

Decision making under uncertainty

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CUMBRE DE
**MINERÍA
SOSTENIBLE**
MENDOZA
20—24

PLORATION

nsights

Overview

Decision making under uncertainty

Background – Stage gate process at Newmont 2005-2009

Rate and Rank

Strategic Fit Score

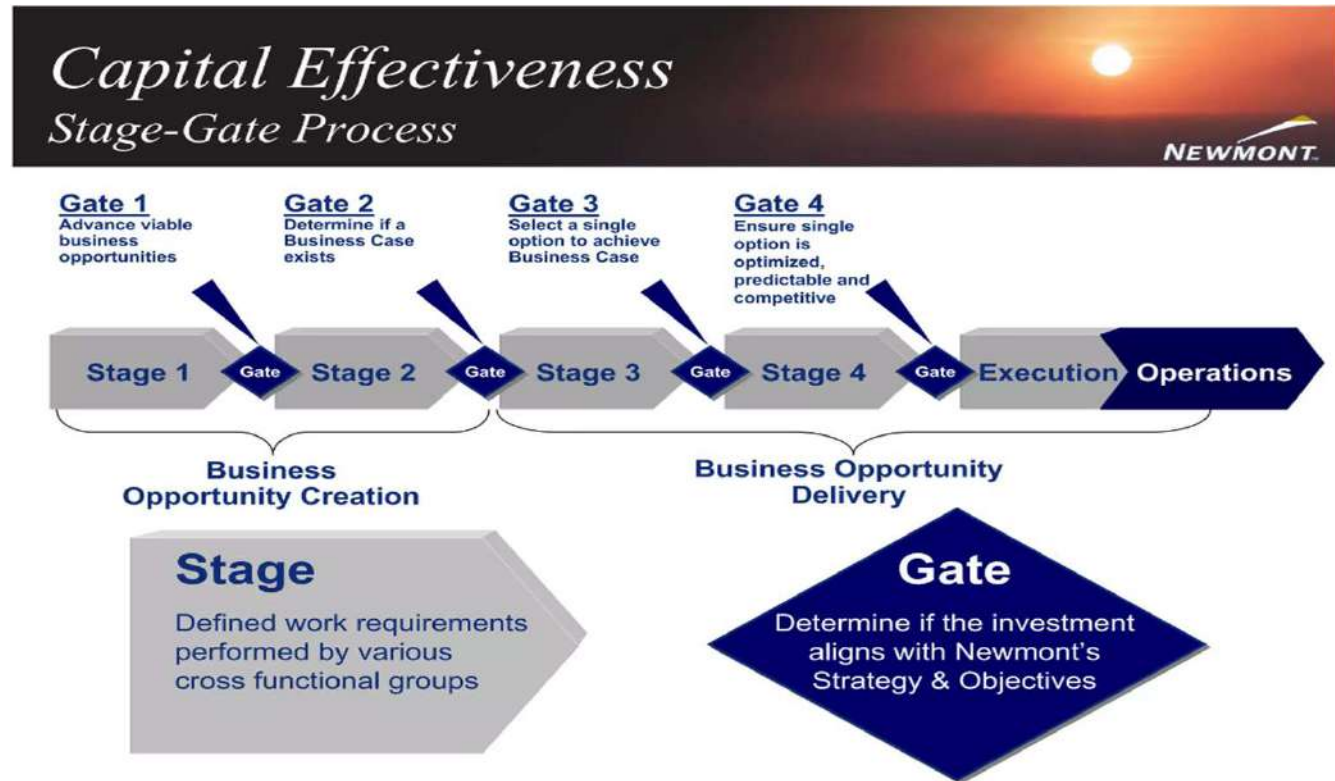
Enterprise Risk Score

Conclusions & Recommendations

Stage-gate

Advancing projects

- Expansion
 - Batu Hijau 3rd SAG mill
 - Yanacocha gold mill
 - Phoenix copper leach
- Infrastructure
 - Nevada Power Plant
- Greenfield projects
 - Hope Bay project
 - Boddington project
 - Ahafo North and Akyem
 - Conga project



February 8, 2008

Source: Newmont 2008

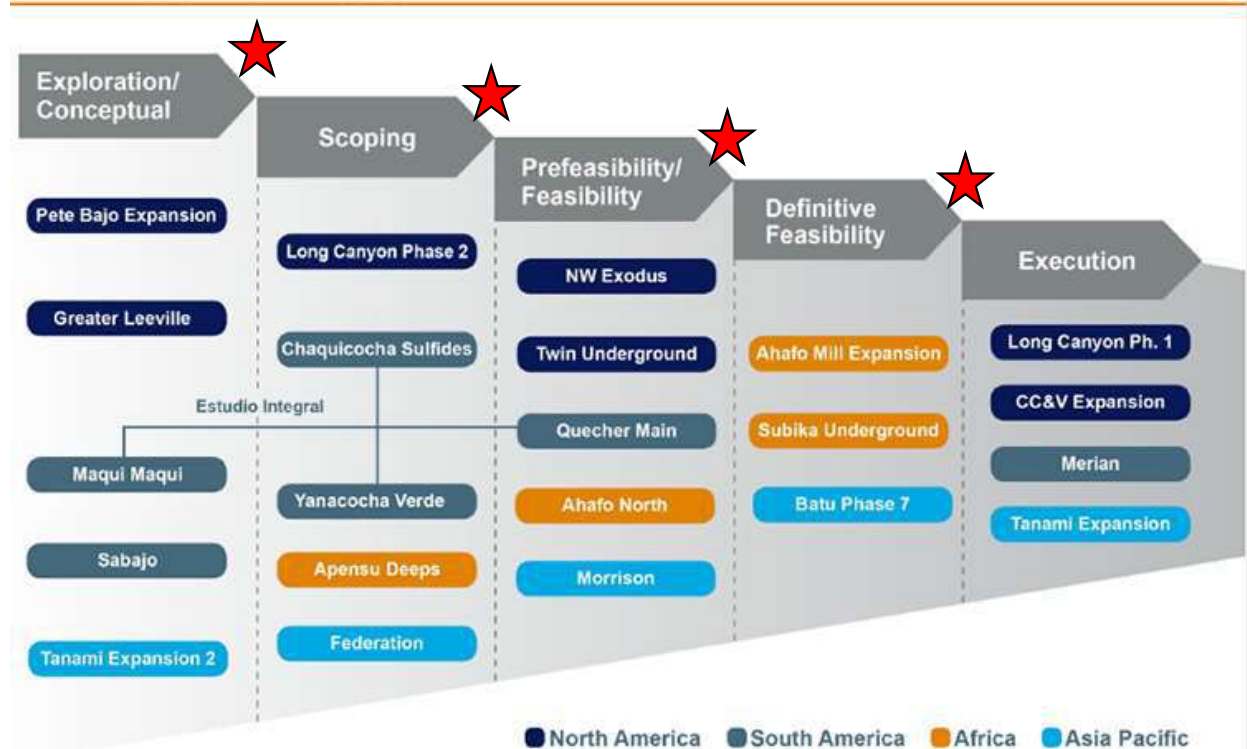
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Decision making

Allocate capital to best projects

- Exploration/conceptual – drill stage, no resource
- Scoping – inferred resource, rough economics +/- 50% accuracy, no engineering
- Prefeasibility study – reserves, +/- 25% accuracy, 2% engineering drawings complete, still trade-off options
- Definitive feasibility study - reserves, +/- 15% accuracy, 10% engineering drawings complete
- Execution – into production

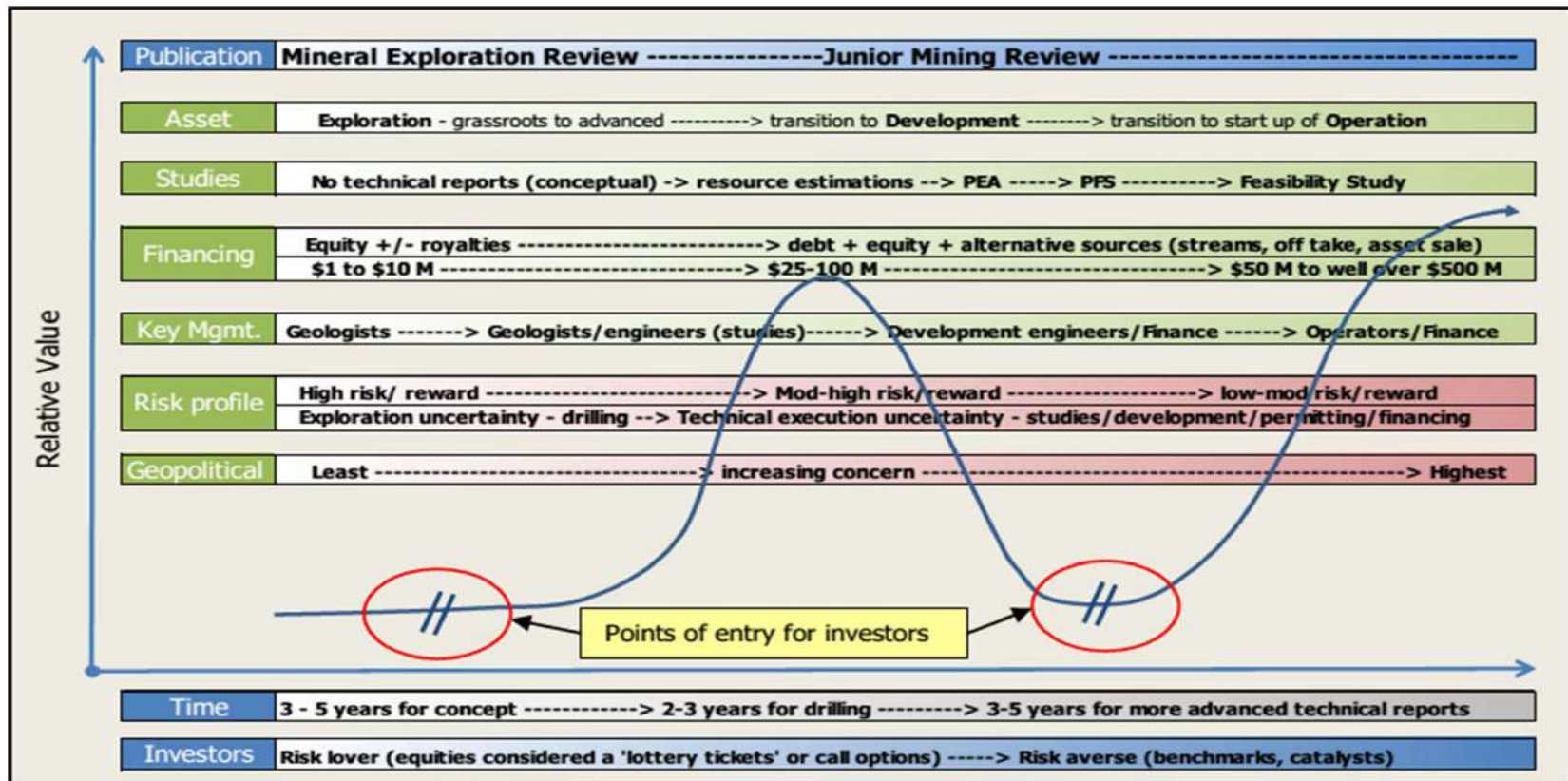
Strong project pipeline and success rate



Source: Newmont 2016

Lassonde Curve looks like Stage-gate process for investors

Ranges from grassroots explorers to producers

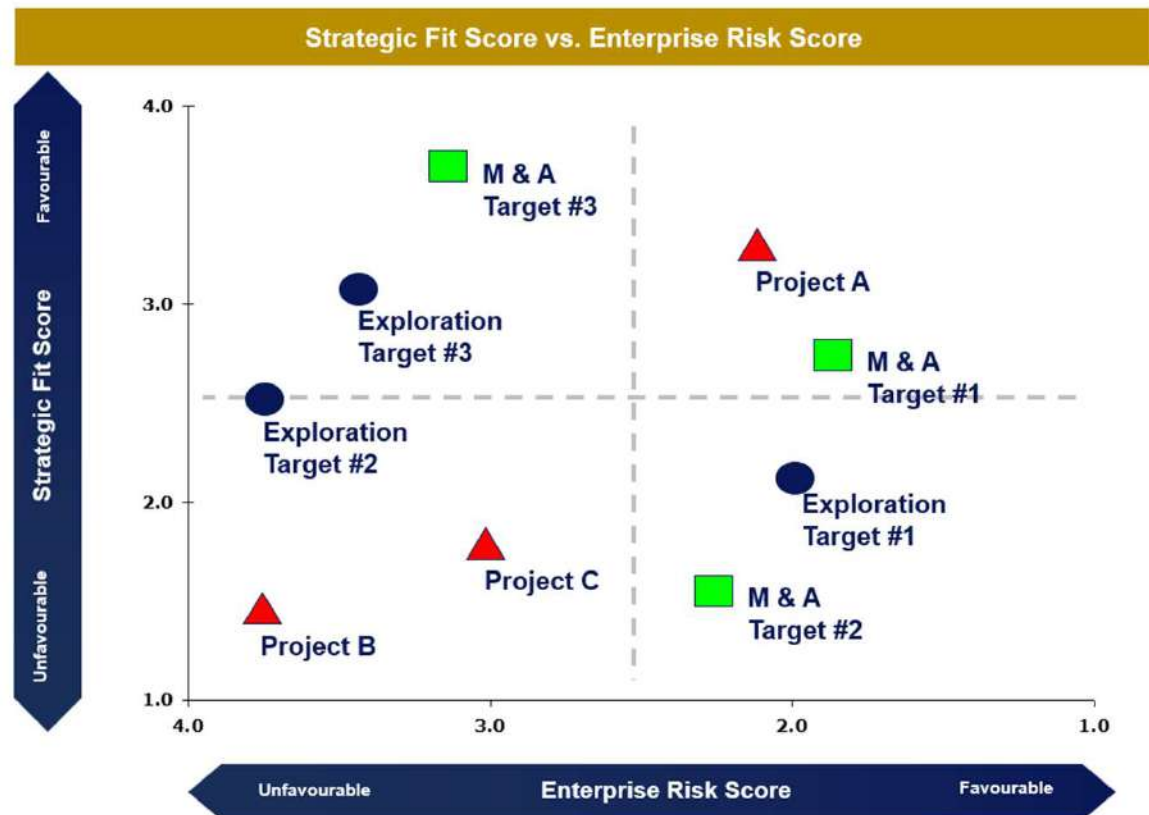


Source: Canaccord Genuity and Exploration Insights

Rate and rank

Apples to apples comparison

- The objective of the process was to avoid making decisions in a vacuum
- Capital is not infinite not even for a major mining company
- Any allocation of capital or a positive decision in the Stage-Gate process may negate the allocation of capital to another asset
- Decisions need to consider the 'Strategic Fit' of the asset into the portfolio and the 'Enterprise Risk' that is added



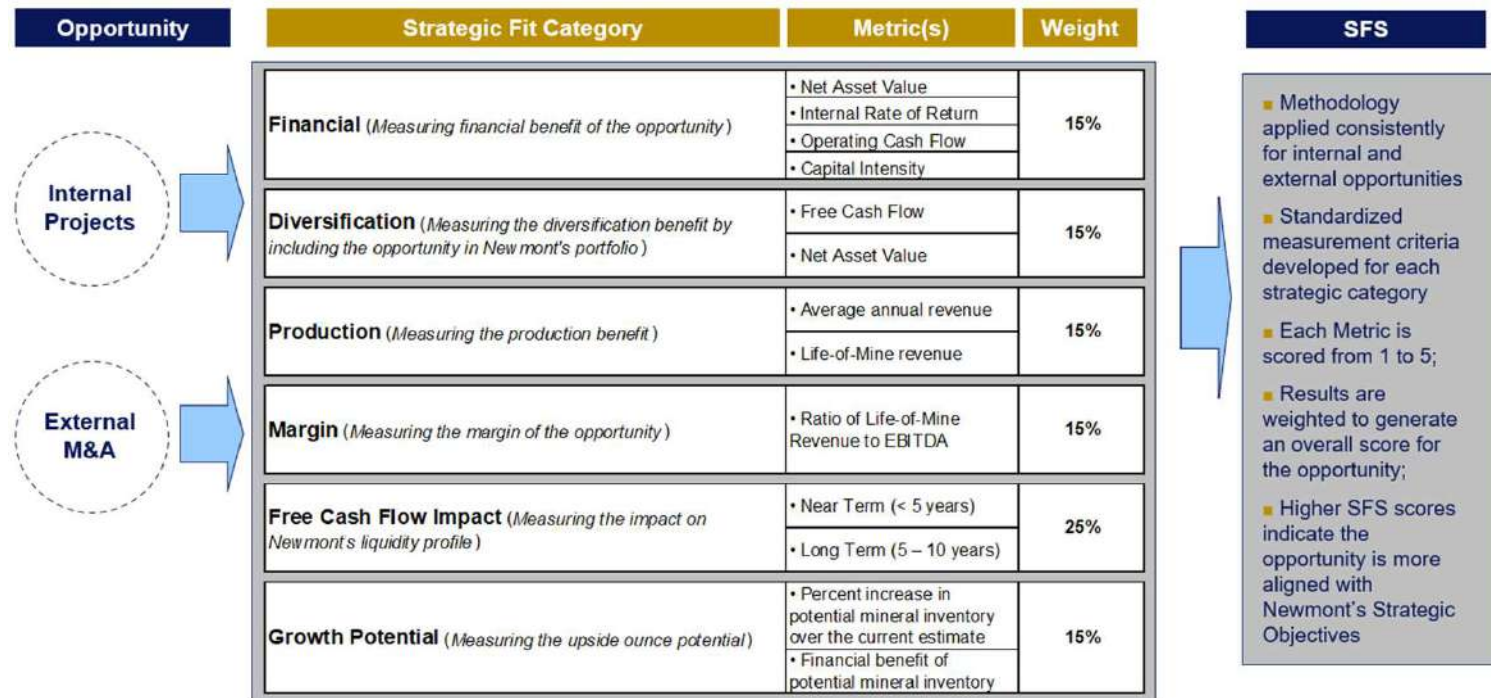
Source: Brady and Mazumdar

Strategic Fit Score

What do decision makers/investors consider add value?

Higher score = higher reward

- Financial metrics – NAV, IRR, OCF and capital intensity
- Diversification – free cash flow and NAV impact
- Production – revenue on average and LOM
- Margin – LOM revenue to EBITDA
- Free cash flow impact - portfolio
- Growth potential - exploration upside



Source: Brady and Mazumdar

Strategic Fit Score

Criteria and weightings

- Ratings range from 1-5
- Weights for each category should reflect management or investor's priorities
- The total would represent the score on the Y-axis of the Rate and Rank graphic

EXAMPLE PROJECT	RATING (1-5)		WEIGHT		SFS
1.) <i>Financial</i>	3	X	15%	=	.45
2.) <i>Diversification</i>	2		15%		.30
3.) <i>Production</i>	4		15%		.60
4.) <i>Margin</i>	3		15%		.45
5.) <i>Free Cash Flow Impact</i>	2		25%		.50
6.) <i>Growth Potential</i>	1		15%		.15

Criteria & Weightings and are flexible and can be adjusted to match shifting strategic goals and objectives

2.45

Source: Brady and Mazumdar

Strategic Fit Score

Financial category (15%)

- **Net Asset Value** – discounted LOM free cash flow
- **Internal rate of return** – best is only better than 12%
- **LOM operating cash flow** – supports projects with a longer mine life
- **Capital intensity** – NPV over upfront capital expenditures

Reward Category	Category Weight	Metric	Metric Weight	Ranking Guidelines		
(1.) Financial	15%	(a.) Net Asset Value	20%	Project NAV		<i>Discounted LOM Free Cash Flow</i>
				Rank		
				> \$2,500M	5	
				\$1,000M - \$2,500M	4	
				\$500 - \$1,000M	3	
		\$250 - \$500M	2			
		\$0 - \$250M	1			
		< \$0	0			
		(b.) Modified IRR	30%	Project MIRR		<i>Internal Rate of Return</i>
				Rank		
				> 12.0%	5	
				9.0% to 12.0%	4	
				7% to 9.0%	3	
		5% to 7%	2			
		2.5% to 5%	1			
		0 - 2.5%	0			
(c.) Life of Mine Operating CashFlow	20%	Project LOM OCF		<i>LOM Operating Cash Flow</i>		
		Rank				
		> \$10,000M	5			
		\$5,000M - \$10,000M	4			
		\$1,000 - \$5,000M	3			
\$500M - \$1,000M	2					
\$0 - \$500M	1					
< \$0M	0					
(d.) Capital Intensity	30%	Profitability Index		<i>Profitability Index</i>		
		Rank				
		> 2.5	5			
		2.0 - 2.5	4			
		1.5 - 2.0	3			
1.0 - 1.5	2					
< 1.0	1					

Source: Brady and Mazumdar

Valuation of Montage Gold's Koné gold project in Côte d'Ivoire

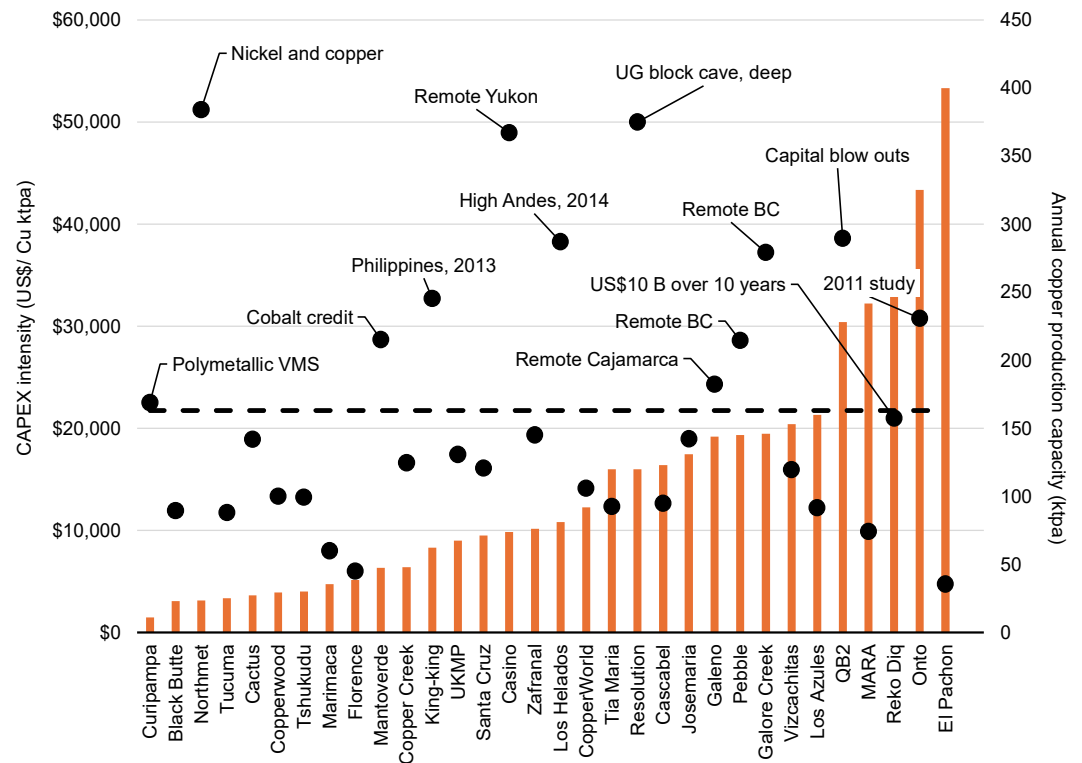


		Gold Price (\$/oz)						
Metric	Units	\$1,850	\$1,950	\$2,050	\$2,200	\$2,300	\$2,500	\$2,700
After-tax NPV _{5%}	\$M	\$1,089	\$1,273	\$1,456	\$1,731	\$1,914	\$2,281	\$2,647
After-tax IRR	%	31.0%	35.2%	39.3%	45.4%	49.5%	57.6%	65.8%
Total Cash Cost	\$/payable oz	\$969	\$977	\$984	\$996	\$1,003	\$1,018	\$1,033
AISC	\$/payable oz	\$998	\$1,006	\$1,013	\$1,025	\$1,032	\$1,047	\$1,062
Payback	years	2.6	2.3	2.2	1.9	1.8	1.6	1.4

Source: Montage Gold

CAPEX intensity is intense

- I graphed these projects using their capital expenditure intensity per tonne of copper produced.
- The average was ~US\$20,000 per tonne of copper produced.
- **Many are above the line.**
- The reasons include polymetallic credits (I only used Cu and CuEq), date of study (pre- or post-COVID19) and remote locations that require infrastructure (roads, power).
- In 2019, Teck Resources estimated upfront capex for Quebrada Blanca 2 in northern Chile (QB2, 210 kt/d) was US\$4.7 B.
- Its late 2023 estimate was US\$8.6 to US\$8.8 billion, which is a significant hike from its pre-COVID19 estimate



Source: S&P Global Market Intelligence and Exploration Insights

Strategic Fit Score

Diversification (15%) and Production (15%)

- **Diversification** – Impact of the asset on the portfolio concerning LOM free cash flows and net asset value
- **Production** – measured in annual average and life of mine revenue at business plan commodity prices

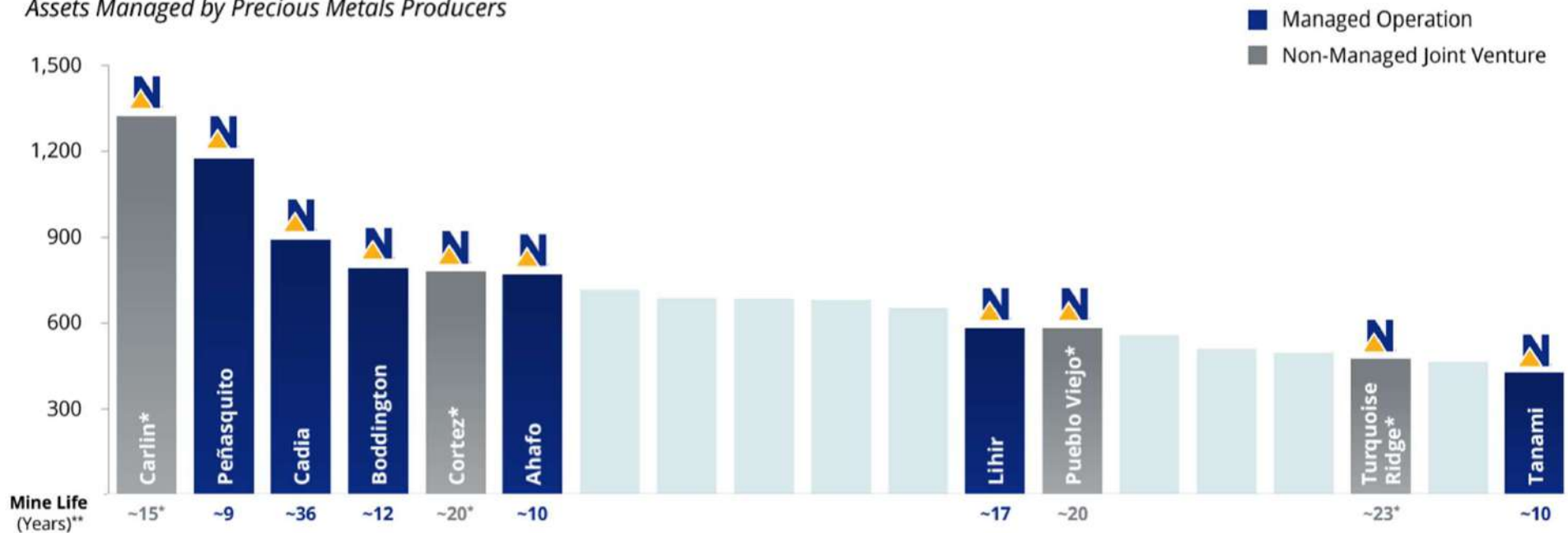
Reward Category	Category Weight	Metric	Metric Weight	Ranking Guidelines		
(2.) Diversification	15%	(a.) Life of Mine Free Cash Flows	50%	Portfolio LOM FCF		<i>LOM Free Cash Flow @ Risk</i>
				Rank		
				> 5.0%	5	
				2.5% to 5.0%	4	
				0% to 2.5%	3	
		-2.5% to 0%	2			
		-10% to -2.5%	1			
		< -10.0%	0			
		(b.) Net Asset Value	50%	Portfolio NAV		<i>NAV @ Risk</i>
				Rank		
> 5.0%	5					
2.5% to 5.0%	4					
0% to 2.5%	3					
-2.5% to 0%	2					
-10% to -2.5%	1					
< -10.0%	0					
(3.) Production	15%	(a.) Annual Average Revenue	50%	Project Annual Average Revenue		<i>Average Revenue</i>
				Rank		
				> \$1,000M	5	
				\$500 - \$1,000M	4	
				\$250 - \$500M	3	
		\$100 - \$250M	2			
		\$0 - 100M	1			
		(b.) Life of Mine Revenue	50%	Project LOM Revenue		<i>LOM Revenue</i>
				Rank		
				> \$20,000M	5	
\$10,000 - \$20,000M	4					
\$2,500 - \$10,000M	3					
\$500 - \$2,500M	2					
\$0 - 500M	1					

Source: Brady and Mazumdar

Diversification lowers production risk

LAST 12 MONTHS (LTM) GEO PRODUCTION FROM TIER 1 ASSETS (koz)

Assets Managed by Precious Metals Producers



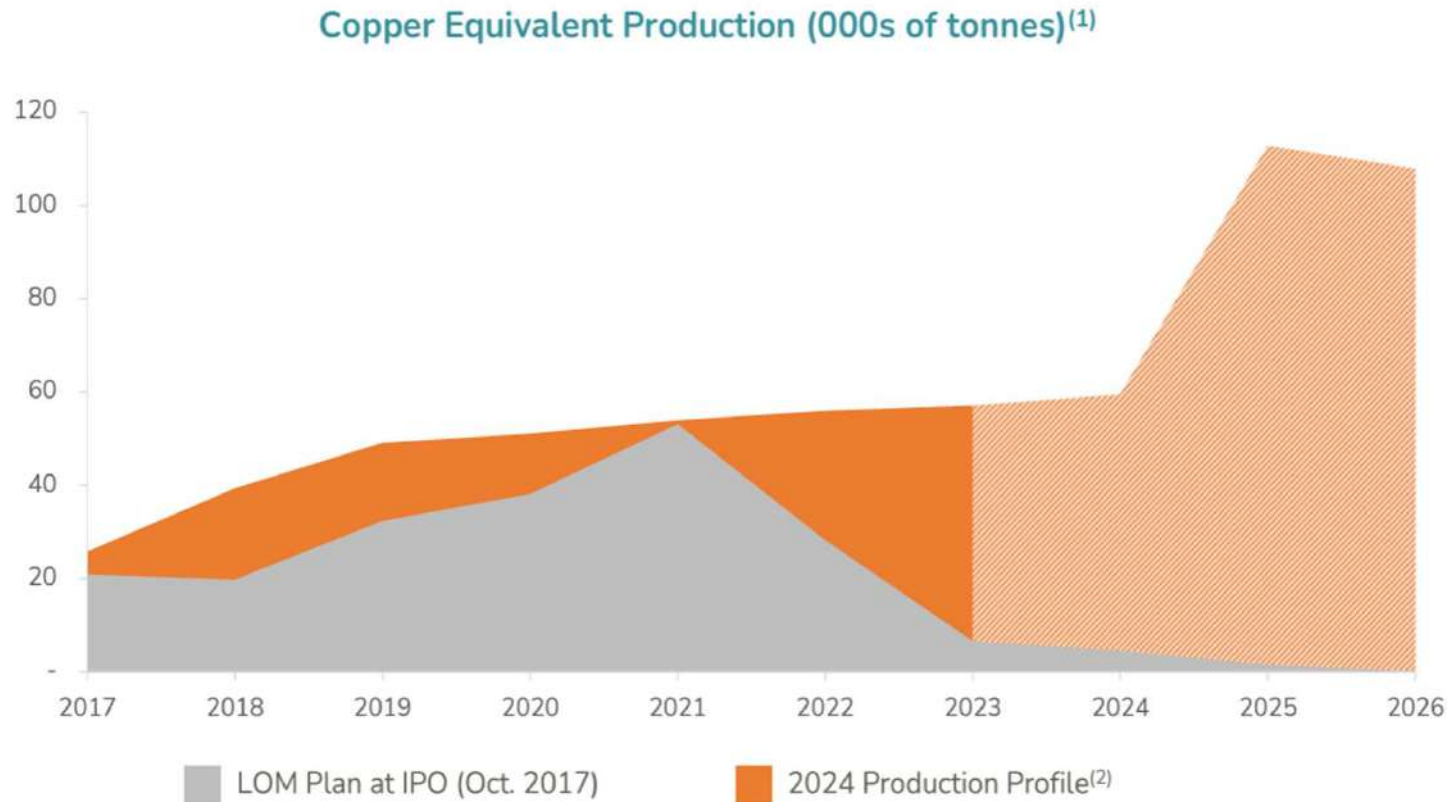
Newmont's Portfolio Includes More than Half of the World's Tier 1 Gold Mines

With the Majority of Assets Having a Mine Life of >15 Years

Source: Newmont Corp.

Meaningfully adding to production

- Ero Copper (ERO.T, ERO.NYSE) is a Brazil-focused copper producer, developer and explorer with a market capitalization of C\$2.2 billion.
- Its valuation is based on the meaningful production added via the development of the Tucumã copper-gold project in the Carajas District.



Source: Ero Copper

Strategic Fit Score

Margin (15%) and Free cash flow (25%)

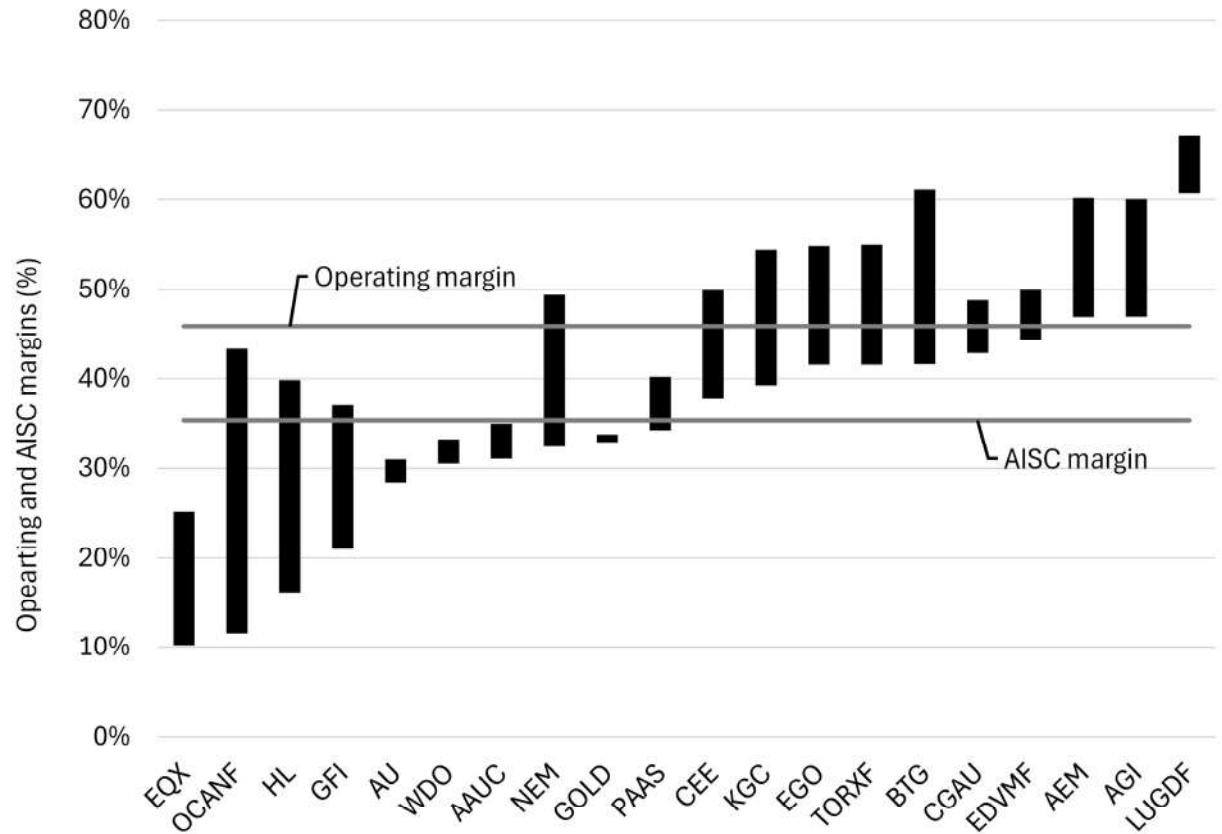
- **Margin** – project EBITDA margin and the portfolio EBITDA margin with project added
- **Free cash flow impact** – near term (< 5 years) and long term (> 5 years) project-added

Reward Category	Category Weight	Metric	Metric Weight	Ranking Guidelines		
(4.) Margin	15%	(a.) Project Margin	50%	Project Margin		<i>LOM EBITDA/ LOM Revenue</i>
				> 60%	5	
				50% - 60%	4	
				40% - 50%	3	
				30% - 40%	2	
		0% - 30%	1			
		(a.) Portfolio Margin Impact	50%	Portfolio Margin Impact		<i>Percent change in Margin (defined above) when Project is added to portfolio</i>
				> 5.0%	5	
				2.5% - 5.0%	4	
				1.0% - 2.5%	3	
0% - 1.0%	2					
< 0%	1					
(5.) Free Cash Flow Impact	25%	(a.) Near to Medium Term (< 5 years)	75%	FCF Impact (year 0 to 5)		<i>Percent change in Cumulative Free Cash Flow at end of Year 5</i>
				> 2.5%	5	
				0% to 2.5%	4	
				-2.5% to 0%	3	
				-5.0% to -2.5%	2	
		< -5.0%	1			
		(b.) Long Term (5 - 10 years)	25%	FCF Impact (year 5 to 10)		<i>Percent change in Cumulative Free Cash Flow at end of Year 10</i>
				> 2.5%	5	
				0% to 2.5%	4	
				-2.5% to 0%	3	
-5.0% to -2.5%	2					
< -5.0%	1					

Source: Brady and Mazumdar

Average operating margin ~46%

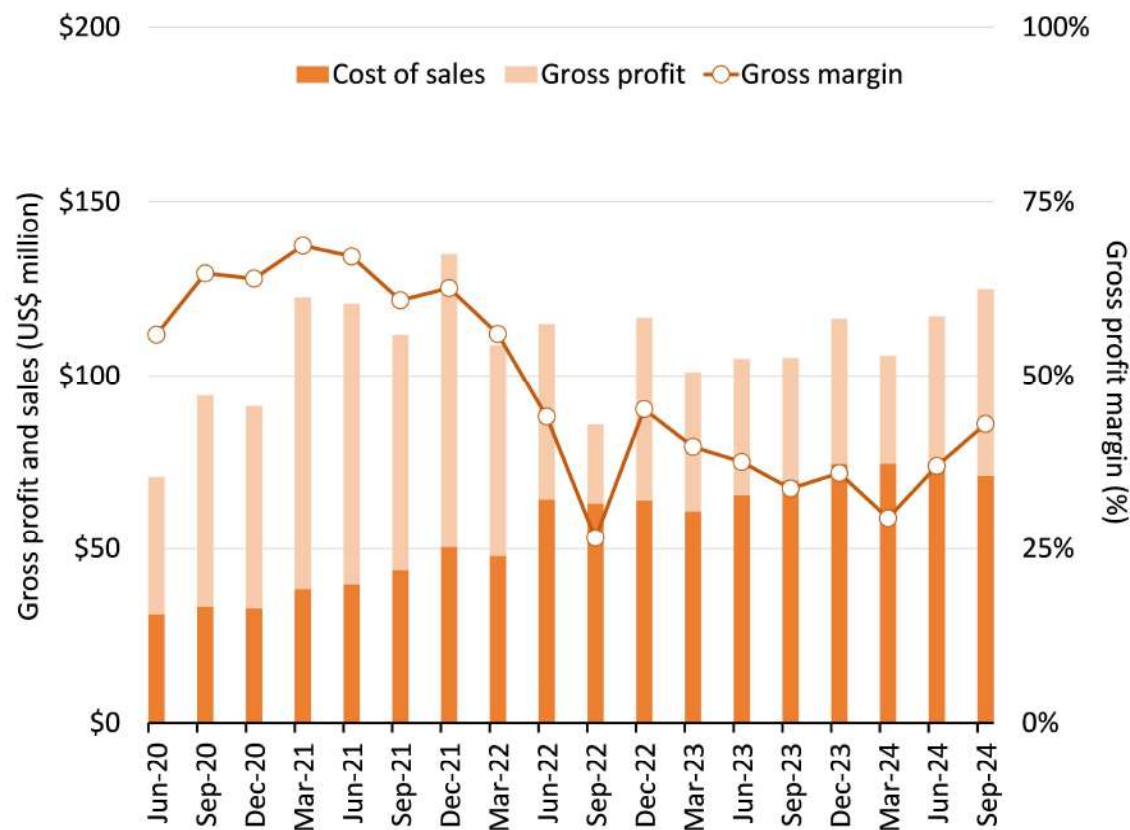
- Higher production volume or grade does not necessarily translate into better economic performance as the operating margin (**revenue net of operating costs**, not including corporate G&A, exploration, or financing costs) per every ounce sold is critical.
- The H1/2024 gold price surge supported the companies' margins despite cost pressures.
- The average operating margin was 46% during the first half of 2024, while the AISC margin was ~10% lower as it includes sustaining capital



Source: Q2/2024 company reports for listed companies and Exploration Insights

Time series of margin

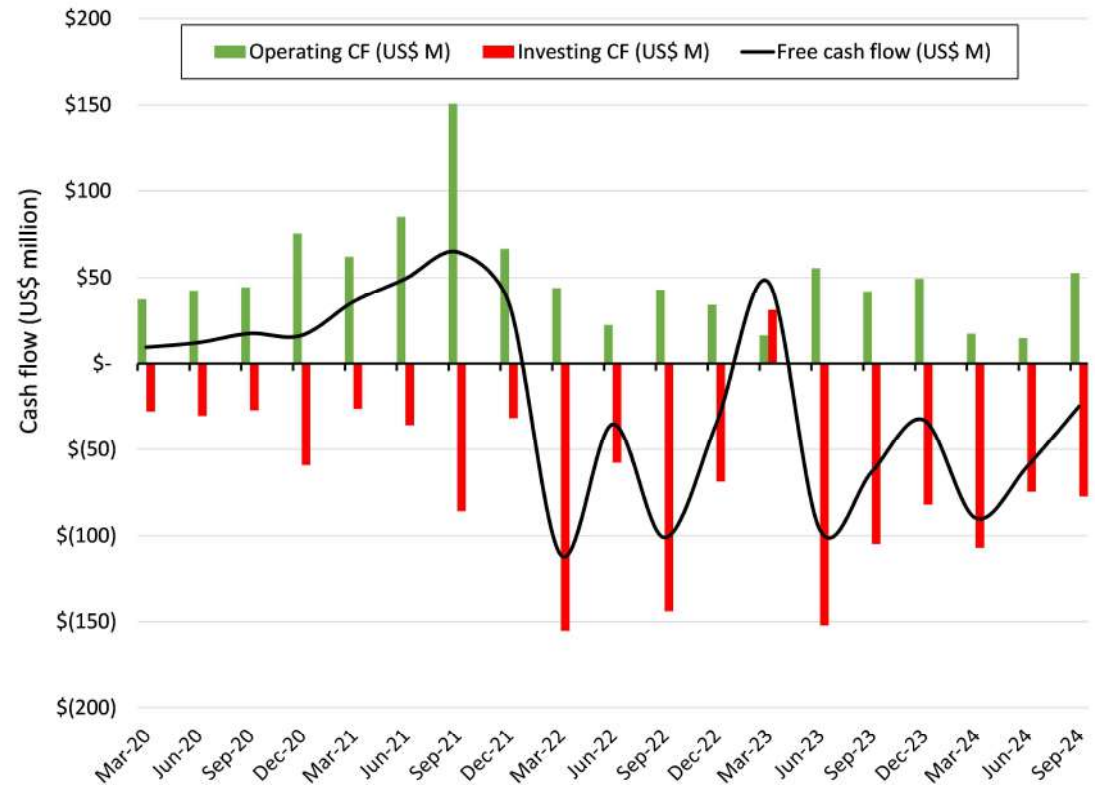
- Gross margin is the revenue net of the cost of sales for gross profit
- At ERO, It is based on production from its Caraíba underground operation (Pilar mine).
- Margin has dropped from 65-70% to ~25% due to lower grades but has been improving as the underground development to higher grade zones advances



Source: Ero Copper and Exploration Insights

Time series of free cash flow

- Free cash flow (black line) is the net of operating cash flow (green bar) and cash flow used in investing activities (red bar)
- Ero Copper began building the Tukumã copper-gold project in 2022 which increased its investing activities and challenged its ability to generate positive free cash flow.



Source: Ero Copper and Exploration Insights

Strategic Fit Score

Growth potential (15%)

- Growth potential – valuing the exploration potential of the asset including the growth in resource and revenue

Reward Category	Category Weight	Metric	Metric Weight	Ranking Guidelines	
(6.) Growth Potential	15%	(a.) Project Growth	50%	Growth (%)	
				> 50%	5
				25% to 50%	4
				10% to 25%	3
				5% to 10%	2
		< 5.0%	1		
		(b.) Project Growth	50%	Growth (\$M)	
				> \$1,500M	5
				\$1,000 - \$1,500M	4
				\$500 - \$1,000M	3
\$250 - \$500M	2				
< \$250M	1				

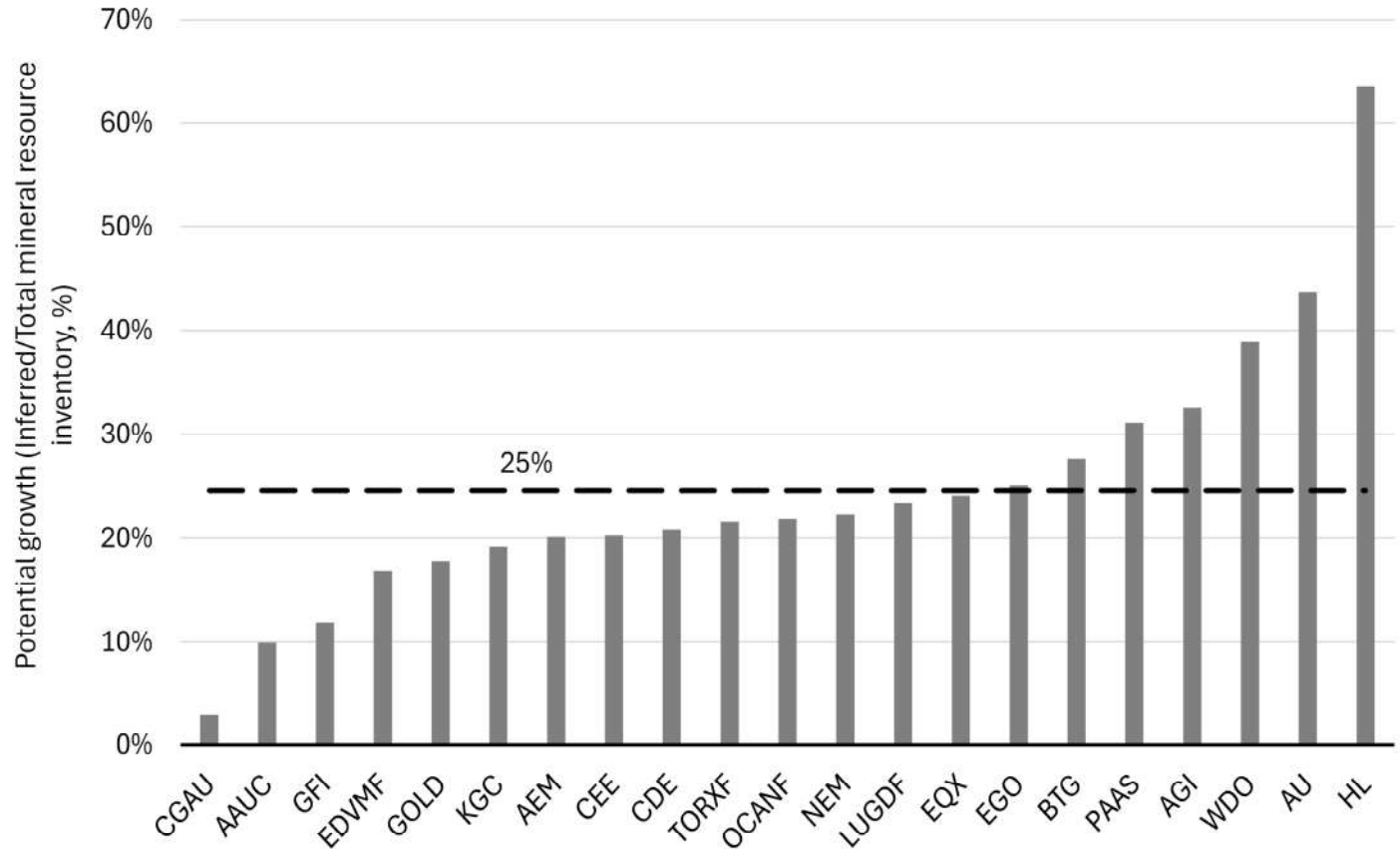
Growth expressed as the P50 of the opportunity as a percent over and above contained in modeled (in units)

Growth expressed as the P50 of the opportunity as a percent over and above contained in modeled (in Revenue using BP prices)

Source: Brady and Mazumdar

Production growth

- The growth of the production profile may be satisfied through M&A, which is generally easier for companies with a smaller production base.
- The average growth potential was higher than expected at 25% (Inf/TMI), though it's important to note that some resources in the Inferred category may be problematic and never be upgraded
- A significant portion of **HL's** growth (+60%) includes the Fire Creek gold project, which was placed on care and maintenance in 2021 after being acquired for US\$462 M in cash and shares in 2018.
- On the other end of the spectrum is **CGAU**, which lost its Kumtor gold mine in the Kyrgyz Republic in 2022.



Source: Company 2023 reserve and resource statements and Exploration Insights

Enterprise Risk Score

What do decision makers/investors consider worry about?

Higher score = higher risk

- **Technical** – compliance, energy, mineralization, supply chains, geotechnical, water, process flowchart
- **Execution** – construction/logistics, safety, labor, operational flexibility
- **Geo-political** – various metrics
- **Environmental and Social Responsibility** – land access, cyanide usage, stakeholder relations, reclamation
- **Sustained low gold prices**
- **Reserve replacement**

Opportunity	Enterprise Risk Category	Metric(s)	Weight
Internal Projects	Technical (Risk of not developing/operating the opportunity as planned due to practical issues with permits, water availability, etc.)	• Compliance	17%
		• Energy	
		• Mineralization	
		• Critical Parts / Supply	
		• Geotechnical	
		• Water Availability	
		• Process Flowchart	
External M&A	Execution (Risk of not developing/operating the opportunity as planned due to issues with logistics, HR, etc.)	• Construction & Logistics	17%
		• Safety	
		• Workforce Availability / Skills	
		• Operational Flexibility	
	Geo-Political (Risk of operating/developing in a country)	• Geo-Political Risk	17%
	Environmental and Social Responsibility (ESR risks associated with the opportunity)	• Land Access	17%
		• Cyanide Usage	
		• Stakeholder Relations	
		• Ability to Reclaim	
	Sustained Low Gold Prices (Risk to profitable operation during sustained low gold prices)	• Risk to Low Gold Prices	16%
	Reserve Replacement (Risk of replacing reserves)	• Risk to Replacing Reserves	16%

ERM Score

- Methodology applied consistently for internal and external opportunities
- Standardized measurement criteria developed for each ERM risk category
- Each Metric is scored from 1 to 5;
- Results are weighted to generate an overall risk score for the opportunity;
- Higher ERM scores indicate the opportunity poses more risks to Newmont's Strategic Foundations

Source: Brady and Mazumdar

Enterprise Risk Score

Criteria and weightings

- Ratings range from 1-5
- Weights for each category should reflect management or investor's priorities
- The total would represent the score on the X-axis of the Rate and Rank graphic

<i>EXAMPLE PROJECT</i>	<i>RATING</i> (1-5)		<i>WEIGHT</i>	<i>ERM SCORE</i>
1. <i>Technical Risk</i>	2	×	17%	.34
2. <i>Execution Risk</i>	3		17%	.51
3. <i>Geopolitical Risk</i>	4		17%	.68
4. <i>Environmental & Social Responsibility (ESR)</i>	2		17%	.34
5. <i>Sustained Low Gold Price Environment</i>	3		16%	.48
6. <i>Reserve Replacement</i>	1		16%	.16
				=
				2.51

Source: Brady and Mazumdar

Enterprise Risk Score

Technical - Compliance (15%), Energy (14%) and Mineralization (14%)

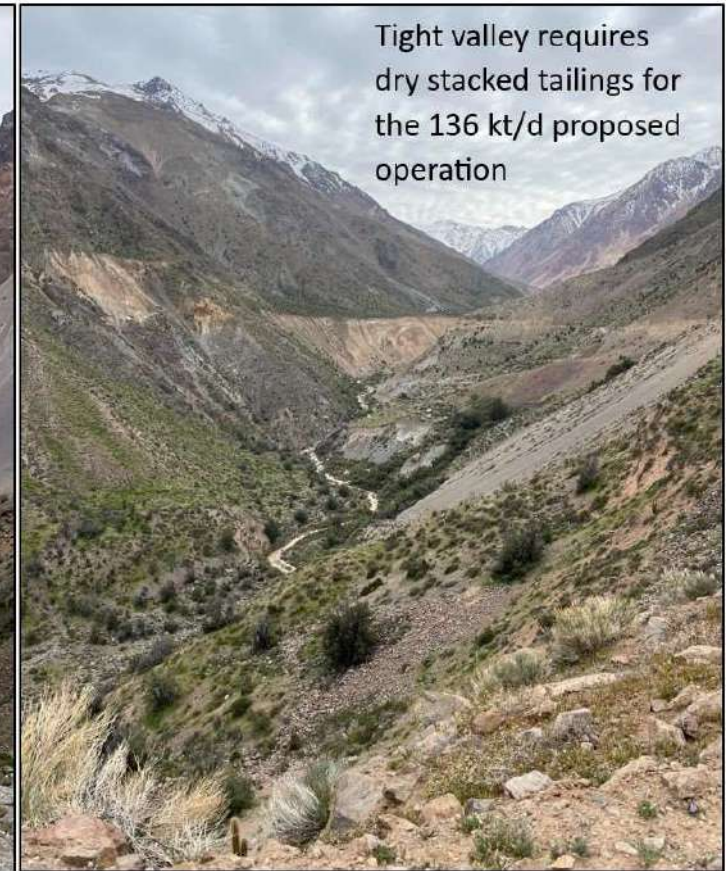
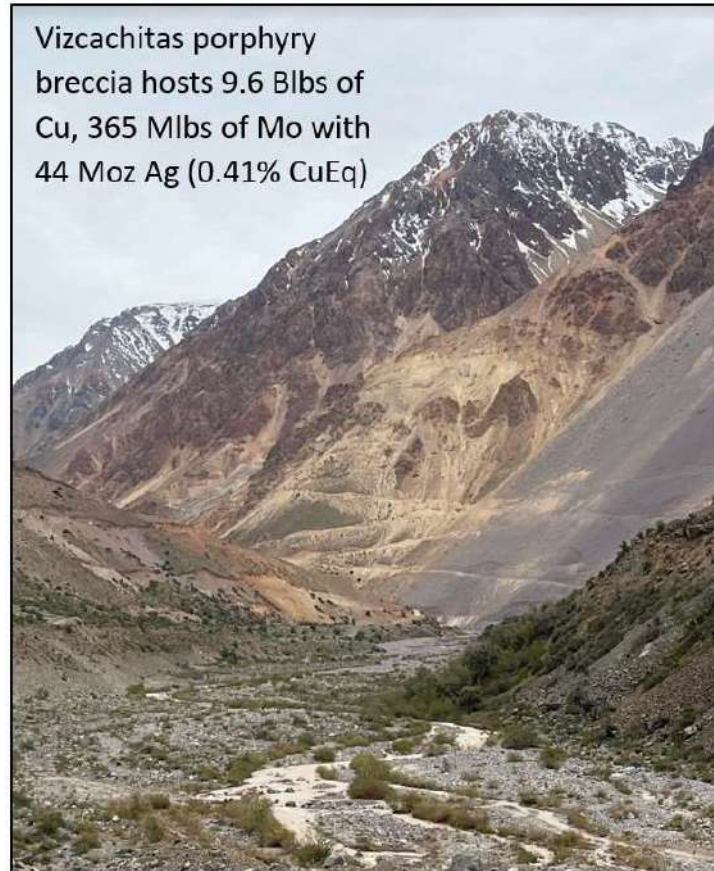
- **Compliance** – will the project meet current and/or foreseeable standards
- **Energy** – access to power
- **Mineralization** – Reserves more valuable than resources

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines		
(1.) Technical	17%	(a.) Compliance	15.0%	Compliance		Rank
				No significant issues with respect to current and foreseeable compliance	1	<i>Risk to the ability of the opportunity to meet set compliance standards</i>
				No significant issues with current compliance but minor issues with foreseeable compliance	2	
				Minor issues with current compliance	3	
				Minor issues with current compliance but significant issues with respect to foreseeable compliance	4	
		Significant issues with respect to current and foreseeable compliance	5			
		(b.) Energy	14.0%	Energy		Rank
				No issues (internally generated power (i.e., Nev. Power plant))	1	<i>Risk to access to power</i>
				Access to reliable grid and/or diesel generation	2	
				Base case - Reliance on grid / Strained regional capacity	3	
				Minor power supply obstacles not fully captured in financial model	4	
		Major power supply obstacles not fully captured financial in model	5			
		(c.) Mineralization	14.0%	Mineralization		Rank
				100% of modeled mineral inventory is in the reserve	1	<i>Risk to the ability to convert all modeled inventory into reserves</i>
				100% of modeled mineral inventory is in reserve/resource category with >50% in reserves	2	
50% to 100% of modeled mineral inventory is in reserve/resource category with ≤50% in reserves	3					
≤50% of modeled mineral inventory is in reserve/resource category	4					
None of the mineral inventory is in reserve or resource category	5					

Source: Brady and Mazumdar

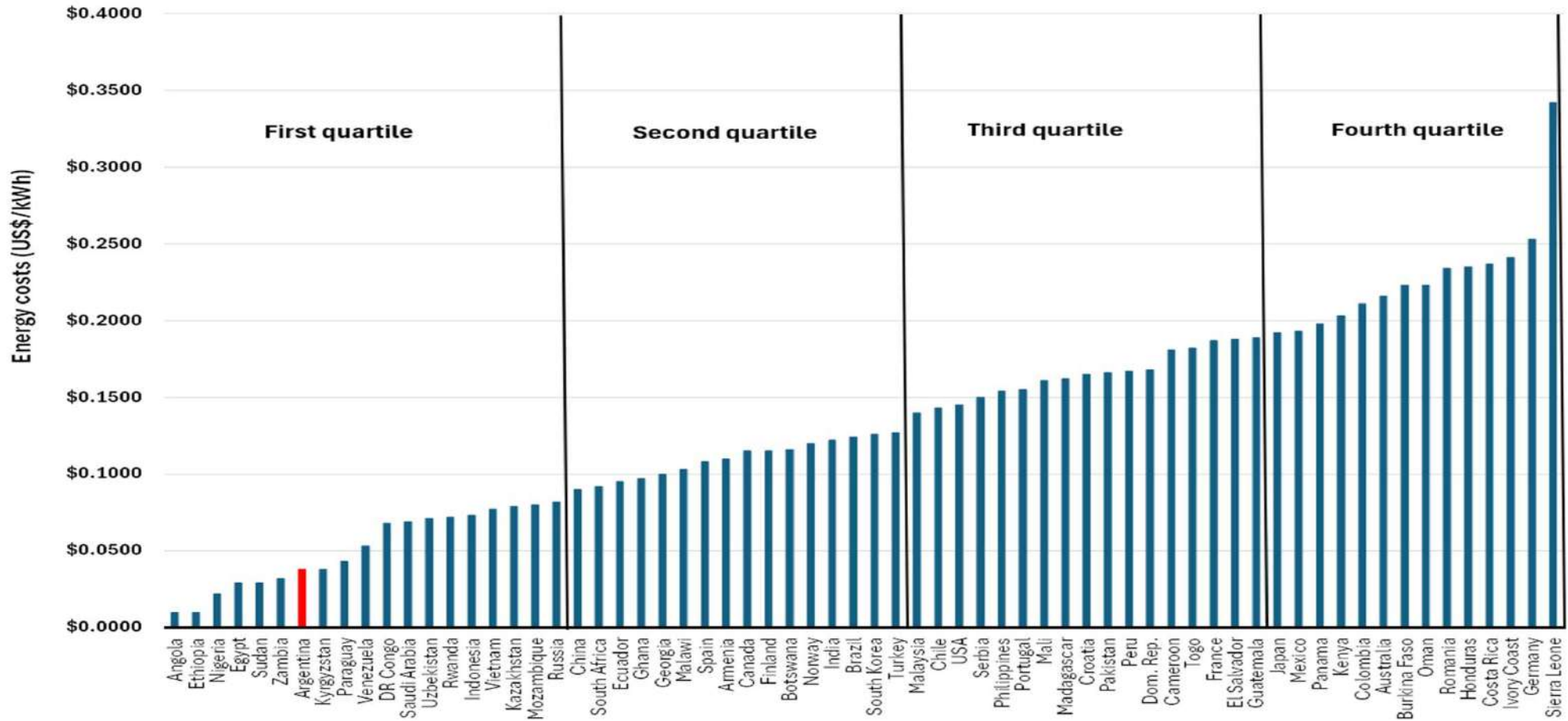
Complying with local concerns

- Feasibility-stage Vizcachitas copper-molybdenum-silver project in Chile operated by Los Andes Copper (L.A.V).
- Vizcachitas is a large open pit project (136 kt/d) located at a low elevation (1,950 masl) in a narrow valley near San Felipe, a few hours from Santiago.
- In my opinion, the project's viability hinges on a more positive sentiment in the copper market to secure the required funding of US\$2.44 billion for its construction.
- The project also includes measures to mitigate its impact on downstream farms' water resources and manage sizable dry-stacked tailings facilities.



Source: Exploration Insights

Energy costs are a significant cost input



Source: www.globalpetrolprices.com/electricity_prices and *Exploration Insights*

Power availability issues in West Africa

- In Côte d'Ivoire, available grid power fell from 69% to 18% in the second quarter, raising power costs by 55% to US\$0.28/kWh.
- In Burkina Faso, availability fell from 91% to 27%, with power costs increasing by 113% to US\$0.49/kWh.

	THREE MONTHS ENDED			SIX MONTHS ENDED	
	30 June 2024	31 March 2024	30 June 2023	30 June 2024	30 June 2023
<i>All amounts in US\$/oz</i>					
Houndé	1,472	1,572	1,085	1,514	1,113
Ity	885	884	797	885	764
Mana	1,927	1,453	1,481	1,661	1,277
Sabodala-Massawa ¹	1,164	947	762	1,050	774
Corporate G&A	48	49	56	48	56
AISC FROM CONTINUING OPERATIONS	1,287	1,186	1,000	1,237	978
Boungou ²	—	—	2,147	—	1,639
Wahgnion ²	—	—	1,817	—	1,566
GROUP AISC³	1,287	1,186	1,136	1,237	1,080

¹Excludes pre-commercial costs associated with ounces from the BIOX[®] expansion project ²The Boungou and Wahgnion mines were divested on 30 June 2023.

³This is a non-GAAP measure, refer to the non-GAAP Measures section for further details.

Source: Endeavour Mining

Mineral resource risk

January 2011 – 6.2 Mt @ 20.1 g/t Au
-> 4.0 Moz

At a cut-off grade of 5 grams gold per tonne

	Tonnes	Grade (g/tonne)	Contained Ounces
Surface (5372el) to 500 m below surface (4872el)			
Drill Inferred Mineral Resources	1,847,000	22.3	1,324,900
Geologically Inferred Mineral Resources	1,576,000	26.8	1,357,100
Total Inferred Mineral Resources	3,423,000	24.4	2,682,000
500m (4872 el) to 1500 m below surface (3872el)			
Drill Inferred Mineral Resources	1,254,000	15.7	631,700
Geologically Inferred Mineral Resources	1,527,000	14.1	693,700
Total Inferred Mineral Resources	2,781,000	14.9	1,325,400
Surface (5372el) to 1500 m below surface (3872el)			
Drill Inferred Mineral Resources	3,101,000	19.6	1,956,600
Geologically Inferred Mineral Resources	3,103,000	20.6	2,050,800
Total Inferred Mineral Resources	6,204,000	20.1	4,007,400

June 2013 – 11.5 Mt @ 9 g/t Au ->
3.3 Moz

Table 5: Mineral Resource Statement*, Phoenix Gold Project, Ontario, SRK Consulting (Canada) Inc., June 24, 2013

Domain	Resource Category	Quantity ('000 t)	Grade Au (g/t)	Contained Gold ('000 oz)
Main [#]	Measured	-	-	-
	Indicated	4,120	8.52	1,129
	Measured + Indicated	4,120	8.52	1,129
	Inferred	6,027	9.49	1,839
HW	Measured	-	-	-
	Indicated	-	-	-
	Measured + Indicated	-	-	-
	Inferred	151	5.21	25
External	Measured	-	-	-
	Indicated	-	-	-
	Measured + Indicated	-	-	-
	Inferred	1,274	8.66	355
Combined	Measured	-	-	-
	Indicated	4,120	8.52	1,129
	Measured + Indicated	4,120	8.52	1,129
	Inferred	7,452	9.26	2,219

Jan 2016 – 2.0 Mt @ 6.3 g/t Au ->
0.4 Moz

Table i: Mineral Resource Statement*, Phoenix Gold Project, Ontario, SRK Consulting (Canada) Inc., January 11, 2016

Resource Category	Quantity ('000 t)	Grade Au (g/t)	Contained Gold ('000 ounces)
Measured	-	-	-
Indicated	492	6.73	106
Measured + Indicated	492	6.73	106
Inferred	1,519	6.28	307

Source: Rubicon Minerals and Exploration Insights

Enterprise Risk Score

Technical - Supply chain (14%), Geotechnical/hydrogeology (14%), water (15%) and process (15%)

- Supply chain – access to long lead items, reagents, mill balls, diesel, etc.
- Geotechnical/hydrogeology – risks to mining and tailings
- Water availability – access to water
- Process flowchart – ability to process ore

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines			
(1.) Technical	17%	(d.) Critical Parts/Supply	14.0%	Critical Parts/ Supply		Rank	<i>Risk to the ability to procure required critical parts</i>
				Operating asset with no expansion required	1		
				Operating asset with limited expansion required	2		
				Operating asset with some development project	3		
				Development project of a limited scale	4		
		Large scale development project	5				
		(e.) Geotechnical/Hydrogeology	14.0%	Geotech		Rank	<i>Mining or process related risk to geotechnical and/or hydrogeology issues</i>
				No significant geotechnical/ hydrogeological issues	1		
				Minor geotechnical/ hydrogeological issues	3		
		(f.) Water Availability	15.0%	Water		Rank	<i>Risk to the ability to access water from an availability and permitting perspective</i>
				Readily available water with access rights	1		
				Minor supply issues with access rights	2		
				Constrained supply with access rights	3		
				Minor obstacles in obtaining water and/or water access rights	4		
		Significant obstacles in obtaining water and/or water access rights	5				
		(g.) Process Flowchart	14.0%	Process Flowchart		Rank	<i>Risk to the ability to process material according to proposed flowchart</i>
				Proven process at other existing Newmont operations	1		
Proven process at other mining operations (with internal expertise)	2						
Proven process at other mining operations	3						
Lab tested process flowchart	4						
Untested process flowchart	5						

Source: Brady and Mazumdar

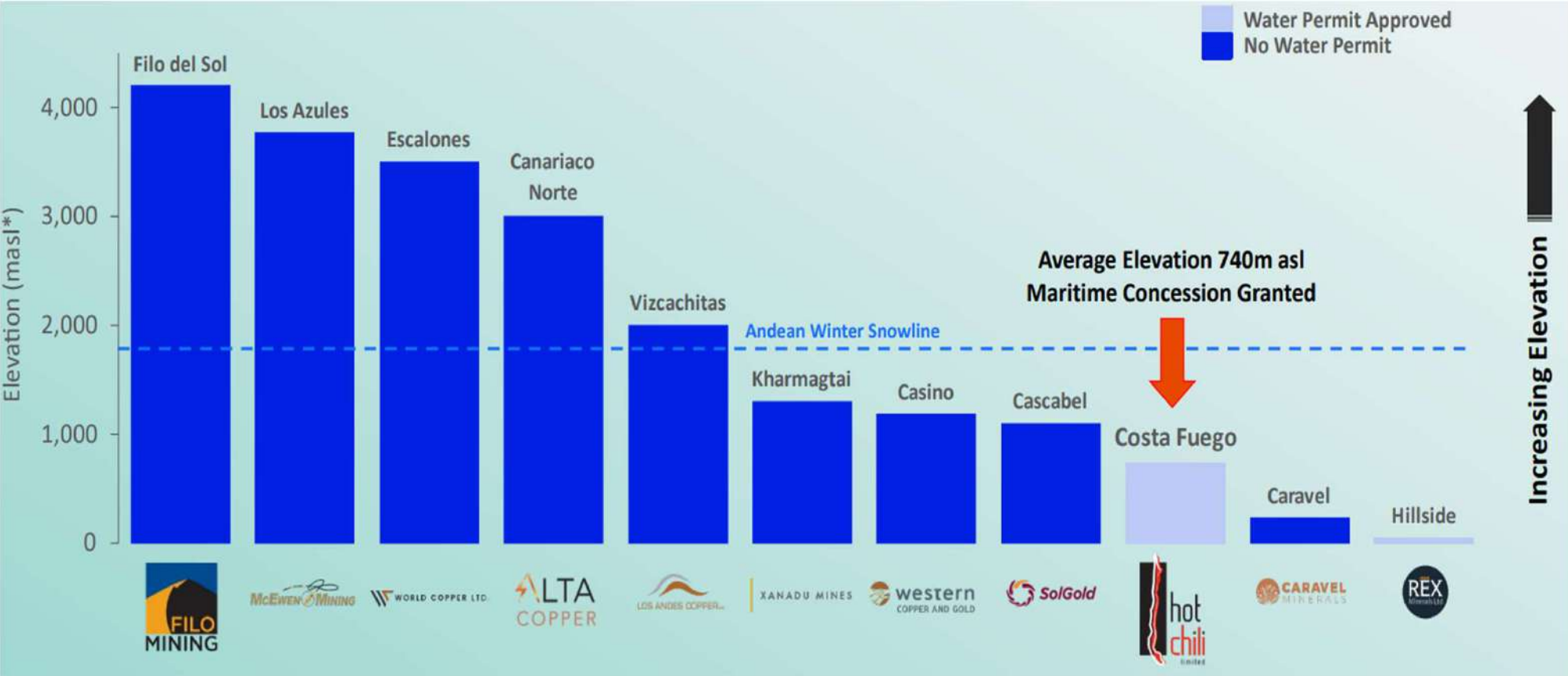
Geotechnical failure at Eagle Gold Mine in Yukon Territory

- A valley-fill heap leach pad at the Eagle gold mine in the Yukon Territory failed resulting in the shutdown of the mine
- The crushed ore was a fine fraction with no agglomeration
- Potential that snow melt may have generated a slip plane that caused the failure



Source: Northern Miner

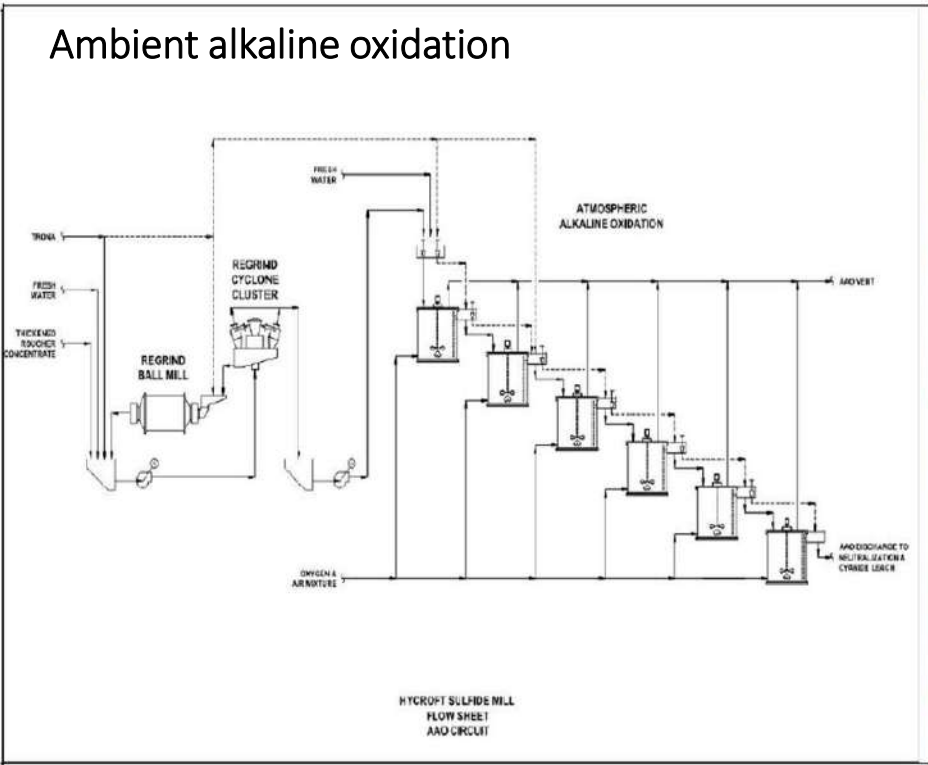
Access to water for copper projects in Chile



Source: Hot Chili Copper

Process flowsheets – lab scale versus commercial scale

Ambient alkaline oxidation



Source: Canaccord Genuity

Enterprise Risk Score

Execution - Construction (25%), safety (25%) and labor (25%)

- Construction/Logistics – execution risk around the project’s development
- Safety – Difficulty in maintaining safety levels
- Workforce availability/skills – Labor availability and technical capacity

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines	
(2.) Execution	17%	(a.) Construction & Logistics	25%	Brownfield -> Greenfield	
				Rank	
				Brownfield (simple process with complete infrastructure)	1
				Brownfield expansion	2
				Brownfield project with some process complexity (no infrastructure but not remote)	3
		Brownfield project with complex process OR simple Greenfield in a mining district and not remote	4		
		Greenfield project with complex process (no existing infrastructure), remote access and/or extreme conditions	5		
		(b.) Safety	25%	Safety Related Risks	
				Rank	
				Asset with applicable Occupational Health and Safety certifications. Significant portion of workforce with mining experience within Newmont.	1
		Current operation with incomplete Occupational Health and Safety certifications. Minor portion of workforce with limited or no experience.	3		
		Development project without applicable Occupational Health and Safety certifications. Significant portion of workforce with limited or no experience.	5		
		(c.) Workforce Availability / Skills	25%	Workforce Availability & Skills Risks	
				Rank	
				Asset with skilled workforce. No significant additional staffing needed.	1
Asset located in a competitive mining district with minor additional staffing needed. Shortage of some key skill sets	3				
Asset located in a competitive mining district with major staffing needed. Shortage of numerous key skill sets	5				

Execution risk around development of the project

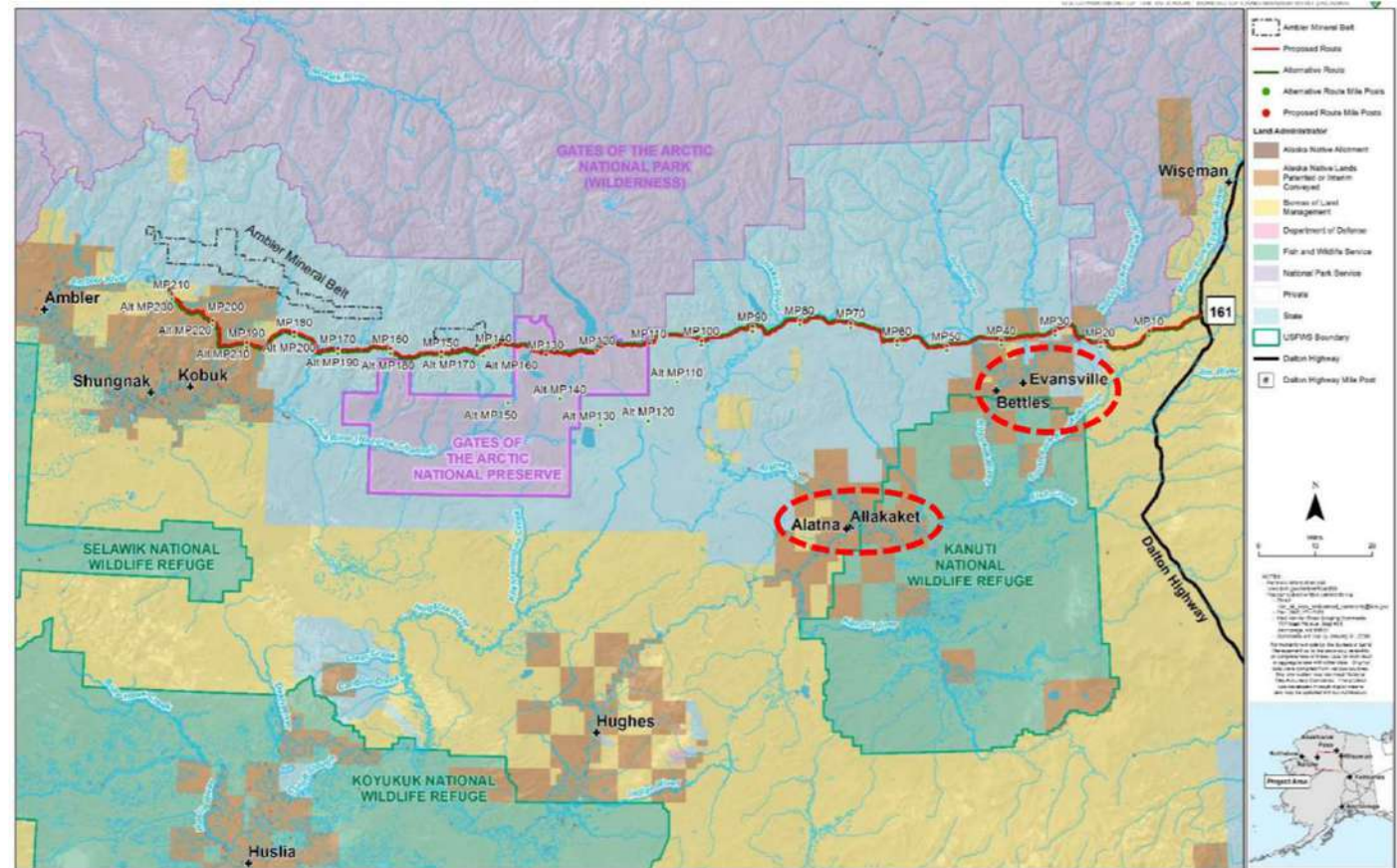
Execution risk around meeting safety standards

Execution risk around access to volume of skilled workforce

Source: Brady and Mazumdar

Access road is critical to Greenfields copper project in Alaska

- The Ambler Access Road is a critical 211-mile road from the Dalton Highway to the Ambler Mining District, which hosts the Arctic and Bornite deposits.
- The reason for the suspension of the previously issued permits is the need to do more studies on the impact of the road on subsistence hunting, specifically for the communities south of the road, which border on the Kanuti National Wildlife Refuge



Source: Trilogy Metals

Mine declared unsafe after fatalities at UG mine in Chile

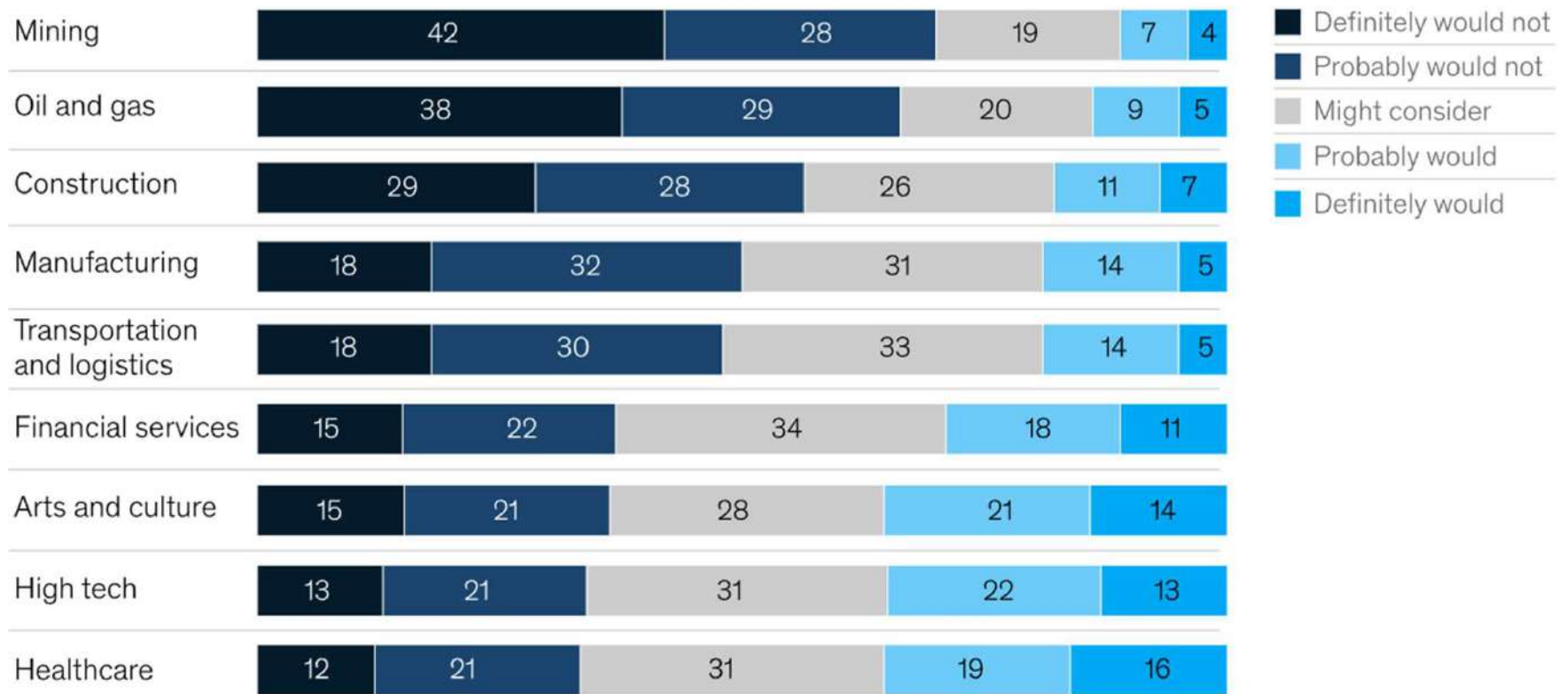
- In June 2017, the flooding of one of the three mines that led to two fatalities at the Cerro Bayo silver-gold operation (1.5 kt/d) in southern Chile led Mandalay Resources (MND.T) to put it on care and maintenance.
- The company lost its social license and sold the project for shares and a royalty.



Source: Municipalidad de Chile Chico via X

Mining is not attractive to younger generation

Share of respondents, ages 15 to 30, who would consider working in the following sectors, %



Source: Mining Industry Human Resources Council 2020/2021 Employee Survey

Enterprise Risk Score

Execution – operational flexibility + Geographic – geopolitical risk, where to invest and mining legislation

- Operation flexibility – lower flexibility = higher execution risk
- Geopolitical risk – creeping nationalism
- Mining legislation – stable tax agreements

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines			
(2.) Execution	17%	(d.) Operational Flexibility	25%	Operational Flexibility		Rank	<i>Less flexible a project is the higher execution risk</i>
				Current operation with both mining and processing flexibility	1		
				Development project with both mining and processing flexibility	2		
				Current operation or development project with either mining flexibility or processing flexibility (not both)	3		
				Current operation or development project with limited mining and processing flexibility	4		
				Current operation or development project with no mining and processing flexibility	5		
(3.) Geographic	17%	(a.) Geopolitical Risk	33%	Willis Index		Rank	<i>Geopolitical risk – Willis Index</i>
				AAA (USA, AUS, CAN, ...)	1		
				< 35 (Romania, ...)	2		
				36-55 (Brazil, Peru, Ghana, ...)	3		
				56-65 (Argentina, Indo, ...)	4		
		> 65 (Ecuador, Uzbek, ...)	5				
		(b.) Where to invest?	33%	Behr Dolbear		Rank	<i>Geopolitical risk – Behr Dolbear</i>
				Excellent (Australia, Canada, Chile, Mexico)	1		
				V Good (USA, Brazil)	2		
				Good (Ghana, Columbia, Argentina, China, Mongolia, Tanzania)	3		
				Bad (Peru, India, Philippines)	4		
		V Bad (S Africa, Kazakhstan, PNG, Russia, Bolivia, Indonesia)	5				
		(c.) Mining Legislation	33%	Fraser Institute		Rank	<i>Mining legislation risk – Fraser Institute</i>
				> 80 (Chile, Nevada, Quebec)	1		
				> 60 (Ghana, Botswana, WA, S Aust., NT, Yukon, Sask., Ont, BC)	2		
> 40 (Peru, Brazil, Burkina Faso, Argentina, Victoria, Queensland, NSW, Montana, Colorado, Alaska, NWT)	3						
> 20 (Nunavut, PNG, NZ, Philippines, DRC Congo, China, Kazakhstan, Russia, Turkey, Venezuela, Columbia, Tanzania, S Africa)	4						
< 20 (India, Mongolia, Ecuador, Bolivia, Indonesia)	5						

Source: Brady and Mazumdar

Limited mining flexibility with BC underground gold mine

- January 2024 – Raises C\$75 million (C\$0.44/sh) for Premier Gold Mine in BC to complete the project and ramp up to commercial production.
- February 2024 – Construction excluding mine development was 86% complete after spending C\$292 M. Mining development focuses on initial mining in the Prew Zone, with stope production in Q3 2024.
- April 2024 – First gold pour.
- June 2024 – Treating stockpile and some underground ore (800 tpd) but running out of money
- July 2024 – Raises another C\$20 million -> C\$34 million (C\$0.43/sh)
- September 2024—The company puts projects on care and maintenance as the pace of mine development falls short of expectations, with not enough stops to feed the mill. The company needs to go deeper, which requires more money.
- November 2024 – Closes financing for C\$42 million (C\$0.16/sh)



Source: xxxxxxx

Argentina improving geopolitical risk environment

- **Argentina** is currently the highest-risk jurisdiction for Latin American countries with a significant copper endowment.
- The biggest risk is economics, operational and taxes which the current government is working to alleviate.
- The **RIGI** policy helps establish a better tax policy for the large investors in resource projects.

Key benefits of RIGI include:

25% corporate tax rate (instead of 35%)	Exempted from export duties after 3 years from the date of the project's approval
Entitled to tax, custom and F/X stability for 30 years	100% of export proceeds available to remain in \$USD after Yr. 3 (20% in Yr. 2, 40% in Yr. 3)
Accelerated dep'n for equipment of 2 yrs, infrastructure & cost of mine 60% of useful life.	Full access to F/X market to repay loans, pay interest and dividends

Source: AbraSilver Corp.

Country	Political	Economics	Legal	Tax	Operational	Security
Australia	1.5	1.3	1.1	1.6	1.4	1.2
Canada	1.7	1.5	1.1	1.3	1.4	1.2
USA	1.7	0.8	1.2	1.6	1.5	2.4
Botswana	1.6	2.0	1.4	1.8	2.0	1.0
Chile	2.0	1.5	1.7	2.1	2.0	2.1
Panama	1.9	1.6	2.0	2.2	3.0	1.3
Namibia	2.0	2.4	2.1	2.1	2.4	1.4
Peru	2.7	1.4	2.1	2.0	2.8	1.9
Serbia	1.8	2.4	2.2	2.0	2.4	2.1
Indonesia	1.9	1.9	2.3	1.9	2.7	2.3
Mongolia	1.8	2.9	2.3	2.6	2.6	0.9
Philippines	1.9	1.6	2.3	2.1	2.7	2.6
Brazil	2.0	2.1	1.9	2.8	2.9	1.8
Kazakhstan	1.9	2.7	2.4	2.2	2.9	1.5
Colombia	2.5	2.3	2.1	2.2	2.6	2.6
Zambia	2.4	3.9	2.7	2.7	2.7	1.3
Mexico	2.8	1.7	3.5	2.8	3.3	1.9
Ecuador	2.6	2.4	2.6	2.9	3.5	2.3
Argentina	2.1	5.4	2.2	2.6	3.0	1.8
PNG	3.1	3.5	2.6	3.3	3.9	1.7
Pakistan	3.3	5.3	2.4	3.2	3.1	3.5
Russia	2.8	5.1	5.3	3.8	4.1	2.6
DR Congo	3.3	3.6	4.3	4.5	5.2	4.0

Source: S&P Global Market Intelligence and Exploration Insights

Security concerns in Mali

- Resolute Mining (RSG.ASX) resolved a US\$160 million tax dispute with Mali's military junta following the detention of its Managing Director and a pair of colleagues after having paid US\$80 million already. The executives' detention led to a 55% drop in the company's share price in early November.



Source: Investing.com

Enterprise Risk Score

Environmental, social responsibility – land access (25%), cyanide usage (25%), stakeholder (25%)

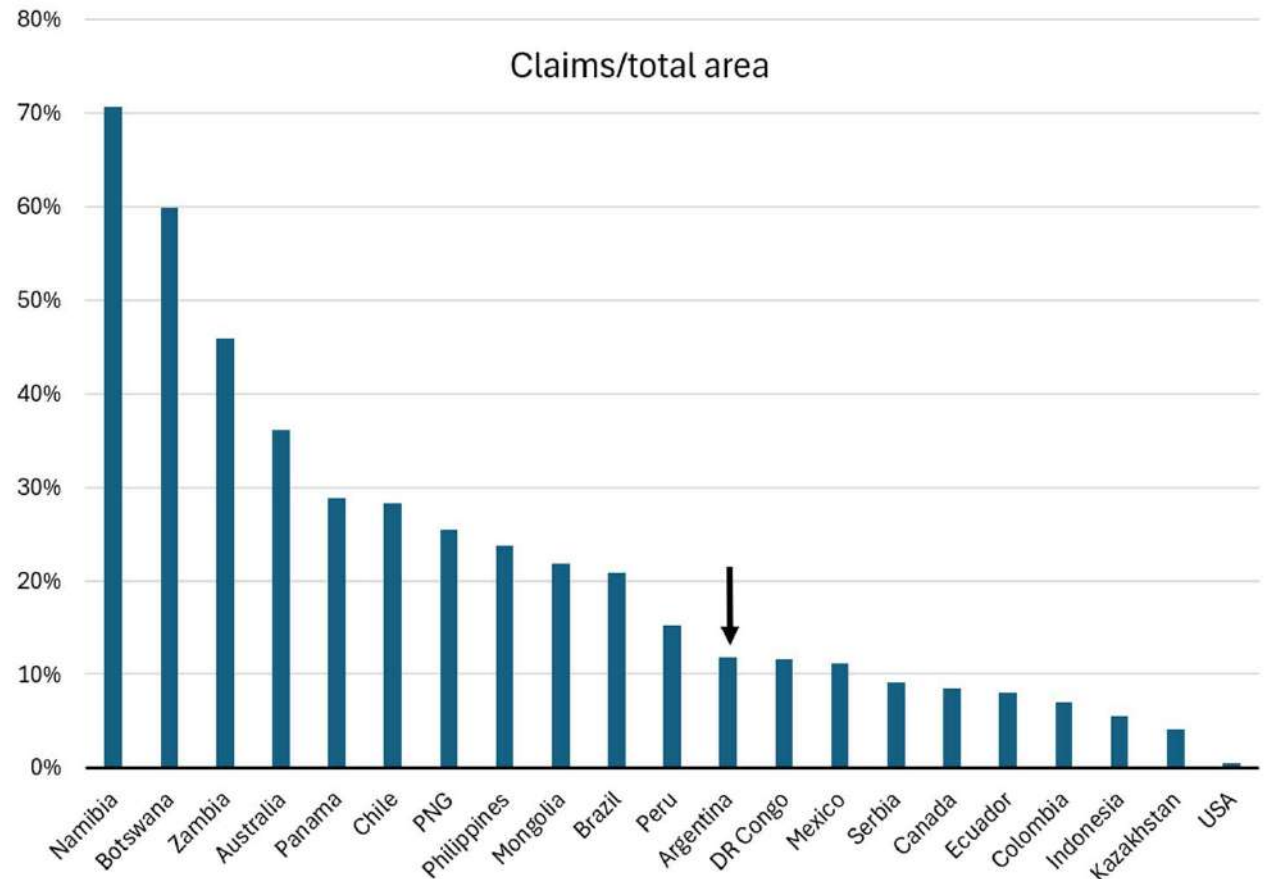
- ESR – Land Access – claim staking and permitting
- Cyanide usage – significant risk for gold companies
- Stakeholder relations – social license to operate

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines		
(4.) Environmental and Social Responsibility	17%	(a.) Land Access	25%	Land Access & Permitting Risks		Rank
				Permits in hand / Favorable mining environment	1	<i>Risk related to land access</i>
				No issues foreseen in obtaining permits / Favorable mining environment	2	
				Minor issues in obtaining permits / Favorable mining environment	3	
				Minor issues in obtaining permits / Challenged mining environment	4	
		Major issues in obtaining permits / Challenged mining environment	5			
		(b.) Cyanide Usage	25%	Cyanide Usage Risk		Rank
				Current operation or development project does not require Cyanide use	1	<i>Risk related to ability to use cyanide in process flowchart</i>
				Current operation requiring cyanide usage in a mining favorable environment	2	
				Development project requiring cyanide usage in a mining favorable environment	3	
				Sentiment towards Cyanide Ban	4	
		Current outright Cyanide Ban	5			
		(c.) Stakeholder Relations	25%	Stakeholder Risk		Rank
				Operation/ Development Project is not proximal to any community or population	1	<i>Risk related to meeting and maintaining local community expectations</i>
				Operation/ Development Project has a minor impact on community (i.e. roadblocks) in favorable mining environment	2	
Operation/ Development Project has a minor impact on community (i.e. roadblocks) in challenged mining environment	3					
Operation/ Development Project has a significant impact on community (i.e. agriculture, displace people) in a favorable mining environment	4					
Operation/ Development Project has a significant impact on community (i.e. agriculture, displace people) in a challenged mining environment	5					

Source: Brady and Mazumdar

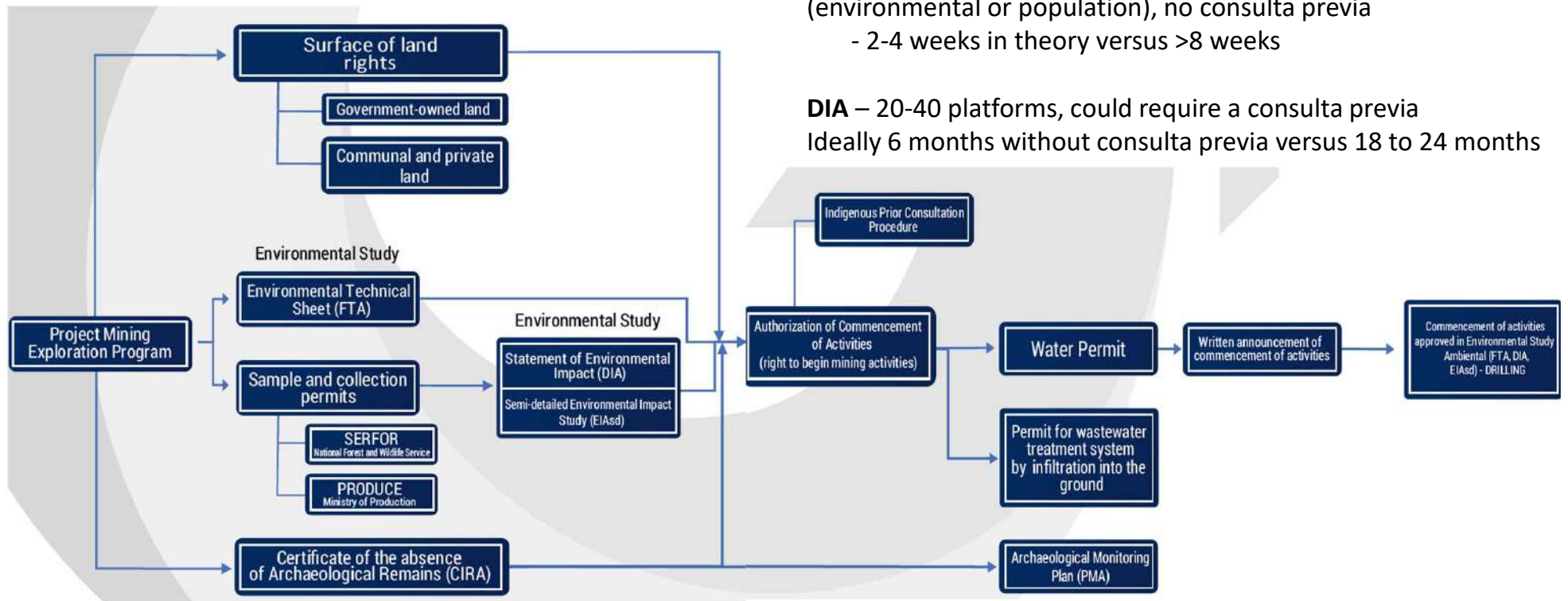
Amount of land open to mining varies

- Some nations allow a large portion open to mining concessions (claims) such as Namibia, Botswana, and Zambia in southern Africa along with Australia
- Mining countries with large areas like Canada, Kazakhstan and the USA have a lower proportion open to claim staking.



Source: S&P Global Market Intelligence and Exploration Insights

Permitting delays



FTA - <20 platforms, smaller area, no sensitive areas (environmental or population), no consulta previa
- 2-4 weeks in theory versus >8 weeks

DIA – 20-40 platforms, could require a consulta previa
Ideally 6 months without consulta previa versus 18 to 24 months

Source: GEADES

Local opposition can stop major projects

- The Judiciary of Cajamarca ruled in favor of a claim against the Ministry of Energy and Mines of Peru and the mining company Yanacocha SRL, concerning the large Conga copper-gold project (17 Moz of Au, 5 Mlbs of Cu).
- The decision nullified the 2010 Environmental Impact Assessment (EIA).



Source: Infobae

Enterprise Risk Score

Environmental, social responsibility – reclamation (25%) + sustained low gold price + reserve replacement

- Reclamation – the potential of changes to policies requiring more liability insurance
- Low gold price environment – the risk of shutdown if gold prices are low for a long time
- Reserves replacement – long life mines add more value

Risk Category	Category Weight	Metric	Metric Weight	Ranking Guidelines	
(4.) Environmental and Social Responsibility	17%	(d.) Ability to Reclaim	25%	Ability to Reclaim	
				No significant issues in complying with current or foreseeable reclamation standards	Rank 1
				No significant issues with current reclamation standards but minor issues with foreseeable reclamation standards	Rank 2
				Minor issues with reclamation standards	Rank 3
				Minor issues with current reclamation standards but significant issues with respect to foreseeable reclamation standards	Rank 4
Significant issues with respect to current and foreseeable reclamation standards	Rank 5				
(5.) Sustained Low Gold Price	16%	(a.) Risk to Low Gold Prices	100%	Break-Even Gold Price (\$/oz.)	
				\$200 - \$400	Rank 1
				\$400 - \$600	Rank 2
				\$600 - \$800	Rank 3
				\$800 - \$1,000	Rank 4
> \$1,000	Rank 5				
(6.) Reserve Replacement	16%	(a.) Risk to Replacing Reserves	100%	Mine Life / Asset Longevity (years)	
				≥ 25 years	Rank 1
				20 - 25 years	Rank 2
				16 - 20 years	Rank 3
				10 - 16 years	Rank 4
< 10 years	Rank 5				

Risk related to the ability to comply to reclamation standards

Risk related to being able to withstand a sustained low gold price environment

Risk related to the ability to replete reserve base

Source: Brady and Mazumdar

Mine plan adds liability and goes bankrupt

- Since 2007, ~500 Mlbs of copper have been produced from the Minto mine, located west of the Yukon River, and ~250 road km north of Whitehorse.
- Minto Mining restarted the Minto copper mine in 2022 as a 4 kt/d plant with a head grade of 1.34% Cu at an AISC of US\$3.18 per pound over an 8-year mine life (10.8 Mt).
- Ceased operations in May 2023 after spending significant capital for the water treatment facilities and going bankrupt as it needed more funds to fund future liabilities.
- Selkirk First Nations took control of the abandoned mine as the sale process failed.

Initial 8-year mine life and only mining ~60% of the current resource base

2022 & Beyond Revised Projections	
Mine Life	~8 years
LOM ¹ Tonnes Processed	10.8Mt
Daily Throughput (2024 onwards)	4,000tpd
LOM Cu grade	1.34%
LOM Au / Ag grade	0.54g/t / 4.68g/t
Avg. Annual / LOM Cu Payable	38.5 / 251Mlbs
Cu Conc. Grade	35%
LOM Unit Costs (Onsite)	C\$75.39/t
LOM C1 Costs (net) ²	US\$2.60/lbs
LOM AISC (net) ²	US\$3.18/lbs
After Tax NPV(8%) @ US\$4.25/lb long term ^{3,4}	C\$288M
Avg. annual Mine EBITDA @US \$4.25/lb	US\$47M



Life Mine vs PEA LOM production profile has been delayed as a result of delays in Yukon mining permits in 2022

Infill Drilling Delays in permitting have allowed us additional time to refine ore mapping and increase reliability on grade control modelling

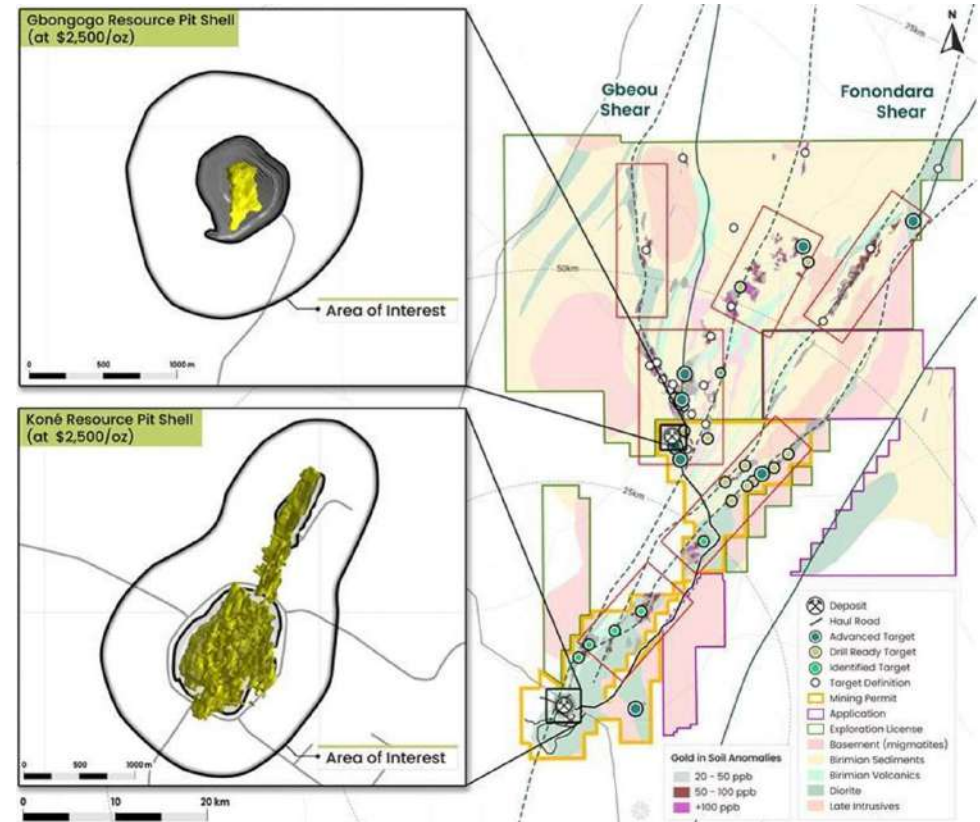
2023 Mining Plan Next phase of mining will include Area 2, Minto North 2 and the development of Ridge Top pit to optimize the camp footprint and open Mill capacity

Notes:
 1. PEA Technical Report titled "Minto Yukon, Canada", completed on May 7, 2021, with an effective date of March 31, 2021, by JDS Energy & Mining Inc. The PEA is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA will be realized.
 2. C1 cost and AISC are a non-IFRS measure. Please refer to the Minto financial statements for the period ending September 30, 2021 on Sedar for a reconciliation of the foregoing non-IFRS measures to their most directly comparable measures calculated in accordance with IFRS. 3. Copper price: 2022+ - US\$4.25/lb. Gold/silver price forecast: 2022+ - US\$1,800 / US\$18.50/oz. Assumes flat FX rate of 0.80.
 4. Includes discounted cash flows of closure related costs (C\$15.4M) which are secured by a bond guaranteed by Capstone.
 5. Mine EBITDA based on mine operating income as disclosed in PEA (revenue - royalties - TCHG - opex) and is a non-IFRS measure. Please refer to financial statements for further disclosure & calculation methodology on Sedar.

Source: Minto Mining

Hedging to mitigate price risk and guarantee cash flow

- **Montage Gold** (MAU.V, MAUTF.OTC) has turned to streaming agreements to finance its Koné gold project in Côte d'Ivoire.
- It raised C\$180 million (US\$130 M) in the middle of August to underpin its **equity** stake (25%) for the US\$712 million in upfront capital expenditure required to build the project.
- It raised another US\$825 million in gold stream deals and loans with Wheaton Precious Metals (WPM.T, WPM.NYSE) and Zijin Mining (ZIJMY.OTC, 601899.SSE).
- MAU raised US\$700 million in a pair of **streaming** deals covering over 20% of gold production up to 400,000 ounces, which gets reduced to just over 6% over the remaining mine life. On a positive note, both facilities can be reduced.
- The company also raised US\$125 million from the same stakeholders in **loans** at SOFOR plus 4.0% to 7.75%.
- It also secured its ability to generate operating margins and cash flow to accelerate deliveries to the WPM stream and potentially exercise buyback options by purchasing **put options** to sell up to 400,000 ounces of gold over 2027-2028 at a floor of US\$2,500 per ounce for US\$52.7 million.



Source: Montage Gold

Summary & Conclusions

- Capital markets provide funds for projects to advance through various stages of development
- Mining companies do the same thing
- The stage-gate process has similarities to the Lasso Curve and requires similar decision-making prowess under uncertainty
- Both have capital constraints
- Find the projects that have a better likelihood of passing the investment hurdles (stage gates) the more likely the project will get funded
- Looking at the project's value proposition (strategic fit score) versus its risk profile (enterprise risk score) may help make better investment decisions and capital allocations
- A rigorous process is required to ensure that the final product is a fair 'apples to apples' comparison
- The tendency is for earlier-stage projects to look better as we know less