SUMMARY OF THE PRE-FEASIBILITY STUDY TECHNICAL REPORT ON THE IOM POLYMETALLIC NODULES PROJECT IN THE CLARION-CLIPPERTON ZONE (2021)

The report was prepared by a team of experts in geology, mining technology, ship construction, processing technology, environmental research and economy from Zarzecki i Wspólnicy Ltd. (Zarzecki Dariusz, Kołodziejczyk Miłosz, Hendryk Michał), Qvistorp S.A. (Urbanek Marcin) and Interoceanmetal Joint Organization (Abramowski Tomasz, Baláž Peter, Cabello Mario, Dreiseitl Ivo, Mianowicz Kamila, Shiryaev Boris). Resources estimation update was prepared and verified by experts from AGH University of Science and Technology (Mucha Jacek, Wasilewska-Błaszczyk Monika) and the University of Warsaw (Szamałek Krzysztof).

Location

The Clarion-Clipperton Zone (CCZ), located in the eastern tropical Pacific, is considered to be a reserve base of the world's most economically beneficial deposit of polymetallic nodules (PMN, PN). Their economic values are derivative of their chemical composition: polymetallic nodules contain nickel, manganese, cobalt, copper, zinc and other economically valuable components. Market of these metals and nickel, cobalt and copper in particular, is expected to be continuously growing due to increasing demand for batteries for electric mobility (environmentally motivated transition to green society).

Interoceanmetal Joint Organization (IOM) operates in the CCZ for more than 30 years now, conducting the exploration work within its license area covering 75 000 km^2 and granted in a form of contract by the International Seabed Authority (the ISA). One of the key responsibilities of the ISA, within legal frames defined by the 1992 United Nations Convention on the Law of the Sea (UNCLOS) and the 1994 Implementation Agreement, is governance of the development of seabed resources in the Area (beyond the limits of national jurisdiction).

IOM is the intergovernmental institution sponsored by six countries: Poland, the Czech Republic, Slovakia, Bulgaria, Cuba and the Russian Federation. Exploration work of IOM focuses on geologic, environmental, economic and technologic aspects of the future possible exploitation of polymetallic nodules. The IOM claim area consists of two sectors: B1 and B2 with four exploration blocks H11, H22, H33 and H44 located in sector B2, delineated as the most prospective (in terms of nodules abundances) areas (Fig. 1).

Resources estimation

Resources estimation is based on data collected during scientific expeditions carried out by IOM. So far, four reports using geostatistical data analysis have been prepared (2007, 2011, 2015 and 2020) and two validations performed by the Competent Person (2016 and 2020). The current state is shown in Tab. 1. The resource validation was carried out in accordance with Annex V of the Recommendations for the guidance of contractors on the content, format and structure of annual reports (ISBA/21/LTC/15): Reporting standard of the International Seabed Authority for Mineral Exploration

Results Assessments, Mineral Resources and Mineral Reserves. The effective date for the estimate is August 2020. No mineral reserves were estimated at this stage of the project development.

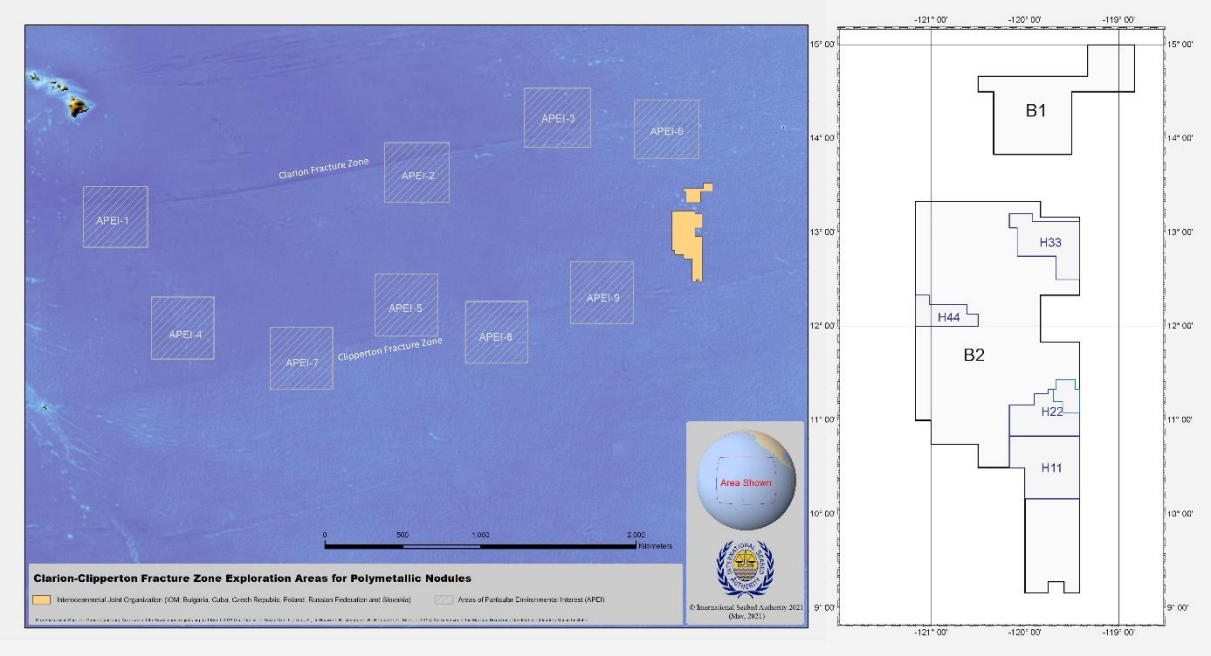

Fig. 1 The IOM claim area in the CCZ, Eastern Tropical Pacific (ISA, 2018, modified)

Estimates of resources and abundance of nodules and metals were carried out in square elementary blocks with a side of 500 m using kriging and co-kriging. The estimates used 8 nearest sampling stations, two from each quadrant (quarters) into which the circular data search zone was divided. The center of the circular data search zone coincides with the center of the elementary block. In the calculation procedure, isotropic models of variograms, cross-variograms, covariance and cross-co-variance were used. The total resources of polymetallic nodules of the exploration blocks and ore fields (ore bodies), for different values of maximal the ocean-floor slopes, were obtained by summation of resources estimated for elementary blocks.

The accuracy of resource estimation in blocks H11+H22 and in block H22_NE is high as evidenced by small, standard kriging errors in the range of 3-6%. The resources of nodules in blocks H33 and H44, expressed by standard errors from the 8-12% range, are estimated with much lower accuracy. The different size of errors is the result of the different density of the bottom sampling in individual blocks.

The dependency the tonnage of nodules and mean abundances in relation to the minimum abundance of wet nodules in B2 Sector is illustrated in Fig. 2.

Tab. 1 Mineral resource estimate of wet polymetallic nodules in the IOM Exploration Area. Cut-off 10 kg/m^2 of wet nodules - without volcanoes, seabed areas free of nodules and areas sloped over 7°

Mineral Resource Classification	Mean Abundance (kg/m^2)	Mn (%)	Ni (%)	Cu (%)	Co (%)	Zn (%)	REE (ppm)	Resources Wet (Mt)
Measured (H22_NE block)	14.6	29.19	1.31	1.25	0.18	0.15	713	12.2
Measured Total								**12.2**
Indicated (H11 + H22 blocks)	12.4	31.37	1.30	1.29	0.16	0.16	-	77.0
Indicated Total								**77.0**
Inferred (B1 sector)	13.4	27.84	1.21	0.90	0.21	-	-	62.6
Inferred (H33 block)	12.0	32.35	1.41	1.20	0.18	0.15	-	21.8
Inferred (H44 block)	11.5	30.71	1.32	1.19	0.19	0.14	-	13.6
Inferred (B2 sector other)	11.59	30.90	1.32	1.21	0.18	0.15	-	85.3
Inferred Total								**183.3**
Grand Total								**272.5**

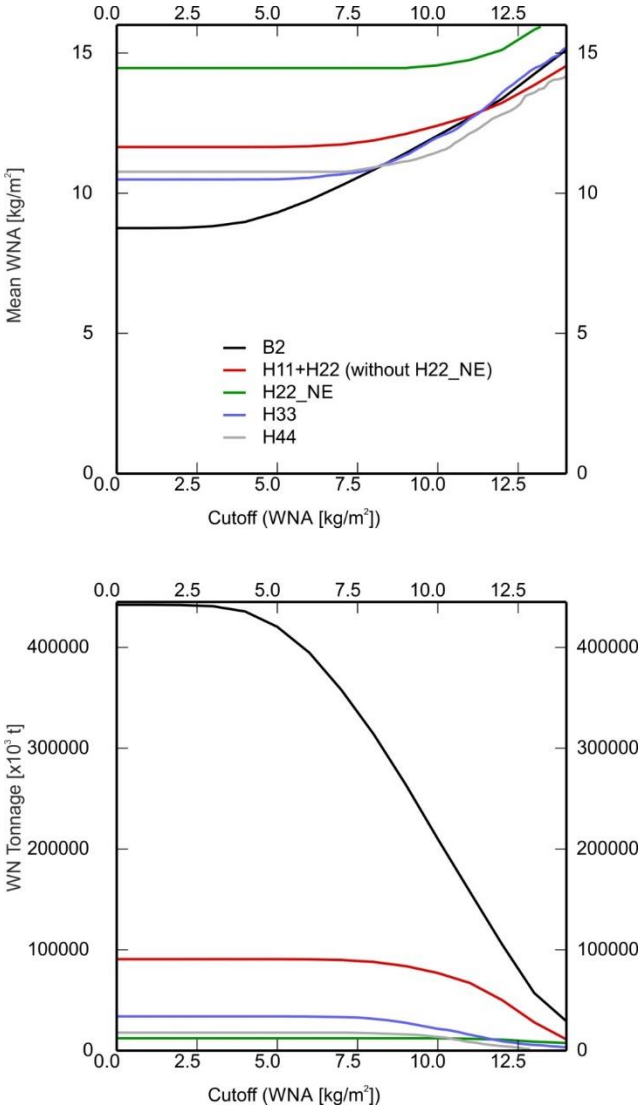

Fig. 2 Graph of the dependence of the average abundance of wet nodules (top) and the tonnage of wet nodules (bottom) on the cut-off value of the abundance of wet nodules (WNA); seabed slope ≤7°

Economic assessment

For over 10 years, IOM has been considering various scenarios for the implementation of the polymetallic nodule mining project, taking into account data collected during more than 30 years of exploration. Results of the works were used to define the optimal business model of the project, determine its scale and technical scope. An in-depth analysis of alternative project's options led to the development of the project assumptions, which are the basis for the present pre-feasibility study.

The scope of the financial part of this project contains the mining part of polymetallic nodules and their sale (without processing). The scale of the project is assumed to be of the level of annual production of 1.5 million tons of wet PMN during ~24 years of operation. Such assumption of the production capacity causes a significant decrease in the required capital expenditure and minimizes the project's market risk at this stage of project implementation. The project's scope, scale and duration are tailored in a way enabling further upscaling of nodules extraction and expansion of the value chain as well as extension of project duration.

Two scenarios of mining activities were analyzed for purposes of the pre-feasibility study, differing in methods of securing the mining vessel. The option of bareboat charter (Scenario 1) and building own ship (Scenario 2) are considered.

The technical scope of both project's variants consists of the following elements:

- Seafloor Mining Tool (SMT),
- Riser and Lifting System (RALS),
- Production Support Vessel (PSV),
- Dewatering plant (DWP),
- PMNs transportation to the port of Moa, Cuba,
- PMNs storage at an onshore stockpile facility,
- Load-out and transportation to a processing facility or to the market.

SMT will be used to excavate the polymetallic nodules from the seafloor. The excavated material will be crushed and pumped as slurry to the Production Support Vessel (PSV) via the RALS. The pumped slurry will be dewatered at surface (DWP) and then be transferred to bulk carriers for transportation to Moa, Cuba.

Scenario 1

Scenario 1 is a variant which assumes the extraction of 1.5 Mt of wet polymetallic nodules and sale of raw ore to Moa Bay plant or any other buyer. Such an assumption is considered to be one of the most realistic scenario of the IOM project at the current stage of project development. Production Support Vessel (PSV) is leased, the main profitability factor is the price and sales volume of raw ore. The main assumptions of Scenario 1 are shown in Tab. 2, the results of the economic analysis are in Tab. 3 and Fig. 3.

Tab. 2 The main assumptions of Scenario 1

Type of investment project:	Green field
Period of resource extraction:	20 years
Construction time:	4 years
Annual mining availability:	292 days
Ramp-up:	Year 1: 50% of capacity (0.75 wet Mt of PN) Year 2: 75% of capacity (1.125 wet Mt of PN) Year 3-20: 100% of capacity (1.5 wet MT of PN)
Total CAPEX:	$910.2M
Annual OPEX (at full capacity utilization):	$173.0M per year
Extraction OPEX:	$122.7M per year
Transport OPEX:	$34.2M per year
Royalties	Year 1: $4.0M; Year 2: $6.1M; Year 3-5: $8.1M; Year 6-20: $16.1M
OPEX / mt	$173.0 / ton
Extraction OPEX:	$122.7 / ton
Transport OPEX:	$34.2 / ton
Royalties	Year 1: $4.0 / ton; Year 2: $6.1 / ton; Year 3-5: $8.1 / ton; Year 6-20: $16.1 / ton
PN price calculation method:	pure metal value contained in PMN less processing OPEX, taxes and processor's margin
Sales volume	100% of extracted raw ore
Revenue / mt	$403.63 / ton
WACC (real; 50% debt):	13.0%

Tab. 3 Scenario 1 – the results of the economic analysis

Item	Unit	Output
Net Present Value (NPV)	USD millions	127.41
Internal Rate of Return (IRR)	%	21.49%
Modified Internal Rate of Return (MIRR)	%	11.86%
Average Yearly Return on Capital Employed (ROCE)	%	5.50%
Equivalent Annual Annuity (EEA)	USD millions	16.93
Profitability Index (PI)	ratio	1.61
Discounted Payback Period (dPP)	years	16.37
Total EBITDA	USD millions	4,420.30
Average Yearly EBITDA	USD millions	138.13
Total Project EBIT	USD millions	3,595.47
Average yearly Project EBIT	USD millions	112.36
Total CAPEX	USD millions	910.21

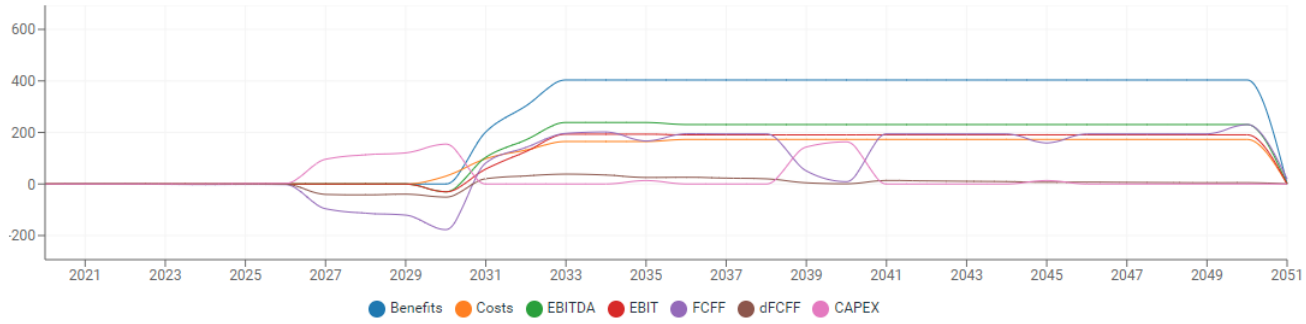

Fig. 3 Scenario 1 – the forecasted outcomes (EBITDA - earnings before interest, taxes, depreciation and amortization, EBIT - earnings before deducting interest and taxes, FCFF - Free Cash Flow to the Firm, dFCFF – Discounted Free Cash Flow to the Firm)

Scenario 2

Similar to Scenario 1, Scenario 2 assumes the extraction of 1.5 Mt of wet polymetallic nodules and sale of raw ore to Moa Bay plant or any other buyer. The main difference is that under Scenario 2 the PSV is purchased, thus it is considered as part of CAPEX. Other assumptions were left unchanged. The main assumptions of Scenario 2 are shown in Tab. 4, the results of the economic analysis are in Tab. 5 and Fig. 4.

Tab. 4 The main assumptions of Scenario 2

Type of investment project:	Green field
Period of resource extraction:	20 years
Construction time:	4 years
Annual mining availability:	292 days
Ramp-up:	Year 1: 50% of capacity (0.75 wet Mt of PN) Year 2: 75% of capacity (1.125 wet Mt of PN) Year 3-20: 100% of capacity (1.5 wet Mt of PN)
Total CAPEX:	$1,365.2M
Annual OPEX (full capacity utilization):	$141.4M per year
Extraction OPEX:	$91.0M per year
Transport OPEX:	$34.2M per year
Royalties	Year 1: $4.0M; Year 2: $6.1M; Year 3-5: $8.1M; Year 6-20: $16.1M
OPEX / mt	$168.8 / ton
Extraction OPEX:	$91.0 / ton
Transport OPEX:	$34.2 / ton
Royalties	Year 1: $4.0 / ton; Year 2: $6.1 / ton; Year 3-5: $8.1 / ton; Year 6-20: $16.1 / ton
PN price calculation method:	pure metal value contained in PMN less processing OPEX, taxes and processor's margin
Sales volume	100% of extracted raw ore
Revenue / mt	$403.63 / ton
WACC (real; 50% debt):	13.0%

Tab. 5 Scenario 2 – the results of the economic analysis

Item	Unit	Output
Net Present Value (NPV)	USD millions	37.23
Internal Rate of Return (IRR)	%	15.11%
Modified Internal Rate of Return (MIRR)	%	10.30%
Average Yearly Return on Capital Employed (ROCE)	%	3.95%
Equivalent Annual Annuity (EEA)	USD millions	4.95
Profitability Index (PI)	ratio	1.10
Discounted Payback Period (dPP)	years	24.83
Total EBITDA	USD millions	5,082.85
Average Yearly EBITDA	USD millions	158.54
Total Project EBIT	USD millions	3,803.07
Average yearly Project EBIT	USD millions	118.85
Total CAPEX	USD millions	1,365.17

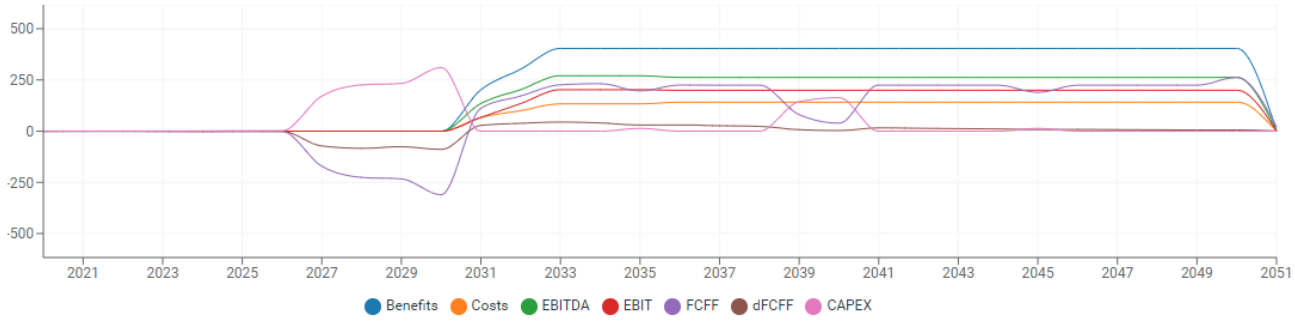

Fig. 4 Scenario 2 – the forecasted outcomes (EBITDA - earnings before interest, taxes, depreciation and amortization, EBIT - earnings before deducting interest and taxes, FCFF - Free Cash Flow to the Firm, dFCFF – Discounted Free Cash Flow to the Firm)

Conclusions

The results of the economic evaluation of the IOM project in both Scenario 1 (Internal Return Rate, IRR: 21.5%; hurdle rate: 13.0%; probability of NPV lower than zero, based on Monte Carlo simulation: 9.78%) and Scenario 2 (IRR: 15.1%; hurdle rate: 13.0%; probability of NPV lower than zero: 19.53%) are promising and economically justify the continuation of the project. However, it should be emphasized that the scenarios are still based on limited information sources (e.g. PMN price estimation process) and conservative assumptions (e.g. 50% CAPEX contingency). It is anticipated that, in coming years, the level of development of methods of mining and metals extraction from PMN will be constantly increasing, which will, in turn, result in continuous clarification of matters that are today insufficiently recognized.

Certain level of the project uncertainty is associated with a range of challenges that IOM has and will have to manage. This includes, in particular, risks related to legal personality of IOM, the potential changes in the ISA licensing or environmental law, matters related to policies (incl. environmental),

limitations and advancements in technology applied in project, fluctuations of market conditions or higher than assumed investment expenditures. The main barrier to the commercial launch of such projects today is the state of technology (both in the area of extraction and metal refining). However, it is anticipated that, in coming years, the currently existing technological barriers will be overcome and the first contractors will commence their commercial activities of polymetallic nodules exploitation.

Based on the economic evaluation, the IOM project can be described as an investment with risk factors. Nevertheless, it has also great economic potential due to growing market demand for battery metals which cannot be met by traditional sources (onshore, recycling, extraction from exclusive economic zones). Growing market demand for these metals will translate to increasing project profitability. IOM – or entity created on the basis or with participation of IOM – may become one of the relevant actors in the process of world's transition to clean energy and electric transportation. The implementation of the IOM project has thus not only business dimensions, but also supports social and environmental goals which are of high importance for variety of stakeholders.

In order to optimize the project, at this stage of its implementation, IOM identifies the potential developments with focus at the project risk reduction:

- in the field of organizational aspects:
    - transformation of IOM into a commercial law company with a clear division of shares, contributions to project profits and costs,
    - acquiring and developing the necessary project resources,
    - searching for strategic partners in the area of technology and sales,
    - adaptive management connected with monitoring of external factors (policies, legal framework, market conditions)
- in the field of technological aspects:
    - developing the methods of mining and metal extraction to ensure mining efficiency and profitable sales of raw ore,
    - identifying the potential cost reduction paths.
    - and sales.