

Financial Payment System Modeling for Polymetallic Nodules

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Open Ended Working Group on Financial Modeling
Kingston, Jamaica
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Agenda

- Quick review of financial payment system options
- Review of previous royalty rate results
- Updates to the model
 - Suggestions from other submissions
 - Complexity around Mn
 - Sponsor State Tax
 - Revised metals prices and costs
- Analysis and updated results

To Design an Effective System, We Model & Simulate Each Component of the System

- Process-based cost models of
 - Collector Operations
 - Environmental monitoring
 - Transport
 - Metallurgical processor
- Cash Flow Models
 - Costs
 - Revenues
 - Royalties
 - Taxes & fees
- Compute performance metrics
 - Cumulative Payments to the ISA

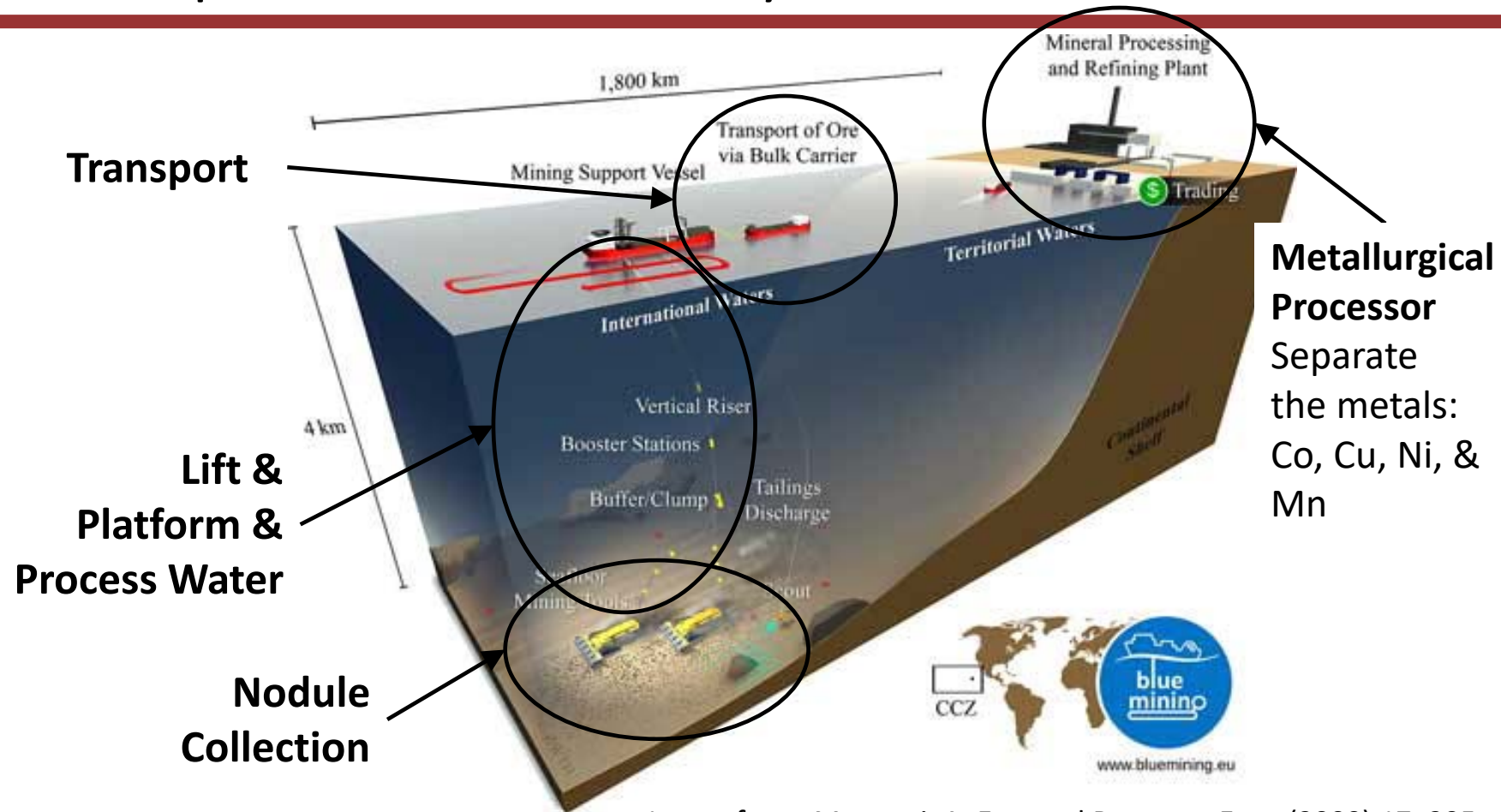
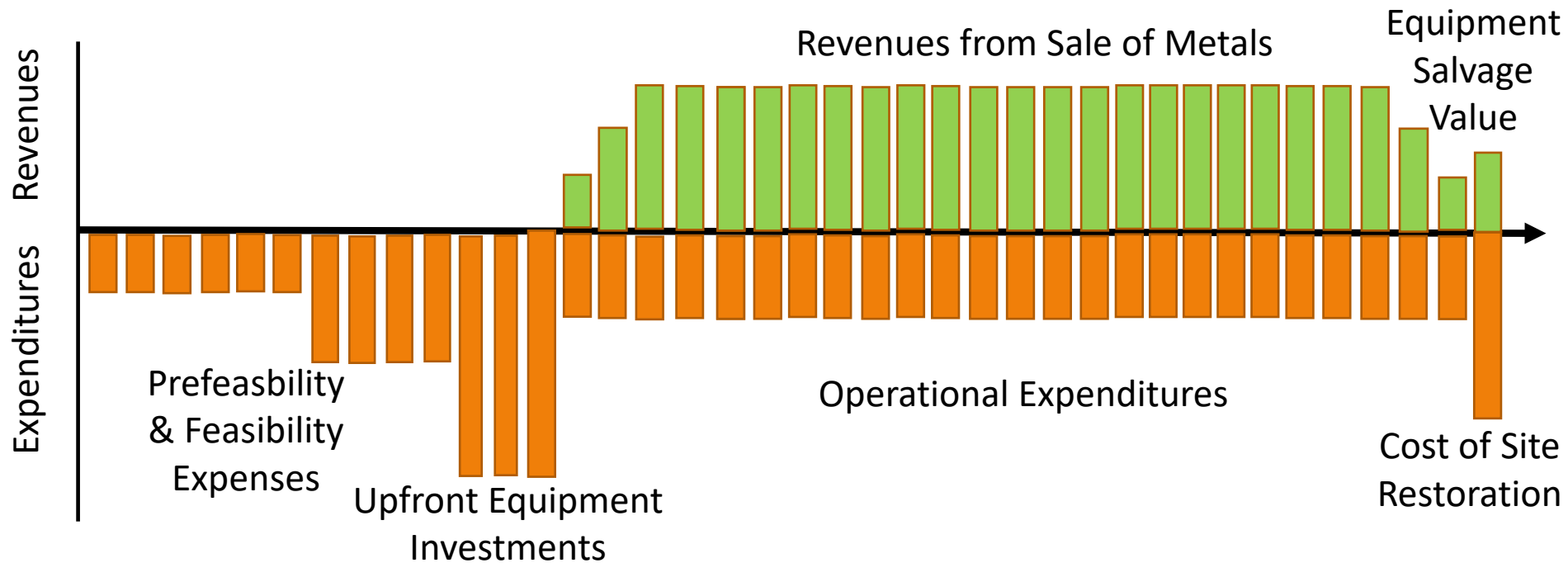
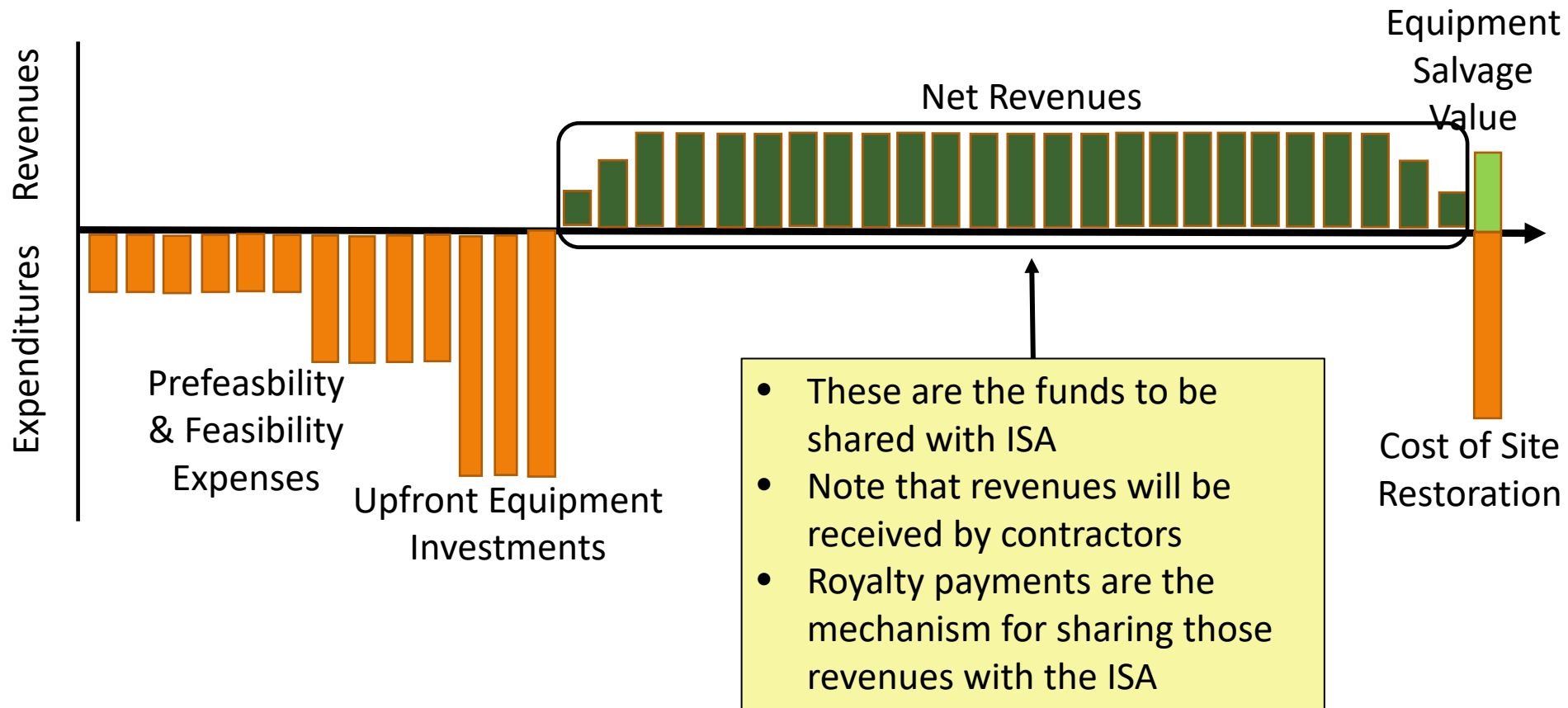


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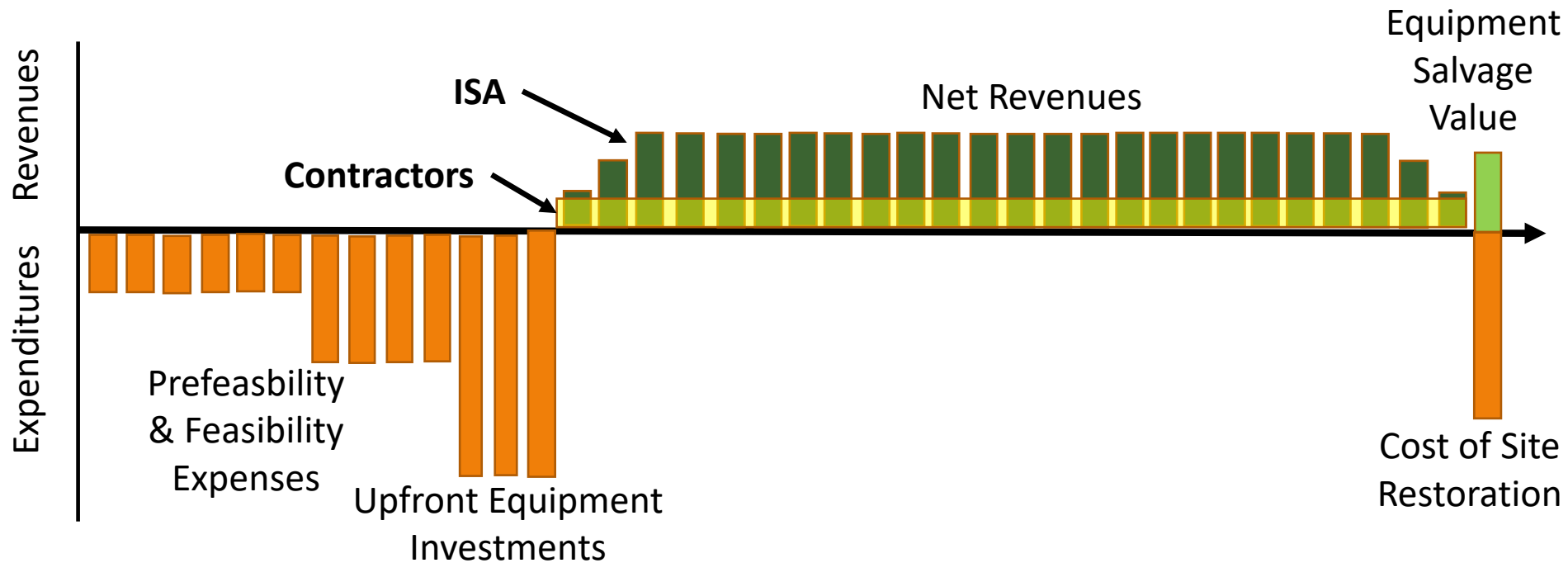
Let's look at the different types of cash flows throughout the project



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Let's look at the different types of cash flows throughout the project



What would make a system for revenue sharing **FAIR**?
What should be the mechanism for calculating the payment to the ISA?

Financial Payment Systems Under Consideration

Four Options

1. Fixed ad valorem - one stage
2. Fixed ad valorem - two stage
3. Blended Profit – two stage
(fixed ad valorem 1st stage, blended profit & fixed ad valorem 2nd stage)
4. Variable ad valorem - two stage
(fixed 1st stage, variable 2nd stage)

One Stage vs Two Stages:

- One stage: same rate in all years
- Two stage: rate changes in 2nd stage

Financial Systems:

- Fixed ad valorem rate
(in each stage)
- Variable ad valorem rate
(rate changes with metals prices)
- Blended ad valorem and profit

All systems can be designed to yield the same revenue to the ISA under baseline conditions

Summary & MIT Recommendations for Financial Payment System

1. One Stage with a Fixed Ad Valorem
2. Two Stage with a Fixed Ad Valorem
3. Blended Profit plus Fixed Ad Valorem
- 4. Two Stage with a Variable Ad Valorem**

Two stage system with a variable ad valorem allows:

- ISA to capture a good amount of upside benefits with only limited downside risk.
- Can be designed to give higher overall revenues to ISA accepting slightly lower revenues in the 1st stage

Summary of updates to previous results

- Suggestions from a variety of other submissions
 - Analyzed and addressed previous rates based on submission suggestions
- Complexity around Mn
 - Chose simpler Mn ore for revenue and costs
- Concerns around sponsor state tax
 - 25% corporate tax rate from sponsor state
 - Other rates will be addressed in a second presentation
- Updated model with revised metals prices and costs
 - Costs inflated to 2022 dollars to match prices

Key Submissions Since November from Different Stakeholders

Numerous submissions were made with important and insightful points

Main points from submissions

- Mn basis
- Proposed royalty rates
- Ad valorem vs. profit-based systems
- Sponsored State Tax
- Taxation on transfer of rights
- Concept of fairness

The model was updated to address and analyze these points.

The African Submission was particularly detailed with five key issues to address their nine tests

- **Issue 1:** The taxation of the direct and indirect transfer of rights
- **Issue 2:** An additional royalty in lieu of sponsoring state corporate income tax
- **Issue 3:** The valuation of Mn
 - Their submission suggested EMM, but they were open to other options as long as the royalties are adjusted accordingly
- **Issue 4:** Fiscal stability
- **Issue 5:** Royalty rates →

Based on a number of assumptions and modeling updates, we have addressed these recommendations and have determined a new set of values

Royalty Rate Option	Stage One (first 5 years)	Stage Two (after 5 years)
Option 1	14.4%	14.4%
Option 2	6.4%	19.3%
Option 3	Hybrid regime: a 5% royalty, 30% profit share and 30% additional profit share	
Option 4	6.4%	12/25%

Nodule Value Determination Issue of Manganese

Possible Valuation Points

- Fully processed metals
 - Easy to do for Cobalt, Nickel and Copper
 - Challenging for Manganese because there may be multiple final forms of manganese sold
 - Electrolytic Manganese Metal (high price, small market)
 - Various grades of Ferromanganese (low, medium and high carbon) each with different prices
 - Other forms such as silico-manganese
- Completely unprocessed nodules
 - Currently no transparent, arms length market price exists
 - Could derive a nodule transfer price based on metals prices and processing costs
 - Some details would need to be worked out
- **Partially processed nodules**
 - **Value for cobalt, nickel and copper based on metal**
 - **Value for “unprocessed” manganese**

Can we simplify the approach to Manganese?

- One approach would be to consider an unprocessed manganese product.
- Metallurgical process could be done to only remove the three other metals. The remaining slag, could be sold as a manganese rich product without considering additional processing
- Fortunately, this slag is quite similar in composition to currently mined (on land) manganese, and a price index for this product exists
- Mn ore prices are typically much lower than those of our refined manganese products
 - About \$475/t of contained Mn, compared to \$1560/t used in model

Important Criteria for Selecting Valuation Point

- Transparency:
 - Prices must be full transparent and easy to obtain
- Arms Length Transaction
 - Prices must represent fair value, not a private one-off deal

Mn Ore Indices

- Mn Ore index 37% Mn, FOB Port Elizabeth
- Mn Ore index 44% Mn, cif Tianjin
- Mn Ore index 46% Mn, Australia
- Mn Ore index 38% Mn, 5% Fe, South Africa
- Mn Ore index 44-45% Mn, Gabon
- Mn Ore index 44-45% Mn, Brazil
- Mn Ore index 32% Mn, 20% Fe, South Africa

Sponsor State Tax Concerns

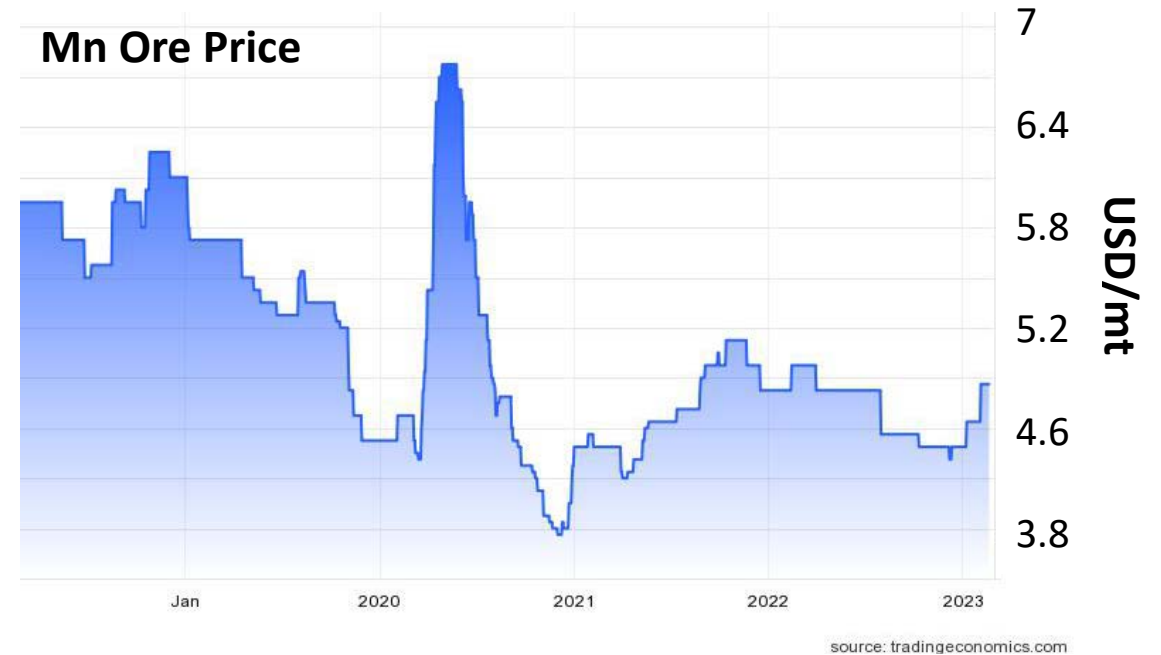
How to handle Sponsor State Tax?

- 25% corporate tax rate from sponsor state
 - Net revenues to be shared by contractors & ISA are reduced by this amount
 - Effective Tax Rate includes payment of this tax
- Concerns that some contractors **may not** pay any or all of this tax.
 - Effective Tax Rate would be much lower than industry standards (40%-50%)
 - Is this system still **FAIR**?
 - Contractors have more net revenue that could be shared with ISA
 - Are we **Maximizing ISA Revenue** while allowing contractors to be economically viable?
- Other rates will be addressed in a second presentation later in this meeting

Materials Price Assumptions

The long-term Manganese price is forecast to be around \$4.75/dmtu

38% Mn Ore (\$/dmtu)	Year	Reference
4.01	2021	S&P Global
4.50	2022	Statista
4.80	2016-2022	Statista
4.74	2018-2021	S&P Global
4.80	2020-2023	Trading Economics

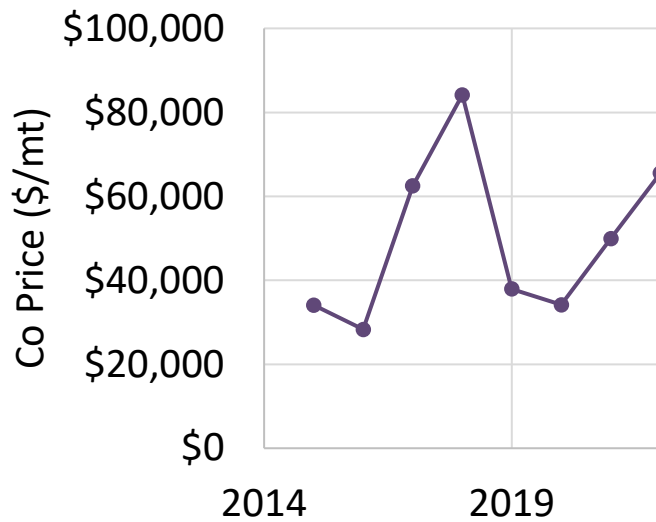


- Mn 38% ore price is expected to remain stable¹ around the 5-year average of \$4.75/dmtu
 - 38% is representative of the composition of the remaining nodule after removal of Cu, Ni, and Co.
- The previous Mn price in the model was \$4/dmtu
 - Not many forecasts in the literature
 - Previous forecast was based on temporary decline of price

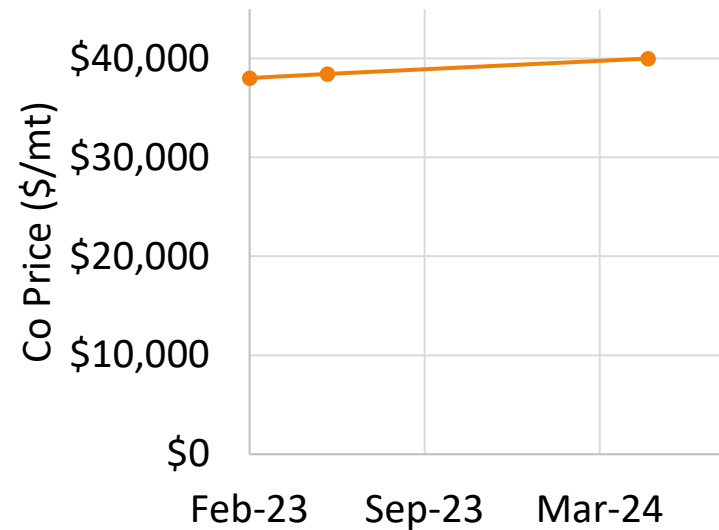
Previous Mn price: \$4/dmtu
New Mn price: \$4.75/dmtu

Despite current low prices, long-term Cobalt is forecast to recover to ~\$60,000/t

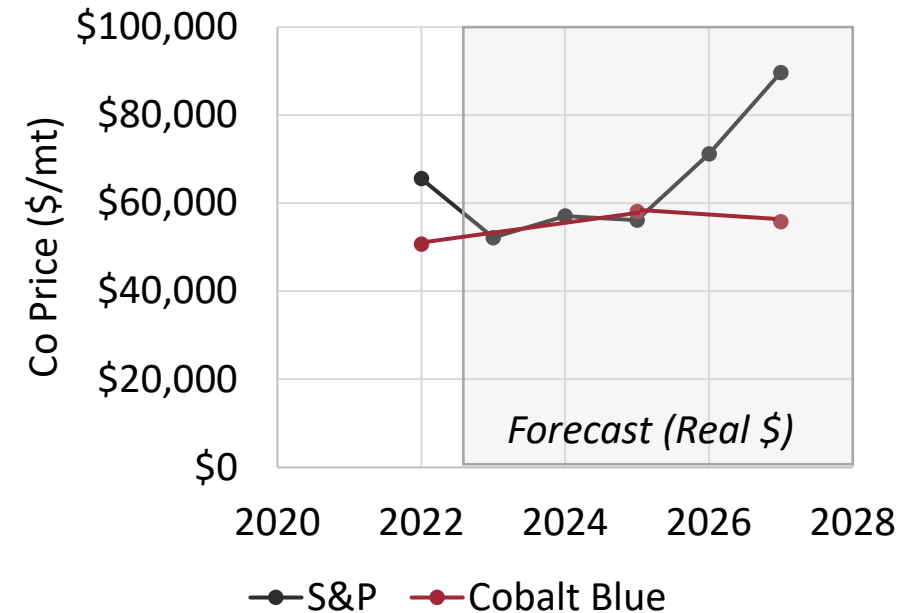
Historical Prices



LME Short-Term Forecast



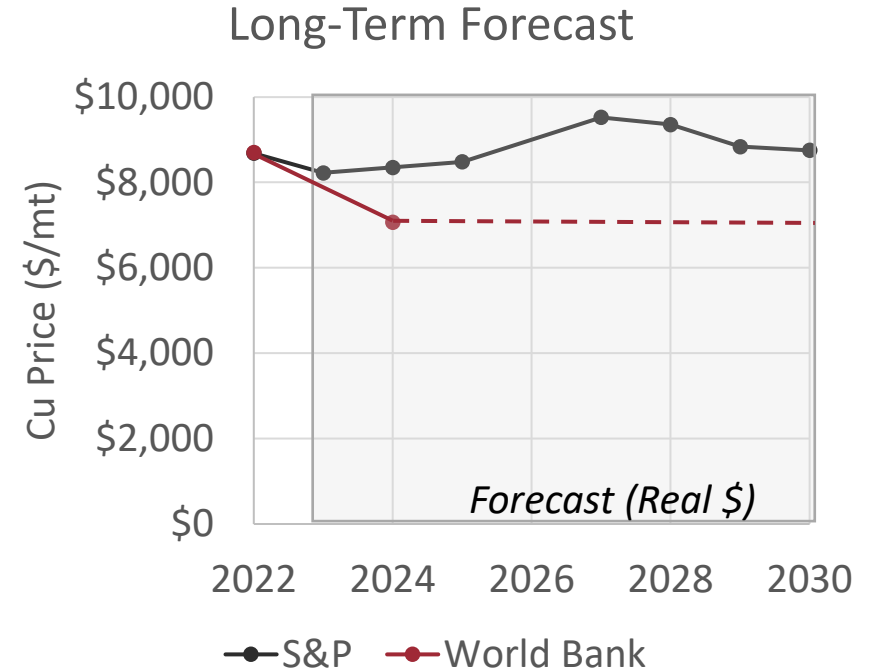
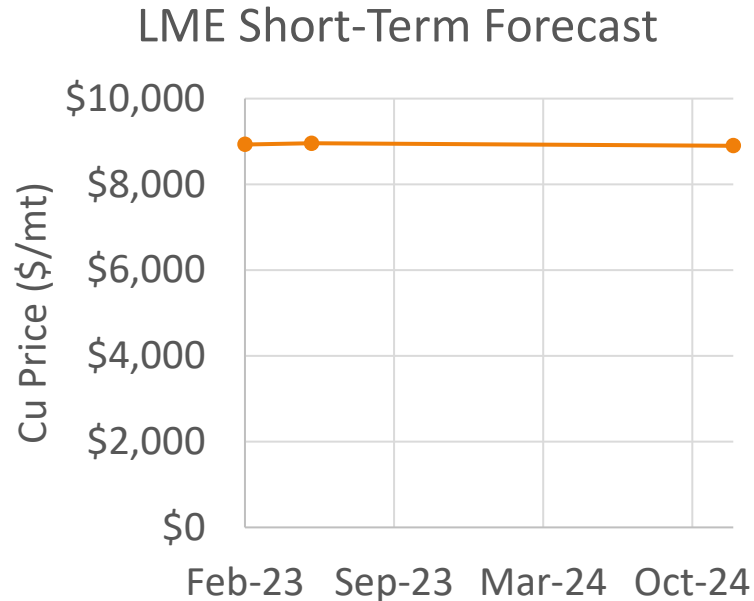
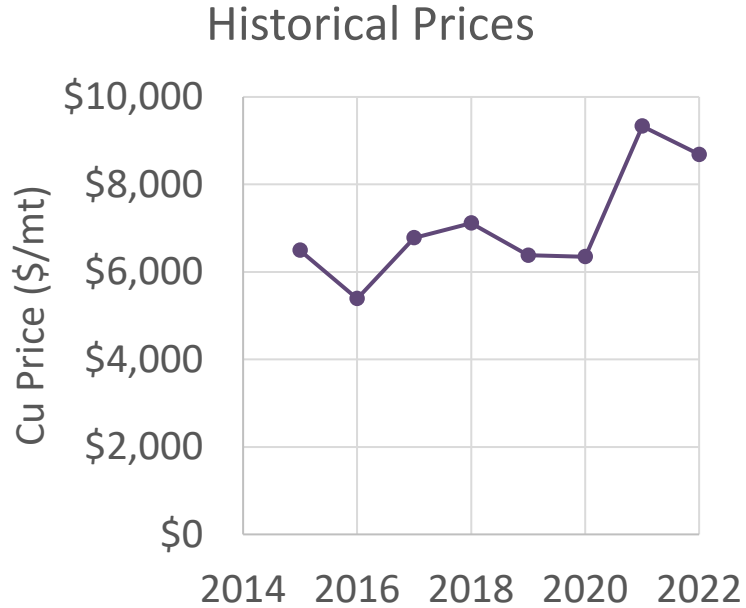
Long-Term Forecast



- However, various groups believe prices may rise again in the future
- Instead of today's price of \$40,000/mt or the highest long-term of \$80,000/mt, we assume a Co price of \$60,000/mt

Previous Co price: \$55,000/mt
New Co price: \$60,000/mt

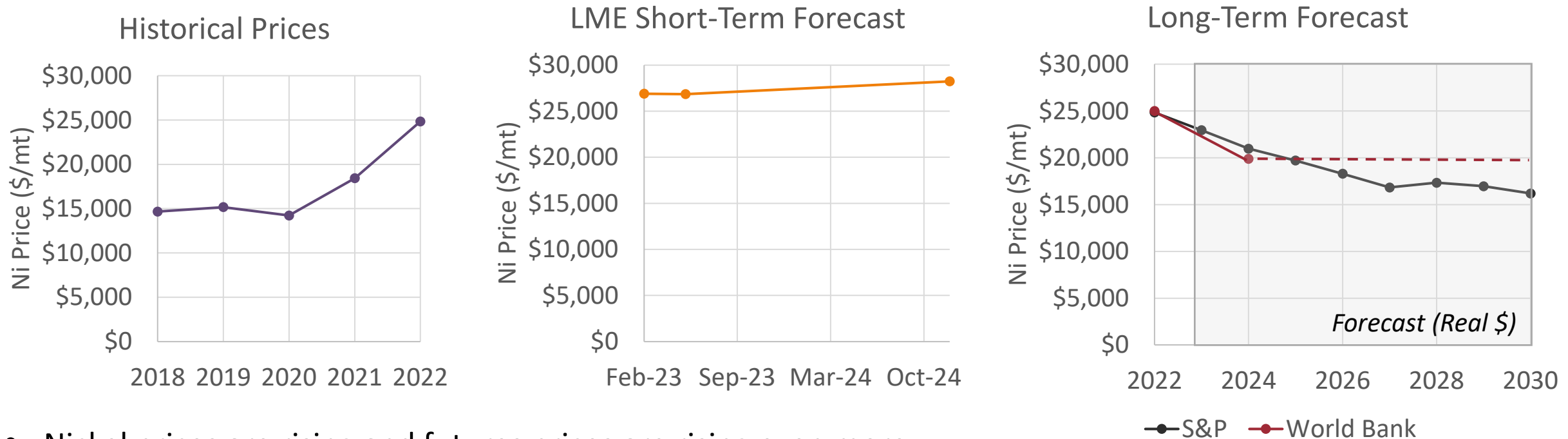
In light of Copper prices rising, long-term price raised to \$9,000/mt



- Copper prices have been rising and current prices around ~\$8,900/mt
- We assume the long-term price will be \$9,000/mt

Previous Cu price: \$7,000/mt
New Cu price: \$9,000/mt

Nickel prices has seen a dramatic rise but long-term are expected to revert to \$20,000/mt



- Nickel prices are rising and futures prices are rising even more
- In the long-term, prices are settling below \$20,000/mt
- Because of the rise, we adjusted the Ni price from ~\$18,000/mt to \$20,000/mt

Previous Ni price: \$18,336/mt
New Ni price: \$20,000/mt

Analysis and Results

Analysis of Royalty Rates with Model Changes

- For all four options, the Effective Tax Rate (ETR) served as a basis for selecting rates
 - 45% was chosen, but other values could be analyzed
- Conducted sensitivity analysis around the costs and metals prices
- Today, the results focus will be on Option #4
 - Two Stage Variable Ad Valorem System

Under baseline conditions, this system results in a 45.4% ETR
3% → 7.5%/12.5%

- Stage One (first 5 years)
 - Fixed Royalty Rate = 3%
- Stage Two (after 5 years)
 - If metal value is:
 - <\$510/t, Royalty Rate = 7.5%
 - ≥\$510/t, <\$580/t, Royalty Rate = 8.75%
 - ≥\$580/t, <\$650/t, Royalty Rate = 10%
 - ≥\$650/t, <\$720/t, Royalty Rate = 11.25%
 - ≥\$720/t, Royalty Rate = 12.5%
- The value of the nodule using the new price assumptions is \$614/t, resulting in a 10% royalty rate

Effective Tax Rate: 45.4%

**ISA lifetime royalty revenue
(undiscounted): \$5.215 billion**

Collector IRR: 17.65%

Sensitivity Analysis Results

If costs are 20% higher than expected, ETR rises to 48.1%

- Same system
 - 3% → 7.5/12.5%

	Baseline CAPEX	20% Higher CAPEX
Collector	\$2.24B	\$2.69B
Metals Processor	\$1.57B	\$1.89B

	Baseline OPEX	20% Higher OPEX
Collector	\$111/t	\$133/t
Metals Processor	\$61/t	\$73/t

Effective Tax Rate: 48.1%

ISA lifetime royalty revenue (undiscounted): \$5.215 billion

Collector IRR: 14.07%

If costs are 20% lower than expected, ETR falls to 43.3%

- Same system
 - 3% → 7.5/12.5%

	Baseline CAPEX	20% Lower CAPEX
Collector	\$2.24B	\$1.79B
Metals Processor	\$1.57B	\$1.26B

	Baseline OPEX	20% Lower OPEX
Collector	\$111/t	\$88/t
Metals Processor	\$61/t	\$49/t

Effective Tax Rate: 43.3%

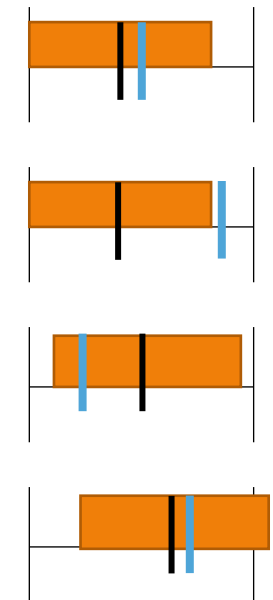
**ISA lifetime royalty revenue
(undiscounted): \$5.215 billion**

Contractor IRR: 22.06%

20% is a reasonable range for the metals prices sensitivity analysis

	Today's Price*	20% Lower Forecast	Baseline Forecast	20% Higher Forecast	Typical Range**
Mn Ore	\$4.97/dmtu	\$3.80/dmtu	\$4.75/dmtu	\$5.70/dmtu	\$3.8-6.1/dmtu
Nickel	\$24,815/t	\$16,000/t	\$20,000/t	\$24,000/t	\$16,000-28,000/t
Cobalt	\$48,874/t	\$48,000/t	\$60,000/t	\$72,000/t	\$40,000-80,000/t
Copper	\$9,174/t	\$7,200/t	\$9,000/t	\$10,800/t	\$6,000-10,000/t

Range Coverage



*March 1, 2023 price

**Semi-quantitative assessment of both recent historical and medium-term forecasts.

— Forecast — Today's +/−20% Typical range

Option 4 is quite effective at dealing with metals price fluctuation

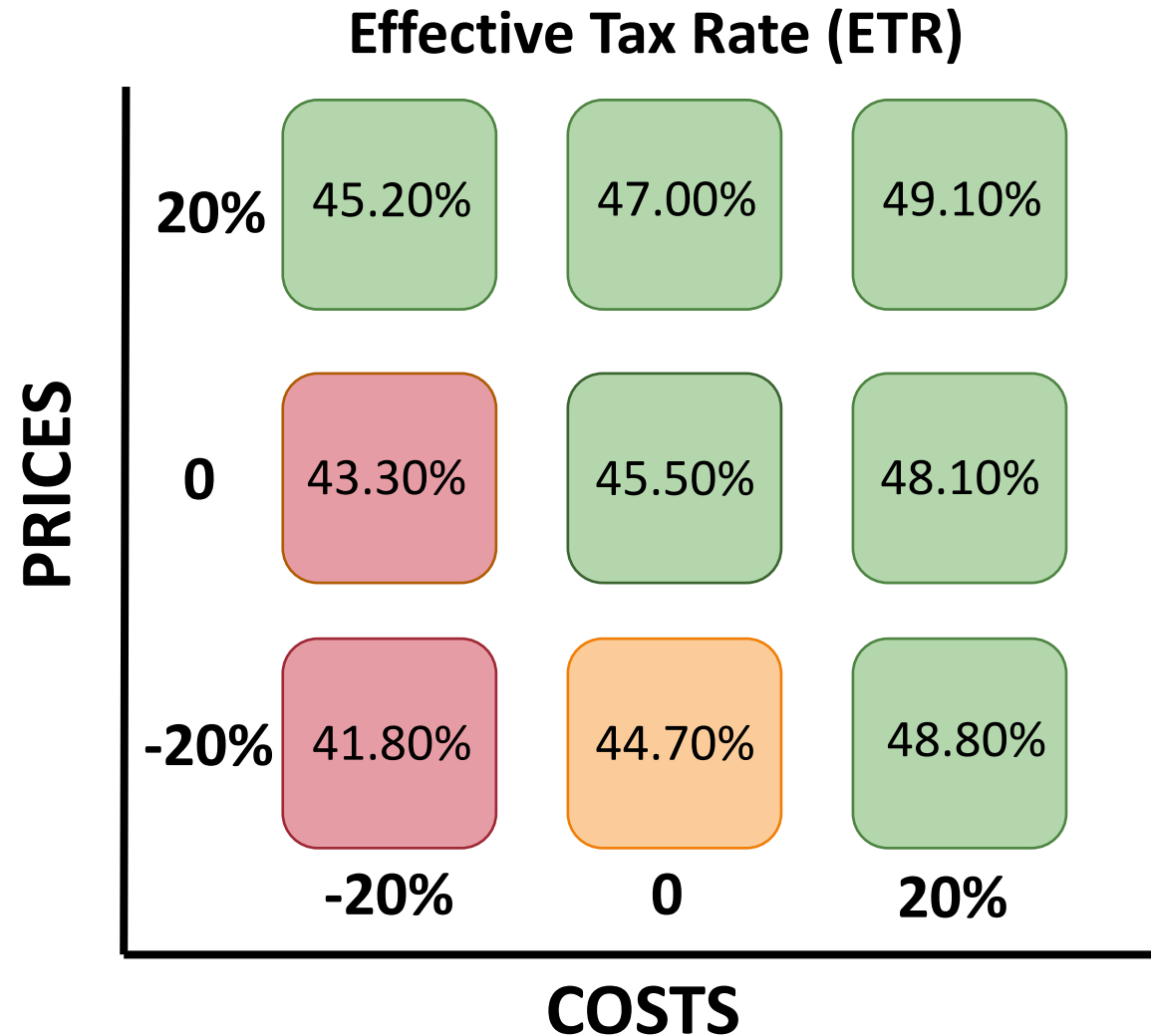
20% higher metals prices

- Effective Tax Rate: 47.0%
 - ISA lifetime royalty revenue (undiscounted): \$7.764 billion
 - Contractor IRR: 20.98%

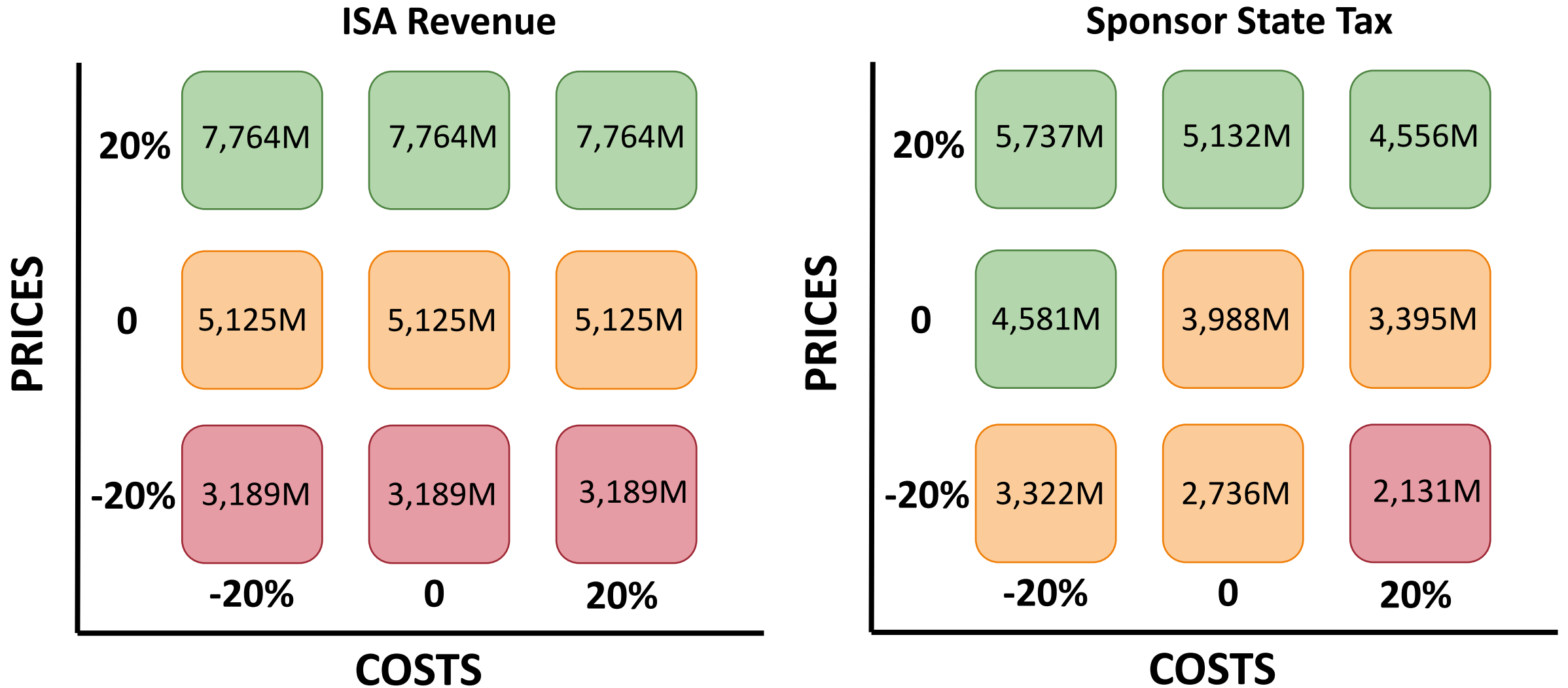
20% lower metals prices

- Effective Tax Rate: 44.7%
 - ISA lifetime royalty revenue (undiscounted): \$3.189 billion
 - Contractor IRR: 13.57%

This system works reasonably well unless both prices and costs fall



Option 4 captures price variations



Key Takeaways

- This financial payment system is designed to give 45% ETR under baseline assumptions
 - Captures upside potential from possible rising metals prices, while minimizing downside potential if prices don't reach long term forecasts
- Model can be re-run to find rates for any assumptions
 - E.g., The range of recommended ETR values ranges from 40% to over 50%
 - While shown for Option 4, results are available for Options 1-3
- System is moderately progressive with regard to metals prices
 - Rates change with +/- 20% change in price, but larger increases could also be used
- CIT to Sponsor State is assumed to be 25%. A system with an additional rate for those that do not pay 25%, will be shown later