Components of Financial Model – Glossary of Terminology

No	Item	Description	Comment	Source/Link
Project Timing & Phases				
For deep ocean polymetallic nodules (PN) exploitation to become a reality, a sound regulatory regime is required that provides for the objective assessment of a project from geological, technical, economic, financial, environmental and social standpoints prior to the issuance of a mining license. In the PN exploitation context, a feasibility study will be the process and provide the benchmarks by which a company demonstrates to the ISA, host or sponsoring countries, financiers, possible partners and others that all relevant challenges surrounding a deep ocean mining project can be overcome to develop a safe, viable and profitable mining project with sufficient revenue to contribute to the development of the common heritage of mankind. (ISA, Tech Study 11, 2013)			
1	Pre-Feasibility (These cash flow estimates are expected to be +/- 25% accurate with a probability of 85%).	Pre-feasibility studies usually include a range of options for the technical and economic aspects of a project and are used to justify continued exploration, to complete the required project permitting or to attract a joint venture partner. The overriding aim of a pre-feasibility study is to select the preferred option, also known as base case scenario, for the project development, which commonly factor in mine access, mining and processing methods After exploration, a contractor generally undertakes a pre-feasibility study to determine, according to its own in-house criteria, whether there is a sufficient resource and whether favorable conditions exist to justify commissioning a full feasibility study to be used to seek funding and government approval for a mining license. (ISA, Tech Study 11, 2013)	May be used to provide the first indications of economic viability. Commonly used as a cost effective method of evaluating alternative concepts. Also used in making bid and/or acquisition decisions and to justify additional drilling or other project investigations. Duration: 4-6 years Expected to be 100% Equity finance.	Chapter 4: https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study AMEC Capital Cost Estimating

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2	Feasibility (These estimates are expected to be +/-15% accurate with a probability of 85%)	According to NI 43-101, a feasibility study is a "comprehensive study of a mineral deposit in which all geological, engineering, legal, operating, economic, social, environmental and other relevant factors are considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production." During the feasibility stage, a contractor would be focused on a pilot mining and processing tests, conditional to having a regulatory framework in place that allows for the eventual exploitation of marine minerals according to its rules and regulations.	To provide a high level of accuracy with defined and managed risks. These estimates can be used to support the final Economic viability assessment and decision and secure project funding. This kind of feasibility study is also known as a 'bankable feasibility study' as it includes confidence levels of reserves and resources and cost estimates that are sufficiently precise for a bank to determine whether to lend money for the project (Nethery, 2003). Duration: 2-6 years Expected to be 100% Equity finance.	Chapter 4: https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study AMEC Capital Cost Estimating
3	Construction	Once all licensees are in place and approval has been granted to proceed, the contractor will be able to look for financing for the construction of the infrastructure.	Duration: 3-4 years Expected to be a mix between equity and debt finance.	
Project Production Data				
4	Annual Tonnes of Nodules Collected	The amount of dry metric tonnes collected annually of Polymetallic Nodules from the CCZ.	Additional variables include days available for collection, design of collector width, speed, and nodule transportation and processing rates. [Attention: A clear distinction needs to be made between wet and dry nodules. (Water content?)]	http://drs.nio.org/drs/handle/2264/3943

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5	Metal Ore Content (Grade)	The percentage by weight of metal ore per metric tonne for Nickel, Copper, Cobalt and Manganese. Note: The nodules represent the ore, containing minerals. Once extracted (processed) these minerals become metals.	Each Claimholder may either utilize published ore content or complete collected nodule assay test results. For nodules, this is measured for "dry" nodules.	http://drs.nio.org/drs/handle/2264/3943
6	Recovery/Yield	The amount (in %) of metals that can be recovered from the available minerals in the ore.	Various processing techniques will have a different recovery (yield) rate for each metal.	
7	Operational Mine Life	The years of mine production to be included in the cash flow analyses. [This is different from total mine life. (i.e., operational mine life should represent the years required to depreciate the required infrastructure)]	It was discussed at the San Diego Payment Regime Workshop that 20-30 years were utilized by those contractors in attendance. (Time from license to production?)	http://drs.nio.org/drs/handle/2264/3943
Capital and Operational Expenditures				
8	Collection System-CAPEX	The design, development, production and testing in the pre-feasibility, feasibility and construction phase for a collector and riser and lift system for the polymetallic nodules. Design and development will be based on equity capital contributions. Once proven, we may expect a debt/equity mix.	The total capital required will be based on the system engineering and prototype development phase of the project. ISA Exploitation Regulations may impact Collection System capital estimates.	http://drs.nio.org/drs/handle/2264/3943
9	Surface Vessels-CAPEX	The design, development, production and testing in the pre-feasibility, feasibility and construction phase for a mining ship, transport bulkers, and other surface vessels to transport the polymetallic nodules to the processing plant location.	The total capital required will be based on the system engineering and prototype development phase of the project. ISA Exploitation Regulations may impact Surface Vessel capital estimates.	http://drs.nio.org/drs/handle/2264/3943

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10	Processing Plant-CAPEX	The design, development, production and testing in the pre-feasibility, feasibility and construction phase for a processing plant, including the labor, electricity, fuel, chemicals and storage required process the polymetallic nodules.	The capital required will be based on the system engineering and prototype development phase of the project. The location of the processing plant will be evaluated based on optimizing operating expenses (OPEX) and permitting timelines. ISA Exploitation Regulations may impact Processing Plant capital estimates.	http://drs.nio.org/drs/handle/2264/3943
11	Recapitalization Estimates	Each capital item will have a "useful" life in which a retrofit/upgrade will be required to ensure optimal usage rate. A percentage of the original capital estimate may be used to "recapitalized" the asset and extend the life. A hot spare may be required on board to limit downtime for the collection unit.	The life cycle concept of operations will need to be reflected along with the associated impacts to available mining operational days. Collector, Riser and Lift Systems are expected to have the highest recapitalization costs as they have the shortest life cycle.	http://www.investopedia.com/terms/c/capital-investment.asp
12	Capital Development Period of Performance	Each segment of the system will have a capital development timeline based on the results of the prototypes.	Equity and debt financing requirements will be based on these developed timelines.	
13	Collection System OPEX	The annual operating expense for the collection system, including labor, other direct costs, and maintenance.	The ISA Exploitations Regulations may impact the Operating Expense for the Collection System	http://drs.nio.org/drs/handle/2264/3943
14	Surface Vessels OPEX	The annual operating expense for the surface vessels including labor, other direct costs, fuel, and maintenance.	The ISA Exploitation Regulations may impact the Operating Expense for the Surface Vessels.	http://drs.nio.org/drs/handle/2264/3943
15	Processing Plant OPEX	The annual operating expense for the processing plant including labor, electricity, chemicals, fuel, and maintenance and on site permit expense.	The ISA Exploitation Regulations may impact the Operating Expense for the Processing Plant.	http://drs.nio.org/drs/handle/2264/3943

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16	Working Capital Percent of Sales	Working capital is the amount of funds which are necessary to an organization to continue its on-going business operations, until the firm is reimbursed through payments for the goods or services it has delivered to its customers.	A percentage of sales may be an assumption used to derive working capital. This would result in a negative cash flow early as the project is constructed begins operations and before generating any sales revenue.	http://www.investopedia.com/ask/answers/102315/what-can-working-capital-be-used.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186
17	Production Phase-in Period	Ramp up is a significant increase in the level of output of a company's products or services. While it is generally a feature of smaller companies at an early stage of development, a ramp up can also be undertaken by large companies that are rolling out new products or expanding in new geographies.	The period in time required to meet full production. Which measurable will trigger full production? [E.g. Duration, quantity...?]	http://www.investopedia.com/terms/r/rampup.asp?ad=dirN&qo=serpSearchTopBox&qsrc=1&o=40186
		Financial Project Data		
18	Equity Company Contributions in the pre-feasibility, feasibility and construction phase. (E.g. Systems Engineering /Collector Prototype/Pilot Plant Testing)	Equity financing is the process of raising capital through the sale of shares in an enterprise. Equity financing essentially refers to the sale of an ownership interest to raise funds for business purposes. Equity financing spans a wide range of activities in scale and scope, from a few thousand dollars raised by an entrepreneur from friends and family, to giant initial public offerings (IPOs) running into the billions.	The amount of investment required to design, develop, and test the system. This equity investment is prior to the additional debt financed (borrowing) capital raise required for full production. [E.g. Pre-feasibility and feasibility stage is 100% equity, while construction and testing may be a combination of debt and equity]	http://www.investopedia.com/terms/e/equityfinancing.asp Chapter 4: https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf
19	Debt to Equity Ratio	The debt-equity ratio compares a company's total liabilities to its total shareholders' equity. This is a measurement of how much suppliers, lenders, creditors and obligors have committed to the company versus what the shareholders have committed.	Mining companies have historically high ratios. Recently these same mining companies have been selling assets (Mines) to reduce debt and associated interest expense (Rio Tinto, BHP Billiton, Anglo American).	http://www.investopedia.com/university/ratios/debt/ratio3.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186

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20	Financing Interest Rate	Interest rate is the amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. Interest rates are typically noted on an annual basis, known as the annual percentage rate (APR). The assets borrowed could include, cash, consumer goods, large assets, such as a vehicle or building. Interest is essentially a rental, or leasing charge to the borrower, for the asset's use. In the case of a large asset, like a vehicle or building, the interest rate is sometimes known as the "lease rate". When the borrower is a low-risk party, they will usually be charged a low interest rate; if the borrower is considered high risk, the interest rate that they are charged will be higher.	The types of loans will also determine the interest rate. For example, the processing plant may have construction type loans addressing multiple phases of the project and deferred principal payment schedule.	http://www.investopedia.com/terms/i/interestrate.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186
21	Weighted Average Cost of Capital	Weighted average cost of capital (WACC) is a calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All sources of capital, including common stock, preferred stock, bonds and any other long-term debt, are included in a WACC calculation. A firm's WACC increases as the beta and rate of return on equity increase, as an increase in WACC denotes a decrease in valuation and an increase in risk.	The percentage return on investment that debt/equity holders of private corporations assume prior to investing. Also representing the opportunity cost of the capital. If this return is not achieved, the corporation is effectively losing money on the investment as the same capital could be invested in other projects. WACC may be influenced by technology, regulatory, environmental, resource and institutional/political risk, which may change over time. Typically, the cost of capital reduces when the risk of the project reduces.	https://index.investopedia.com/index?q=WACC&qsrc=1&qo=serpSearchTopBox&o=40186&l=&ad=&ap=

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22	Depreciation Schedule	Depreciation is an accounting method of spreading the cost of a tangible asset over its useful life. Businesses depreciate long-term assets for both tax and accounting purposes. For tax purposes, businesses can deduct the cost of the tangible assets they purchase as business expenses; however, businesses must depreciate these assets in accordance with tax rules about how and when the deduction may be taken.	Each capital Item will have an individual depreciation schedule based on the its useful life. The residual value is the value of the capital item after full depreciation.	http://www.investopedia.com/terms/d/depreciation.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186
23	Commodity Prices	The forecasted price of Nickel, Copper, Cobalt and Manganese per metric tonne for the next 30 years. Other metals considered? Options: (1) Fundamental Model (Supply & Demand), (2) Deterministic Model (Weighted Average), (3) Probabilistic Model (Monte Carlo), (4) Time Series, (5) Cost-Curves	Commodity Prices may vary depending on business model assumptions. Manganese is complex due to the variety forms in which it is sold: Electrolytic Manganese Metal (EMM), FeMn, SiMn.	London Metal Exchange Metals Bulletin, Infomine
24	Inflation	Inflation is defined as a sustained increase in the general level of prices for goods and services. It is measured as an annual percentage increase. As inflation rises, money you own buys a smaller percentage of a good or service.	The time value of money. Used in mining companies to escalate costs (and revenue?) over time versus keeping them constant. Some economic models will have no inflation, which will keep revenue and expenses in constant dollars. Others may have inflation applied.	http://www.investopedia.com/terms/i/inflation.asp
25	Operational Cash Flows	Operating cash flow is a measure of the amount of cash generated by a company's normal business operations. Operating cash flow indicates whether a company is able to generate sufficient positive cash flow to maintain and grow its operations, or it may require external financing for capital expansion.	The collection of Polymetallic Nodules will require significant up front investments (negative cash flow) by the contractors who will model positive cash flows based on revenue generation through the various metal commodity markets.	http://www.investopedia.com/terms/o/operatingcashflow.asp?ad=dirN&qo=serpSearchTopBox&qsrc=1&o=40186

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26	Internal Rate of Return	The internal rate of return (IRR) is frequently used by corporations to compare and decide between capital projects, The IRR is the interest rate (also known as the discount rate) that will bring a series of cash flows (positive and negative) to a net present value (NPV) of zero (or to the current value of cash invested). Using IRR to obtain net present value is known as the discounted cash flow method of financial analysis.	Defined as a percentage return based on a series of negative and positive cash flows. Typically the IRR is compared to company "Hurdle Rates", representing the minimum return a project should obtain. Exceed and the project may proceed. If the IRR equals the WACC, the NPV is zero.	http://www.investopedia.com/articles/07/internal_rate_return.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186
27	Net Present Value	The net present value approach is the most intuitive and accurate valuation approach to capital budgeting problems. Discounting the after-tax cash flows by the weighted average cost of capital allows managers to determine whether a project will be profitable or not. And unlike the IRR method, NPVs reveal exactly how profitable a project will be in comparison to alternatives. The NPV rule states that all projects which have a positive net present value could be accepted while those that are negative should be rejected. If funds are limited and all positive NPV projects cannot be initiated, those with the high discounted value could be accepted.	The present value of project cash flows until end of project life. If $0, then the NPV generated is equal to the WACC. Companies will review each projects IRR and NPV and will only invest in those that provide the highest return. A positive NPV equals a IRR > WACC.	http://www.investopedia.com/walkthrough/corporate-finance/4/npv-irr/net-present-value.aspx?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186
28	Hurdle Rate	The IRR percentage required for an entity to invest in the opportunity.	A hurdle rate is the minimum rate of return on a project or investment required by a manager or investor. The hurdle rate denotes appropriate compensation for the level of risk present; riskier projects generally have higher hurdle rates than those that are deemed to be less risky.	http://www.investopedia.com/terms/h/hurdlerate.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186

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Regulatory Costs				
29	Exploitation License Application Fee	A fee payable to the ISA in accordance with the Exploitation Regulations for the processing of a Plan of Work for Exploitation	The fee is unknown at this stage. The application fee for an exploration contract is USD500k, however, given the significant increase in workload to evaluate an exploitation license, this can be higher.	https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf
30	Exploitation Annual Fees	An Annual contract administration fee and an Annual fixed fee payable to the Authority as prescribed by ISA Regulations.	Methodology of calculation and quantum of fee(s) under discussion, but USD100k has been suggested in a previous workshop in San Diego.	Working draft exploitation regulations, reg. 21 & 22 https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf
31	Ad - Valorem Royalty Light vs Full	A royalty payable to the CHM as compensation for extraction of the mineral resources.	Under discussion / consideration following San Diego Workshop, May 2016 taking in consideration the pro's and cons of each system.	https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf
32	Environmental Bond	A financial guarantee or security required under the ISA Regulations to secure compliance with environmental obligations.	Under discussion / consideration at Payment Regime Workshop #3.	https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf Article 127
33	Environmental Liability Trust Fund	A general environmental liability fund to cover any liability gap for environmental damage.	Under discussion / consideration at Payment Regime Workshop #3.	https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf Article 127
34	Seabed Sustainability Fund	A fund to promote and develop MSR in the Area together with capacity building / technical assistance.	Under discussion / consideration at Payment Regime Workshop #3.	https://www.isa.org.jm/files/documents/EN/Pubs/2016/DSM-ConfRep.pdf Article 127

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35	Sponsoring State Fiscal Regime	The sponsoring State's responsibility is to ensure the contractor's compliance with the ISA Mining Code, by means of adopting laws and administrative measures for enforcement, which have to be "no less effective" in the case of environmental protection.	These laws and administrative measures may result in monitoring tax or others.	LOSC, Part VII, Article 209
36	Corporate Tax Rate of the sponsoring State	A corporate tax is a levy placed on the profit of a firm to raise taxes. After operating earnings is calculated by deducting expenses including the cost of goods sold (COGS) and depreciation from revenues, enacted tax rates are applied to generate a legal obligation the business owes the government. Rules surrounding corporate taxation vary greatly around the world and must be voted upon and approved by the government to be enacted.	The tax rate applied to profits for each Claim Holder dependent on sponsoring State and is part of the sponsoring State's fiscal regime.	http://www.investopedia.com/terms/c/corporatetax.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=0&o=40186