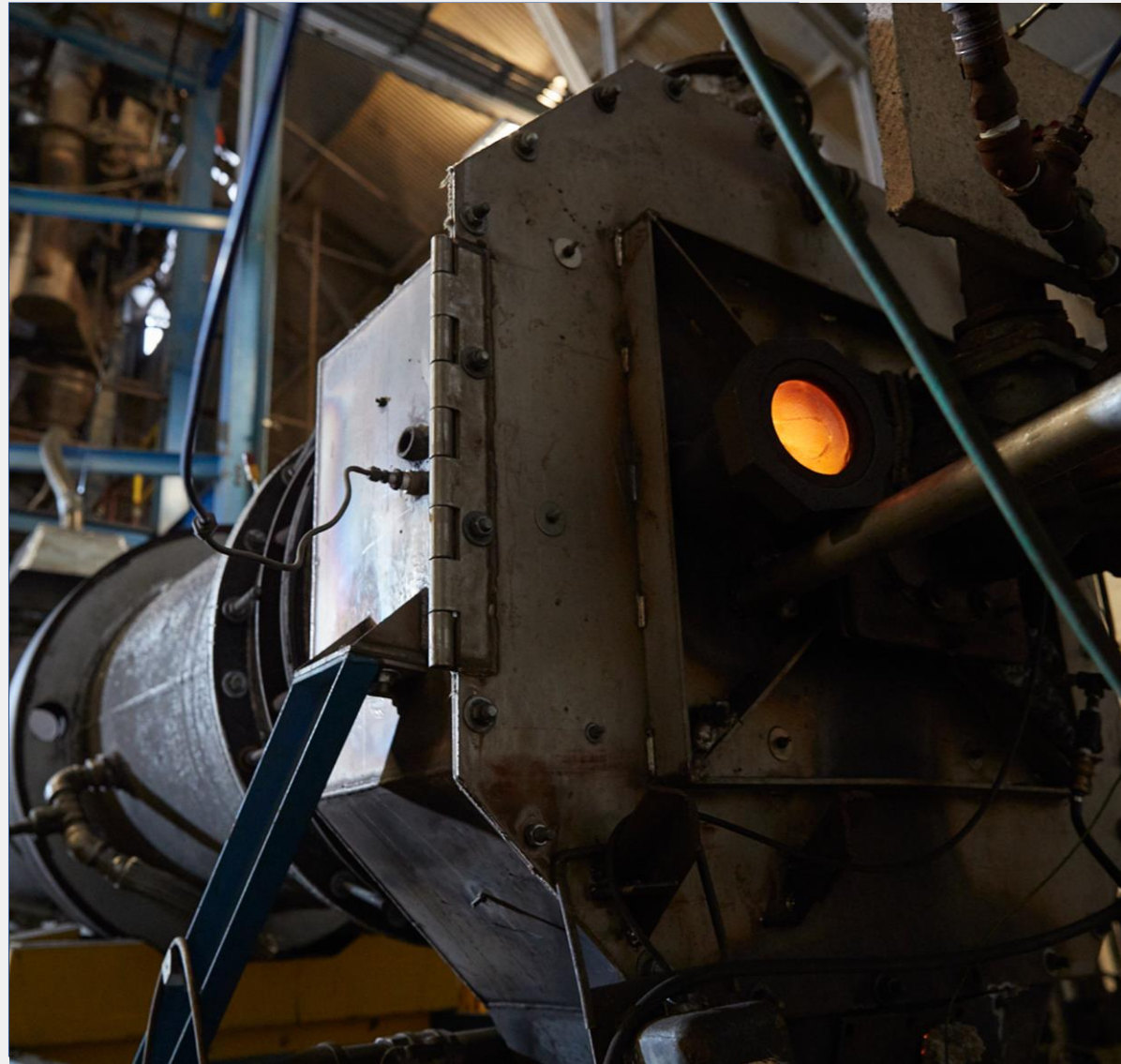
## ENVIRONMENTAL IMPACT MONITORING CAMPAIGN

2021-2022	EIS, EMMP & revisions submitted to ISA
July 8–15	Mobilization
July 15	Pre-collector test survey
Sept 7	ISA recommendation to proceed
Sept-Dec	<a href="#">Pre, during, post environmental surveys</a>

## PILOT TRIALS IN NORI-D

Sept-Dec	Integrated collector test ~4.5k wet tonnes collected, over 3k wet tonnes brought to surface
----------	--

**Onshore, we have demonstrated we can turn nodules into manganese silicate and NiCuCo alloy & matte.**



**Calcining** nodules at FLSmidth's facilities in Whitehall, Pennsylvania.



**Smelting** nodules in an Electric Arc Furnace at XPS facility in Canada. Electrode temperature 1450 degrees C. Smelting results in two products:

- Manganese silicate product
- NiCuCo alloy (intermediate)

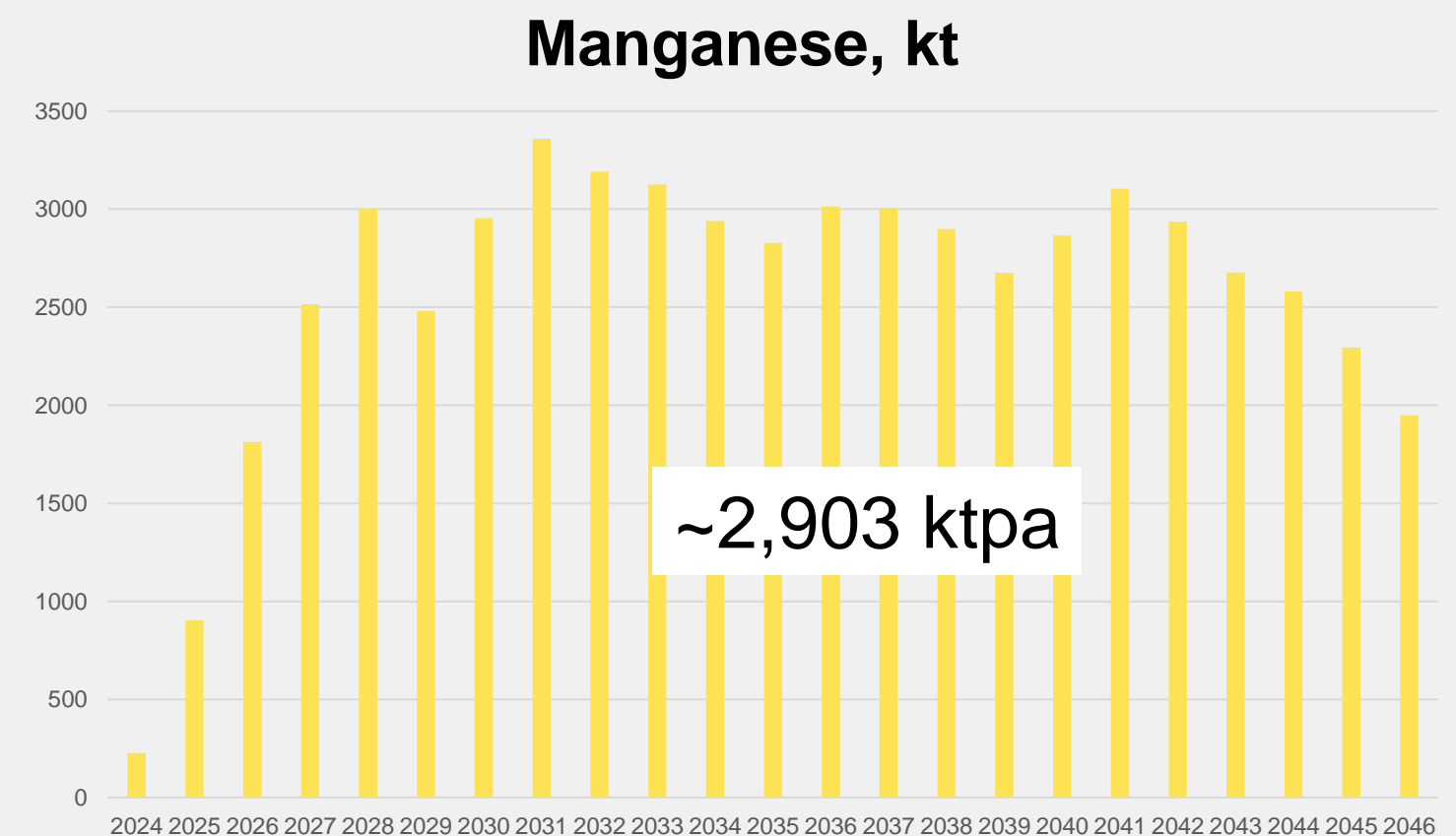
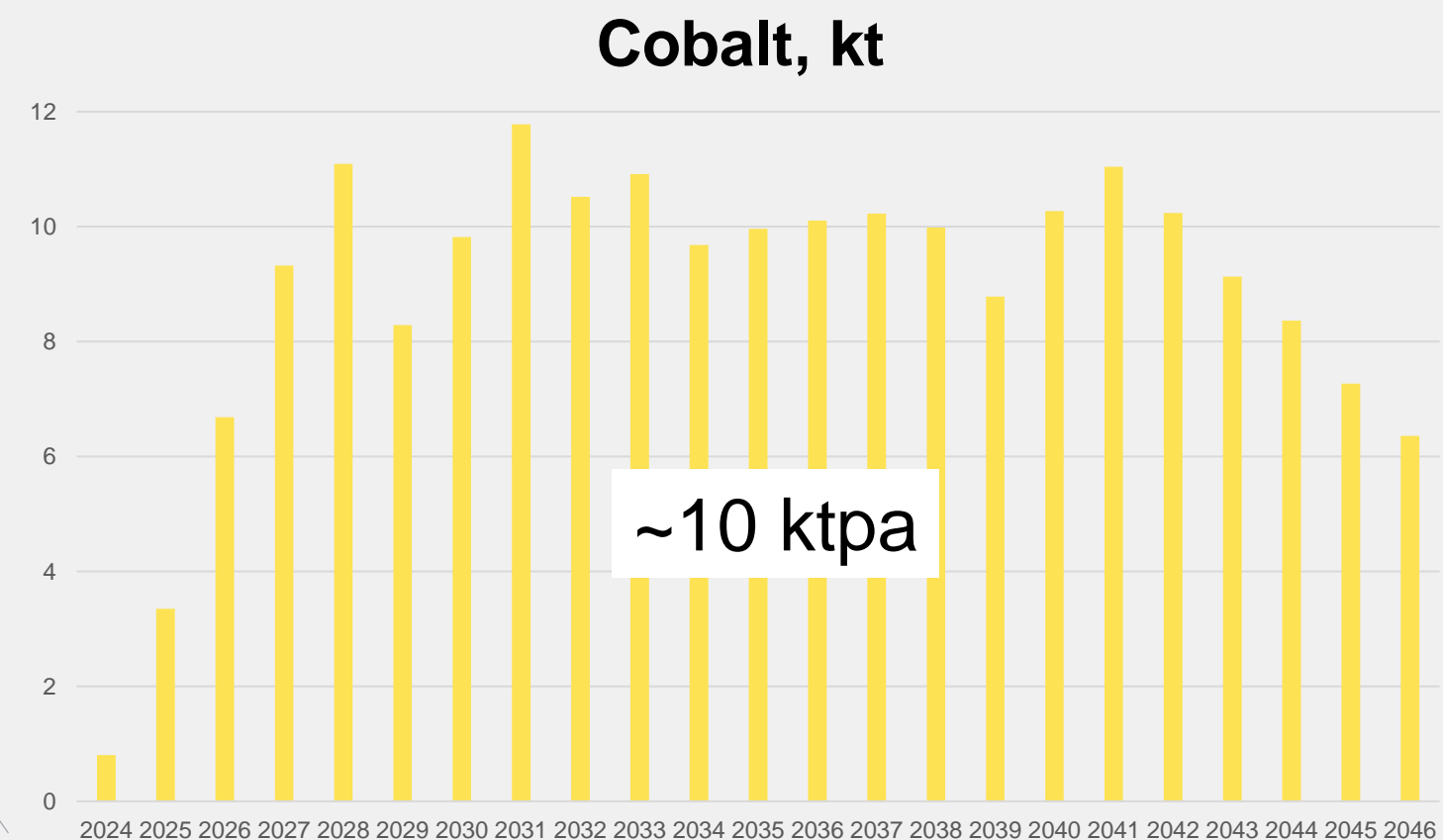
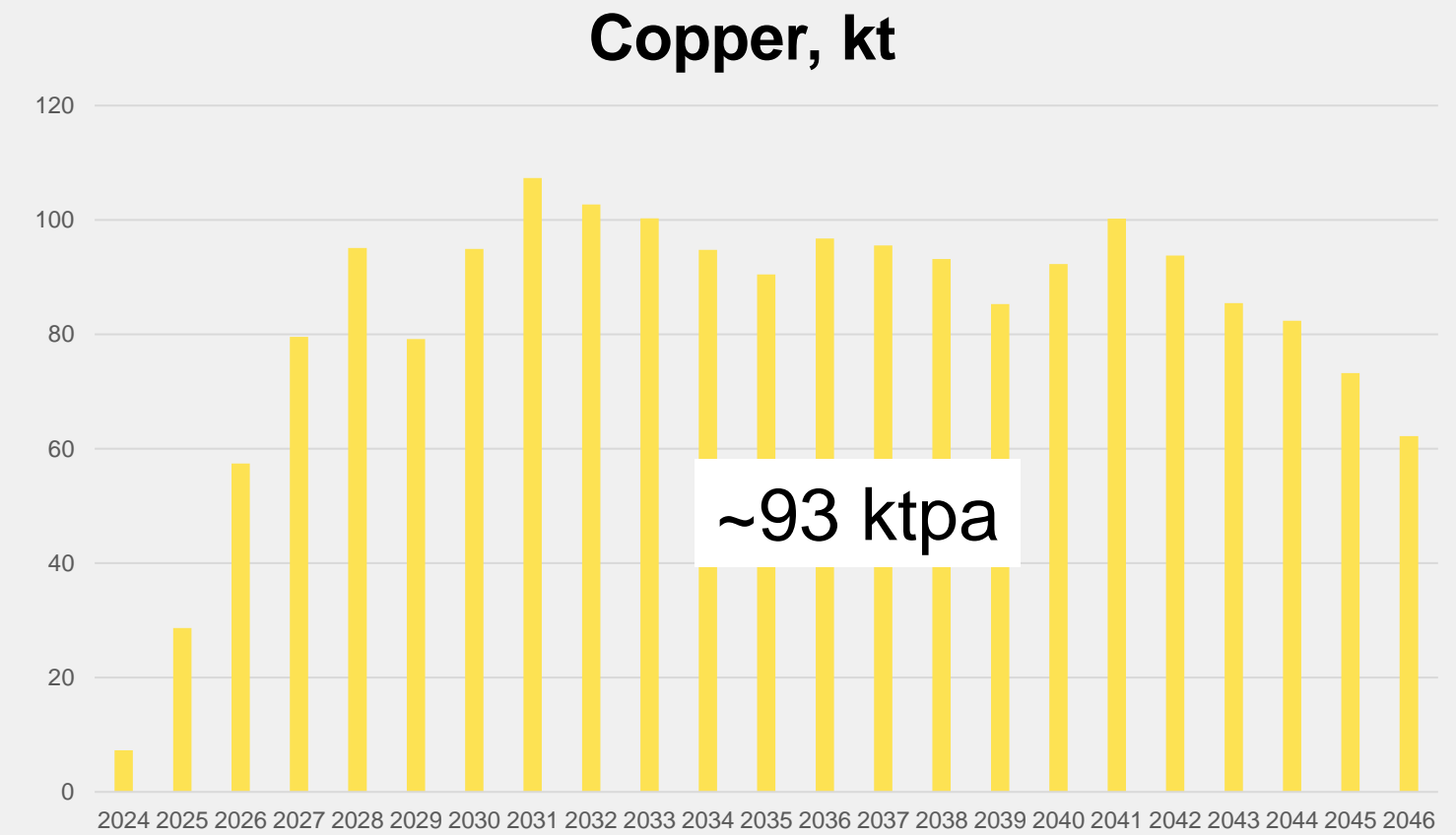
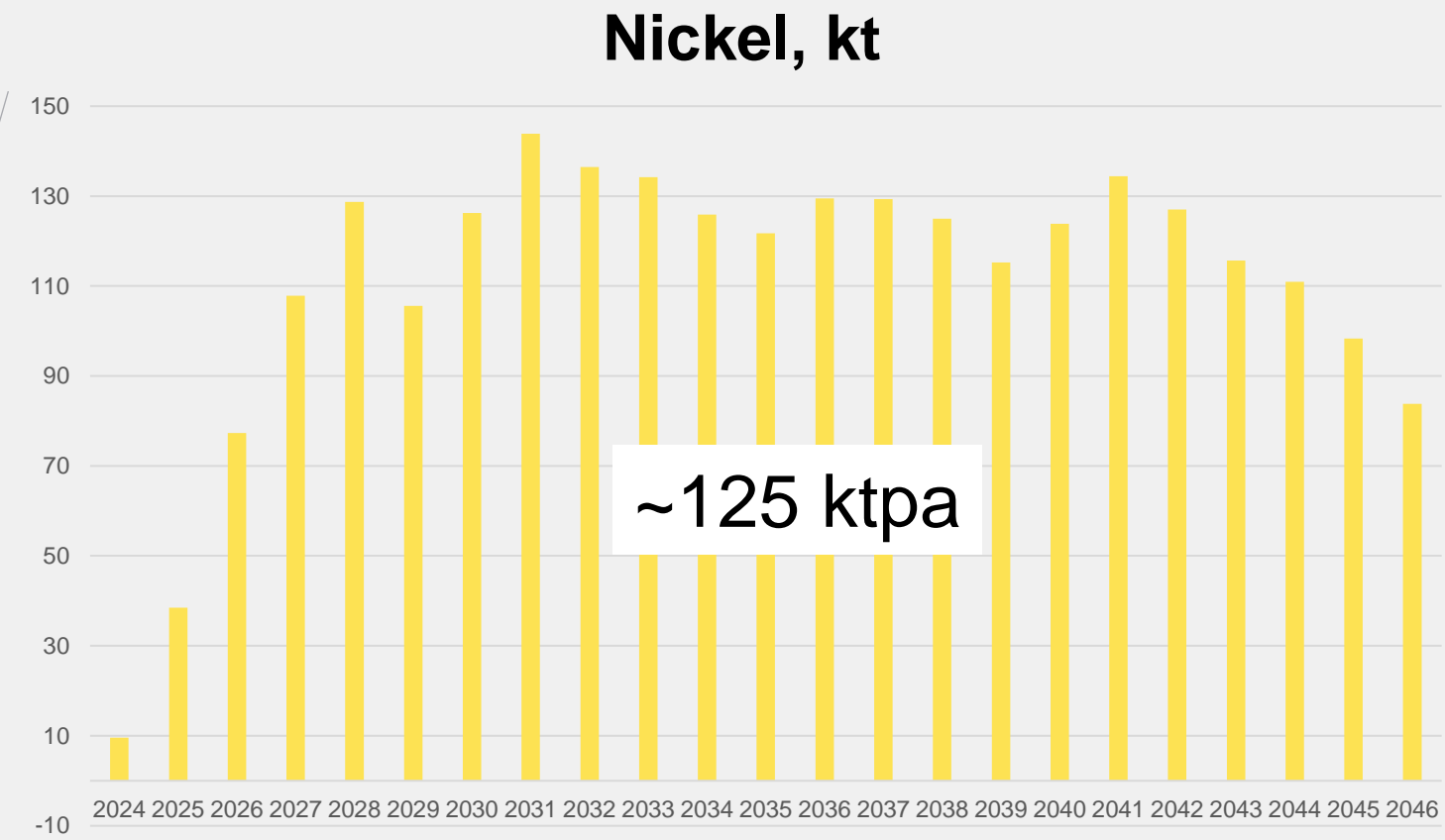


**Converting** NiCuCo alloy into NiCuCo matte (intermediate) at the same XPS facility.



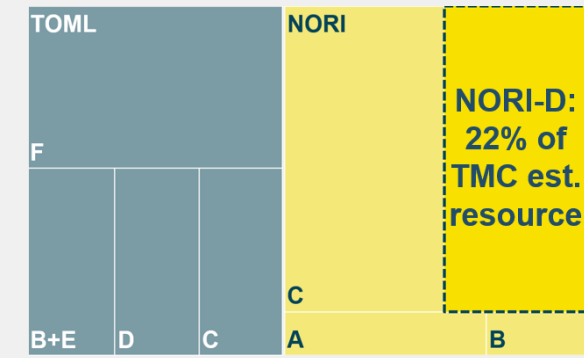
**Matte pour post converting.** End-product is NiCuCo matte.

# NORI-D project: expected production volumes.



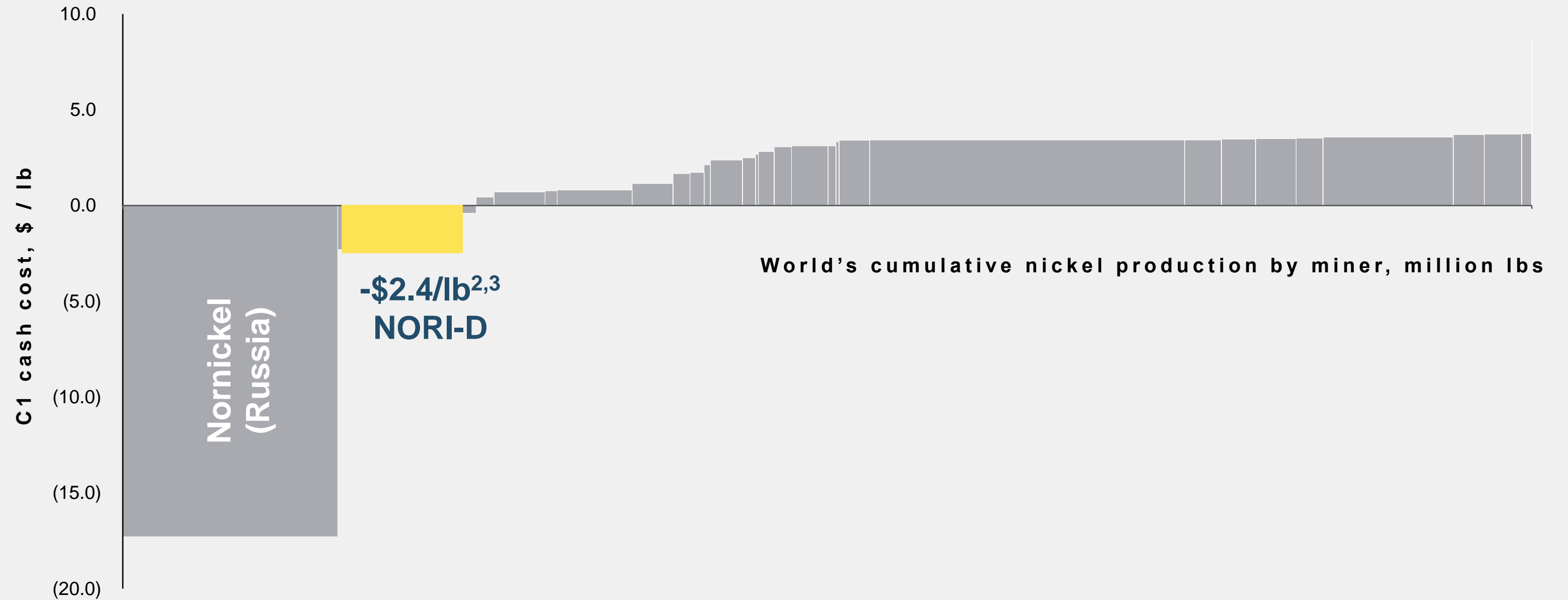
Note: Total NORI-D stable state production including both Project Zero and Project One, 2030-2045 average – based on March 2021 SEC Regulation S-K (Subpart 1300) Compliant NORI Initial Assessment.

# We expect to become the second lowest-cost nickel producer in the world.



## Nickel C1 cost curve on a by-products' basis<sup>1</sup>

C1 Cash Cost represents all direct costs, including mining, processing, freight, SG&A minus revenue from by-products



<sup>1</sup> Nickel C1 Cost Curve, Wood Mackenzie, August 2020.

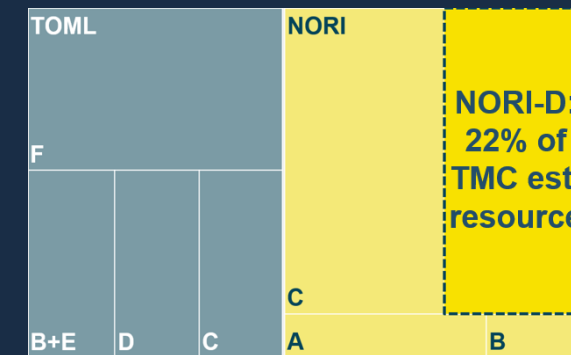
<sup>2</sup> Average for the steady state years 2030-45.

<sup>3</sup> Canadian NI 43-101 Compliant Preliminary Economic Assessment (PEA) for NORI-D Area, AMC, February 2021.

# Near term focus on Project Zero, with plan to scale quickly.

Products	Production <sup>1</sup>
NiCuCo alloy	25Kt
Mn in silicate	303Kt

Products	Production <sup>3</sup>
Nickel	125 Kt
Manganese	2,903 Kt
Copper	93 Kt
Cobalt	10 Kt
Fertilizer	254 Kt



## PROJECT ZERO

1.3Mt (wet)  
1.0Mt (dry)

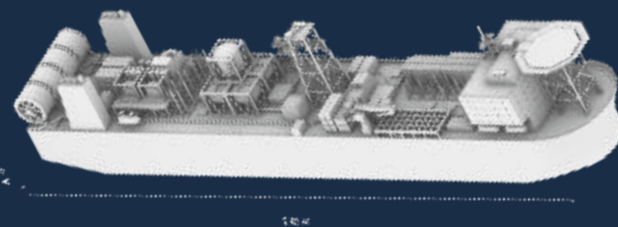
**~\$55M**

Project Zero construction and engineering costs borne by TMC prior to production<sup>2</sup>

## PROJECT ONE

12.5Mt (wet)  
9.5Mt (dry)

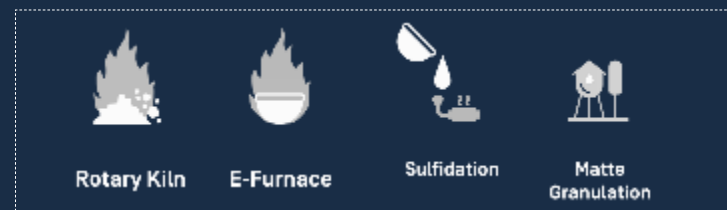
**Production vessels**  
*Hidden Gem acquired*



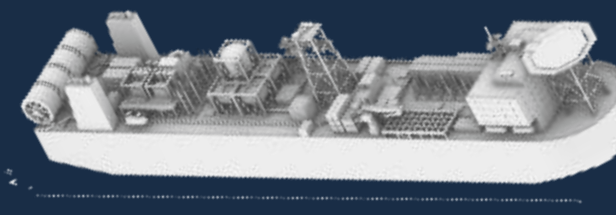
**Collector robots**  
*Completed tests in 2022 for pilot collector (#1)*



**Onshore processing term sheet**  
*Partnering with Epsilon Carbon to address onshore processing*



**Converted drillship**



**Purpose-built collection vessel**



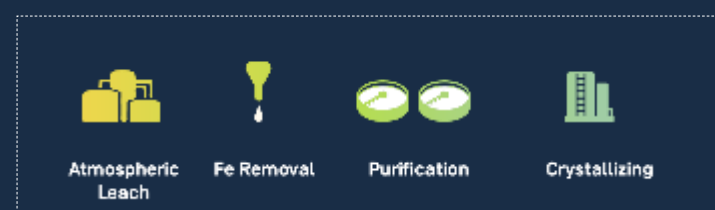
**Support vessel**



**RKEF lines (x4)**  
*New construction*



**Refineries (x2)**  
*New construction*



<sup>1</sup> Production based on 1.3Mtpa (wet) with a single subsea collector.

<sup>2</sup> Assuming definitive agreement reached with Allseas based on the non-binding term sheet signed March 17, 2022.

<sup>3</sup> Total NORI-D stable state production including both Project Zero and Project One, 2030-2045 average.

**Source:** Canadian NI 43-101 and SEC Regulation S-K (Subpart 1300) Compliant NORI Area D Clarion Clipperton Zone Mineral Resource Estimate and associated financial model, AMC, March 2021.

# Marine minerals: why we only focus on nodules.

## Polymetallic nodules



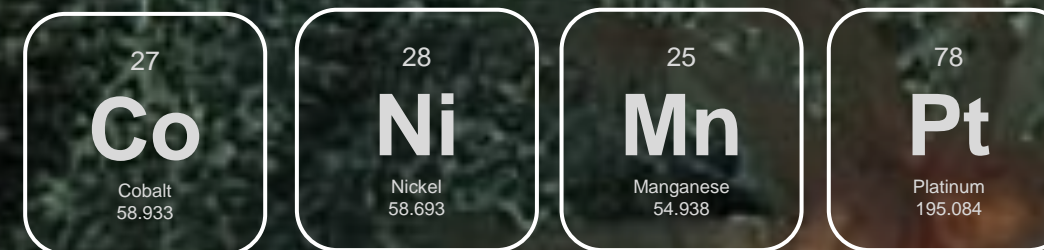
3,800-5,500m depth  
**The Abyssal Plains**

2-30 cm diameter discrete rocks formed by dissolved metal compounds precipitating around a nucleus  
Growth: 10-100mm per million years

Unattached to the seafloor  
Can be collected using gentle water jets directed at nodules in parallel with the seafloor

Low-food, low-energy environment  
**13 grams of biomass / m<sup>2</sup>**

## Cobalt crusts



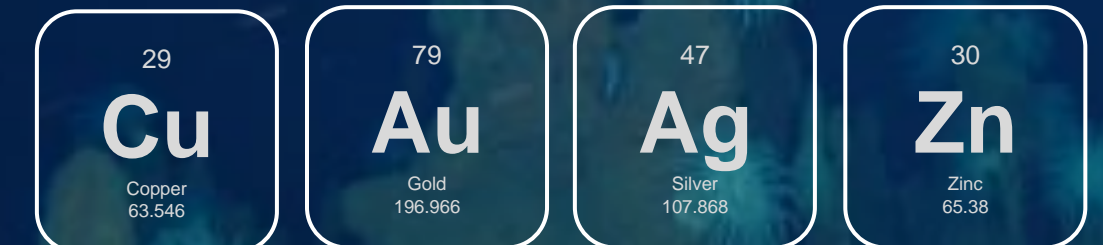
800-2,500m depth  
**Seamounts**

2-26 cm thick, rock-hard, metallic layers that precipitate on the flanks of submarine volcanoes  
Growth: 1-5mm per million years

Integral part of the seafloor that requires hard-rock cutting to break the ore from the substrate

Abundant food supply due to nutrient-rich water upwelling from near-bottom currents  
High frequency destination for tuna and sharks  
**10-100x biomass vs. Abyssal Plain**

## Seafloor massive sulfides (SMS)



1,000-4,000m depth  
**Hydrothermal vents**

Tall chimney-like structures that form at hot vents where sulfide-enriched water flows out of the seabed, causing dissolved metals to bind into minute sulfide particles and sink as fine precipitants to the bottom

Integral part of the seafloor that requires hard-rock cutting to break the ore from the substrate

Abundant food supplied by chemoautotrophic bacteria which exploit energy-rich chemical compounds from the vents  
**100x biomass vs. Abyssal Plain**

Remoteness & depth  
of the site has  
several advantages.

## Biomass on Earth

Contained carbon kg/m<sup>2</sup>

~~Deforestation~~  
~~Child labour~~  
~~Social displacement~~  
~~Destruction of carbon sinks~~

0.01  
Abyssal seabed

3.6  
Land biome average

15-30  
Rainforests (e.g., Indonesia)

**Note:** The seafloor-biomass value incorporates an estimate of seamounts and hydrothermal vents attributed to Wei, et al., 2010. It is also an overestimate because it includes all fish in the water column, rather than focusing only on the seafloor and mid-water column. The overall biomass of earth's ice-free terrestrial area was 472.7 gigatonnes of carbon, compared to 2.49 gigatonnes of carbon for the global abyssal seabed.

**Source:** Bar-On, Phillips, & Milo, 2018; Wei, et al., 2010.