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What Does it Mean to Create Value in the Mining Industry?

CIM MES Discussion Group, Toronto

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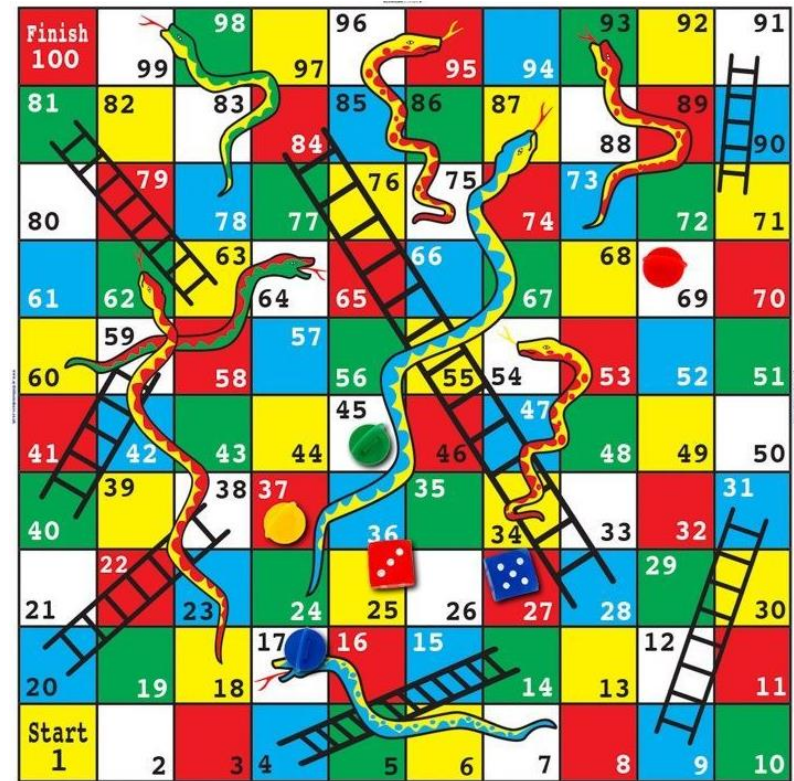
Toronto Denver London Vancouver Quebec City New York City

- RPA has been giving advice to the mining industry for over 30 years
- All stages, and all geographies:
 - exploration and resource evaluation
 - scoping, prefeasibility and feasibility studies
 - financing, permitting, construction, operation, closure and rehabilitation.
- Clients are financial institutions, governments, major mining companies, exploration and development firms, law firms, individual investors, and private equity ventures
- We are 100% employee owned, completely independent
- This has given RPA the opportunity to objectively assess the key fundamentals that are necessary for long-term value creation in the mining industry
- The purpose of this presentation is to summarize some of RPA's observations, and inspire some lively debate and dialogue surrounding the question:

What does it mean to create value in the mining industry?

What is Mining?

- Mining is simple: pull money out of the ground, and hopefully it is worth more than the money you had to spend to enable you to do this
- The mining industry is unparalleled in its ability to create FIRST GENERATION value for all stakeholders, including owners, suppliers, lenders, community groups, employees, governments
- From grass roots exploration to Mineral Resource definition, studies, construction, operations, and closure, there will be many ups and downs



“Making choices to create value for all stakeholders in a responsible manner”

- Richard Ross, Director of Global Mining Management Program,
Schulich School of Business;
Former CEO of Inmet Mining

- How is value creation measured?
- More importantly, through whose lens is value creation being measured?
- Traditional thinking is that stakeholders and shareholders have opposing or conflicted views
- Who is more important?
- How do you value and prioritize one over the other?
- Everyone has different wants, needs, expectations, and timelines



Owners

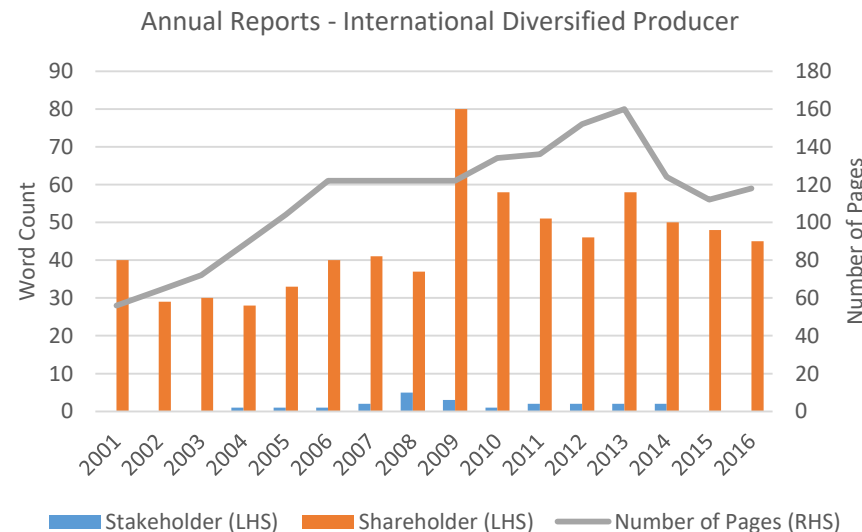
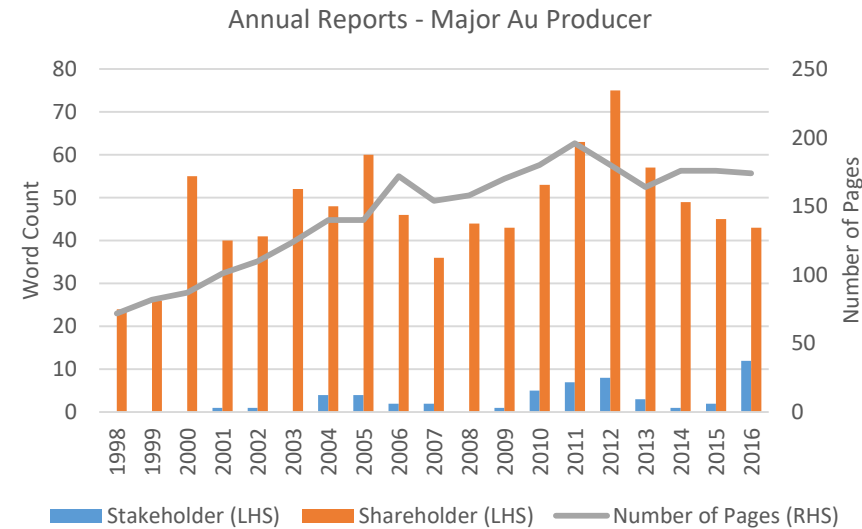
- Institutional
- Private Equity
- Retail
- Larger Company

Stakeholders

- Employees
- Suppliers
- Communities
- Customers
- Lenders

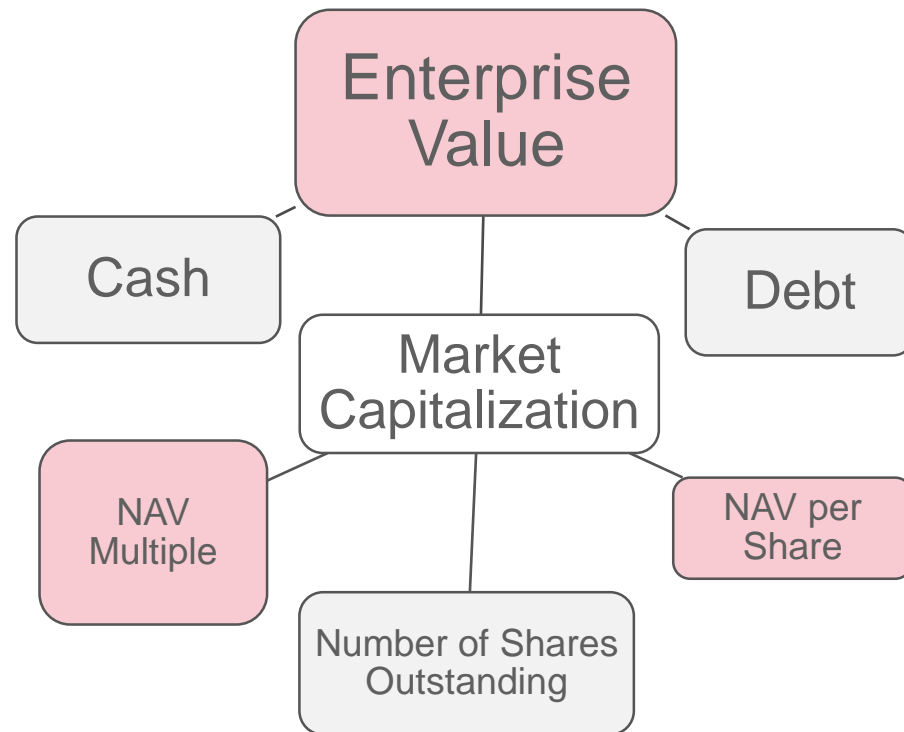
Are Shareholders Stakeholders?

- Evolved thinking is that shareholders are one of many equally important stakeholders, however this is not a universally accepted view
- There is still the question of how all the various priorities are aligned
- Michael C. Jensen, HBS Professor proposes *Enlightened Stakeholder Theory*, where “The objective function of the firm is to maximize total long-term firm market value”
- In simplified language, **do what you need to do to keep everyone happy**



How is this Applied to the Mining Industry?

- It seems reasonable that the traditional measure of value is still applicable for the broader group of stakeholders
- The majority of concerns that are front-of-mind for other stakeholders would be included in a company's NAV Multiple
- Investors are less likely to purchase shares of a company that is frequently in the news for the wrong reasons, thus lowering the NAV Multiple
- The concept of market value using a NAV Multiple is fairly unique to the mining industry



NAV: Net Asset Value

Calculating Net Asset Value

$$\text{Mkt Cap} = (\text{NAV Multiple}) * (\text{NAV})$$

Determined by Investors

Calculated by Equity
Research Analysts
("The Street")

Quality

Confidence

Sentiment

Management Team

$$= \sum \text{NPV of Assets} + \text{Cash} - \text{Debt}$$

Discount Rate

Net Cash Flow

Mineral Resources

Shares Outstanding

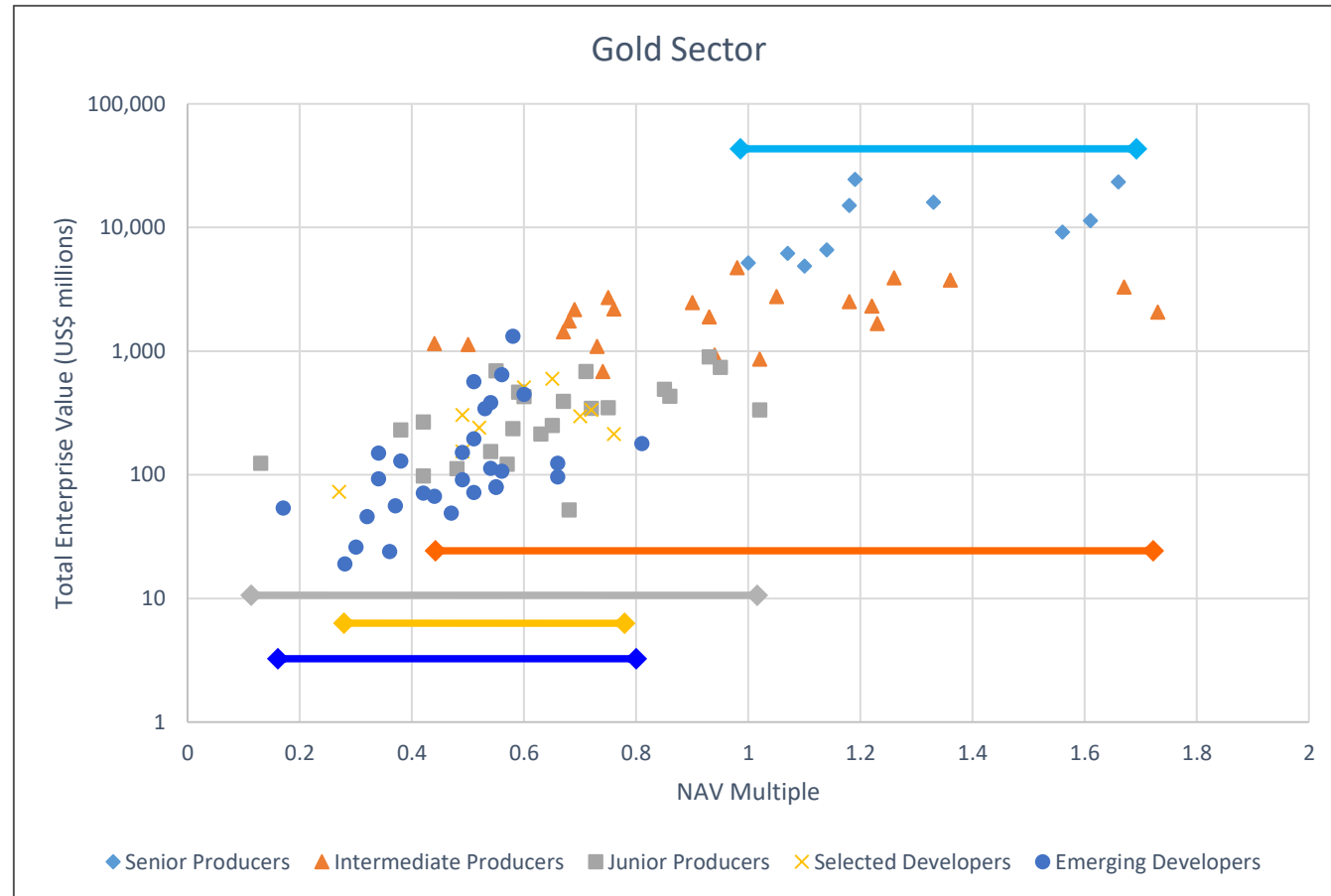
What does a company need to do to create value?

1) Grow NAV, and 2) Increase NAV Multiple

Simple, right?

The NAV Multiple – Wide Ranges

- Clear distinction between different tiers of mining company, from exploration to majors
- Within the tiers of companies, there is a wide range of NAV Multiples
- How does a company position itself toward the right hand side?



1. Adapted from CIBC Global Mining Group Weekly Comps Update, January 15, 2018
2. Share price as of January 15, 2018
3. NAV is calculated based on analyst consensus estimates
4. Total Enterprise Value equals market capitalization + net debt + preferred shares

✓ Technical Factors

- Metal production
- Cost position
- Defining in-ground asset base
- Operational efficiency

✓ Capital Allocation

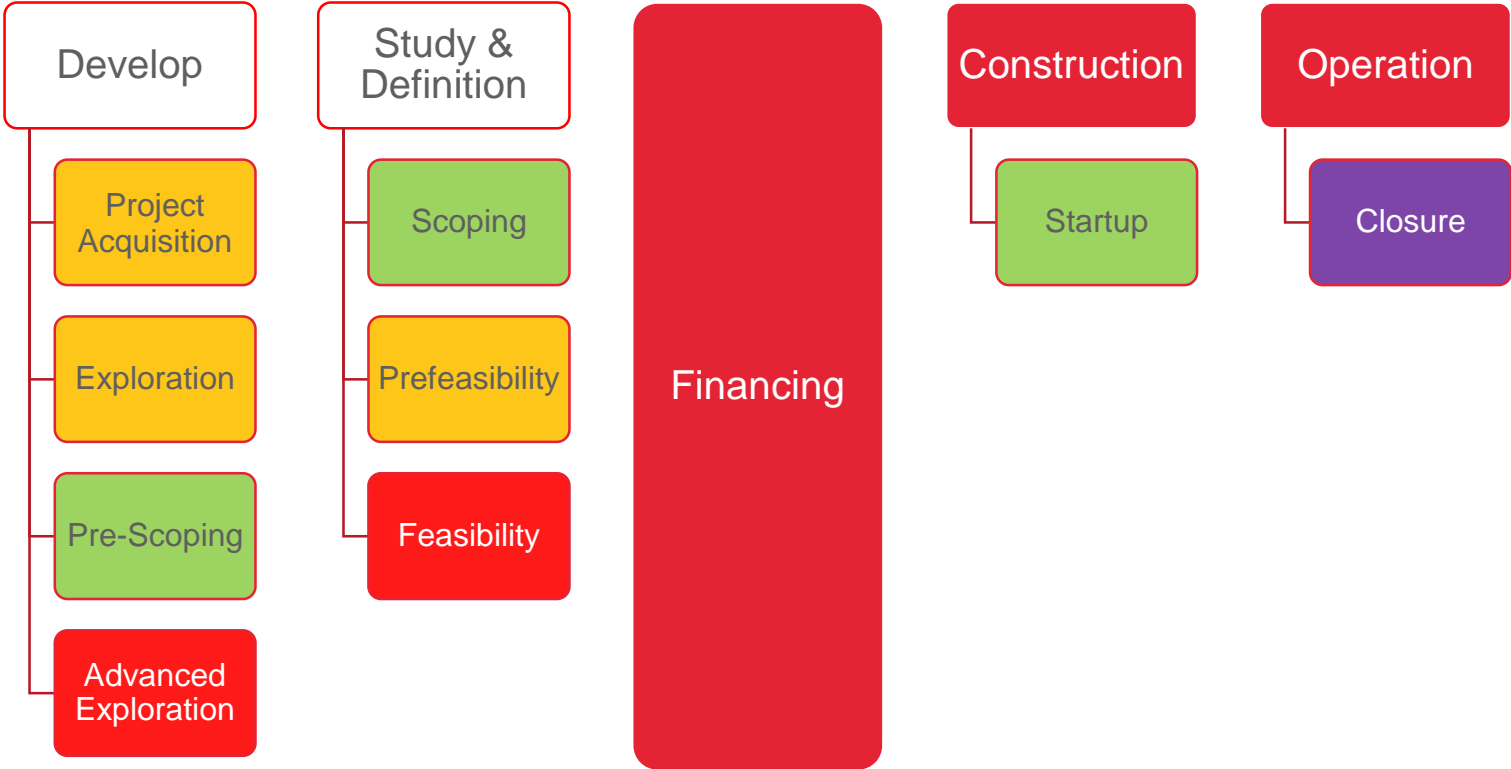
- Mergers and acquisitions
- New project construction
- Managing pipeline

✓ Reputation

- Delivery on commitments
- Social license
- Building trust and confidence



The Investment Stages of a Mining Project



Relative Cost

Low

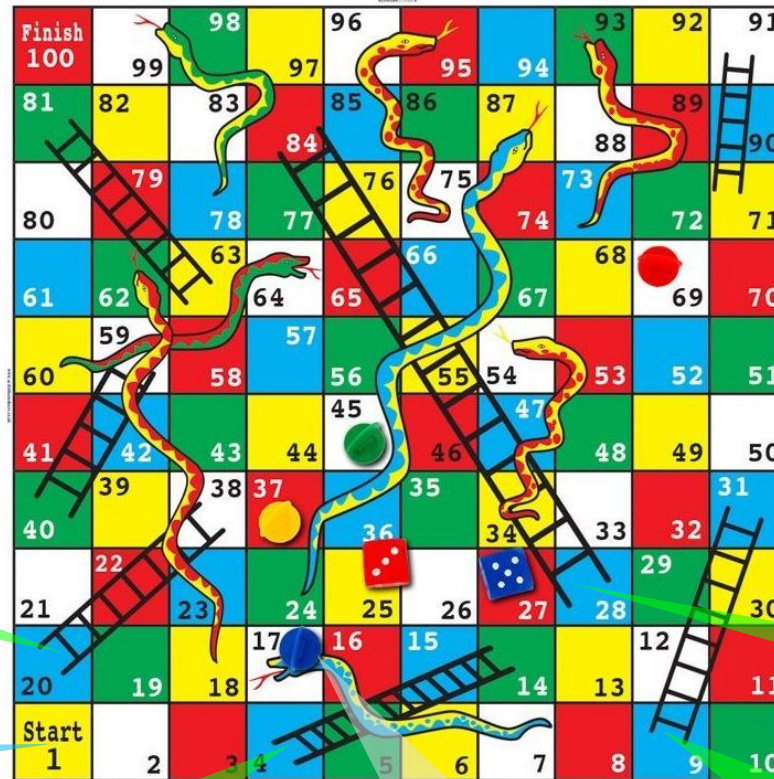
Medium

High

Uncertain

Exploration and Acquisitions

- Successfully acquiring (through exploration or purchase) Mineral Resources is one of the prime areas where value can be created for investors



Analyst coverage initiated

Mineral Staking

Drilling hits high grade mineralization

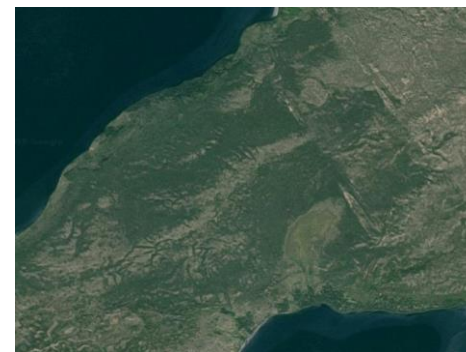
Metallurgy test work shows high arsenic

Project is optioned to a Major

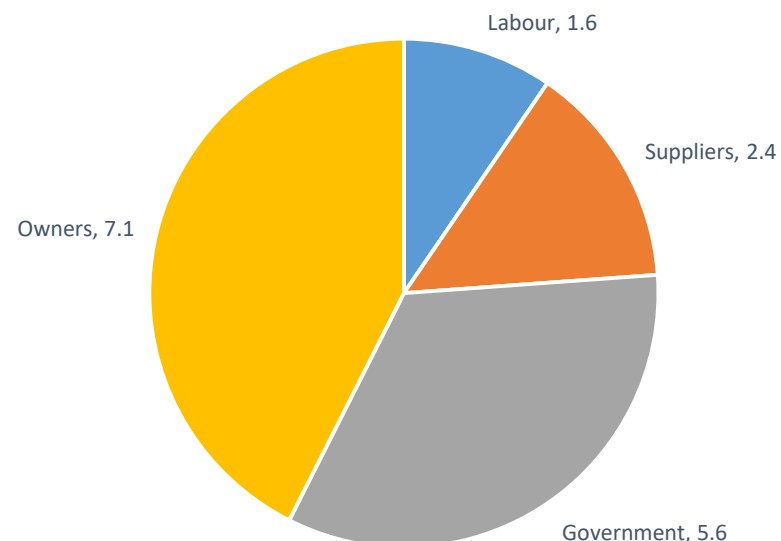
Maiden Mineral Resource estimate is promising

Exploration Example

- A recent PEA completed by RPA is an example of how a mining project can potentially create significant value for all stakeholders
- It all started when a geologist had an idea
- The idea led to seed-financing and exploration, which led to a discovery, Mineral Resource estimate, and PEA
- Important to remember that the Project is at an early stage, with a lot of work ahead to capture the value that has been identified in the PEA



Value Creation for all Stakeholders (C\$ billions)



Acquiring Mineral Resources and Reserves

- Two broad methods – exploration or acquisition, with a host of other sub-methods: farm in/out option agreements, in-house exploration, minority equity positions
- Either way, a key metric for any mining company is the cost incurred per unit of Mineral Resource – i.e. US\$/oz or lb
- Some companies regularly publish this, however it is not the norm

Successful M&A and Exploration Strategy

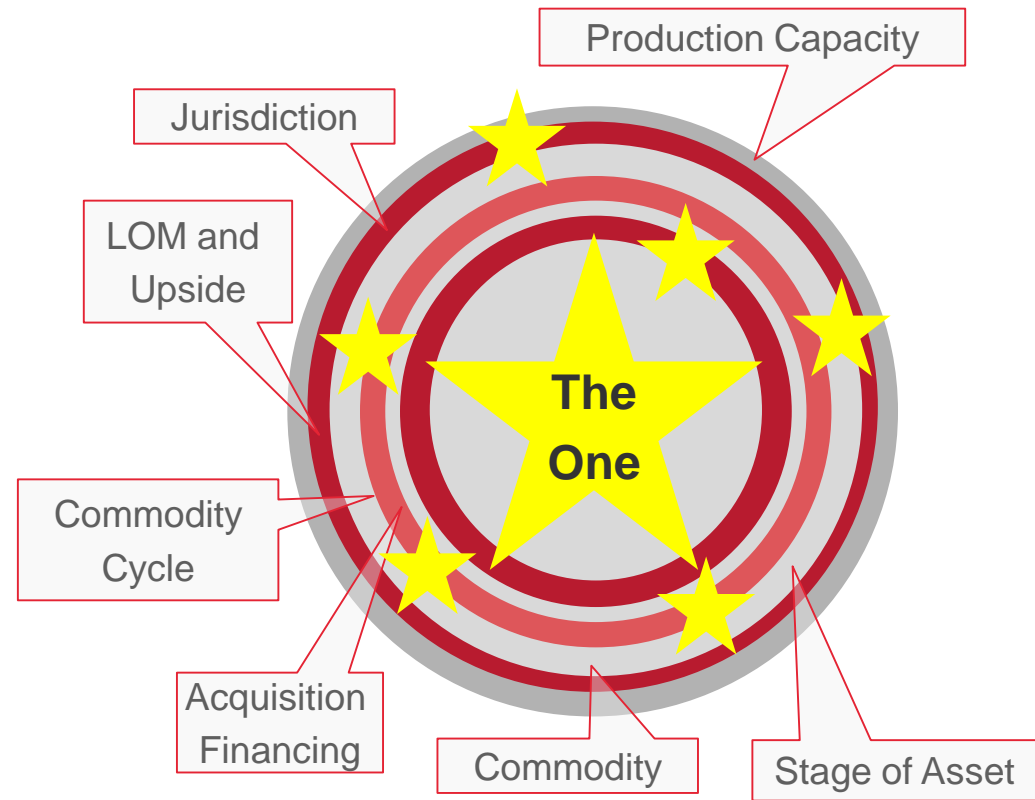


Significant Value Added, Key Deposits Still Open and Positioned to Deliver More Value



Source: Agnico Eagle 2018 TD Mining Securities Conference January 17, 2018

- Every company will have a unique set of parameters that they use to weigh acquisition opportunities
- Factors that are considered include jurisdiction, commodity, stage of asset, point of commodity cycle, financing constraints, execution planning
- Capacity for M&A must be built within the company



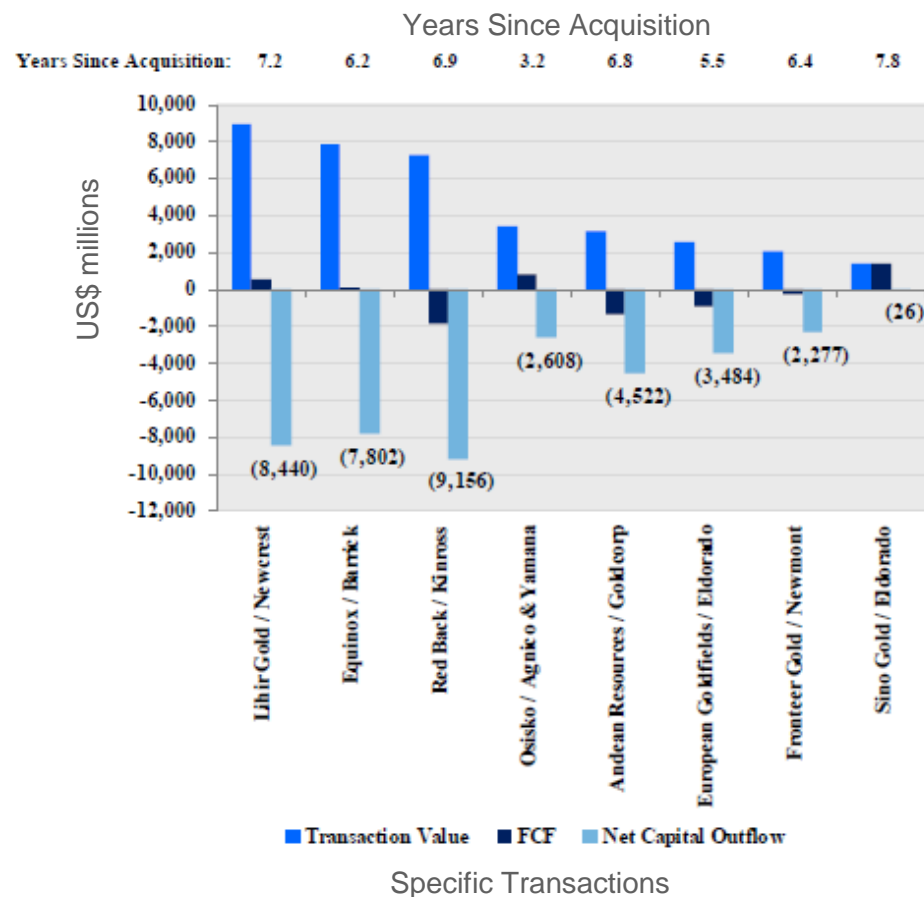
Potential Target



Source: Deans, G., 2014

Mining M&A Outcomes

- Recent presentation from Paulson & Co. at the 2017 Denver Gold Forum shows that among large transactions, there is a poor track record of M&A that results in value creation
- Major write-downs were common in the past three years, as a result of acquisitions from last seven years
- Despite write-downs, M&A can be used as a key value creation engine for a mining company
- Counter-cyclical approach is required, however the investor community may have other ideas



Source: Paulson & Co., BMO Capital Markets, September 2017

Questions for the Group on Discount Rates:

- You are evaluating two separate gold mines for a potential acquisition, both producing approximately the same annual revenue. One is located in Ontario, and one is located in Guatemala. What is an appropriate discount rate for each of the two mines?



Ontario



Guatemala

- You are evaluating a copper mine and a gold mine for a potential acquisition, both producing the same annual revenue, with the same mine life, and both located in Ontario. What is an appropriate discount rate for each of the two mines?



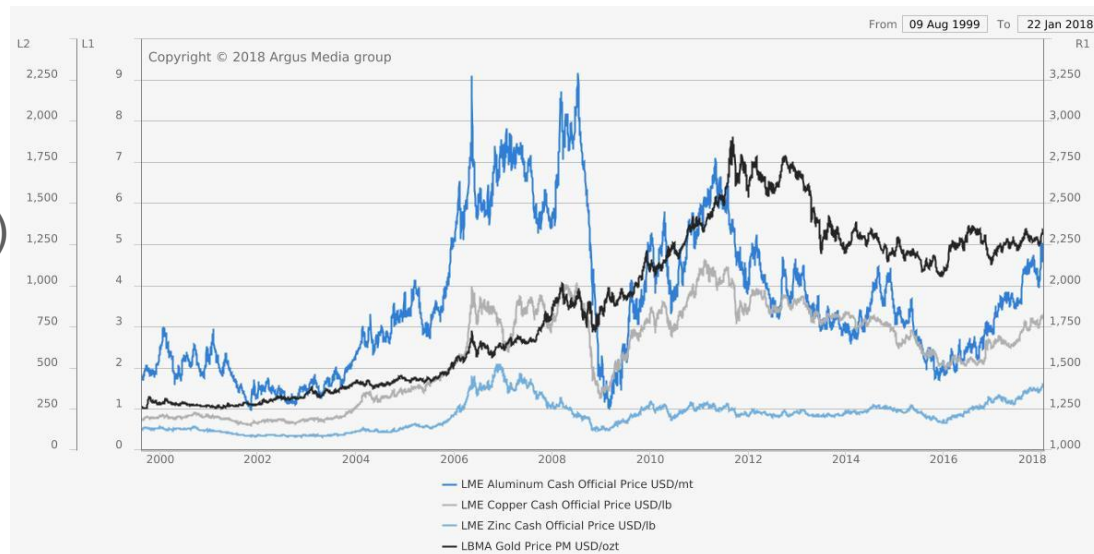
Gold



Copper

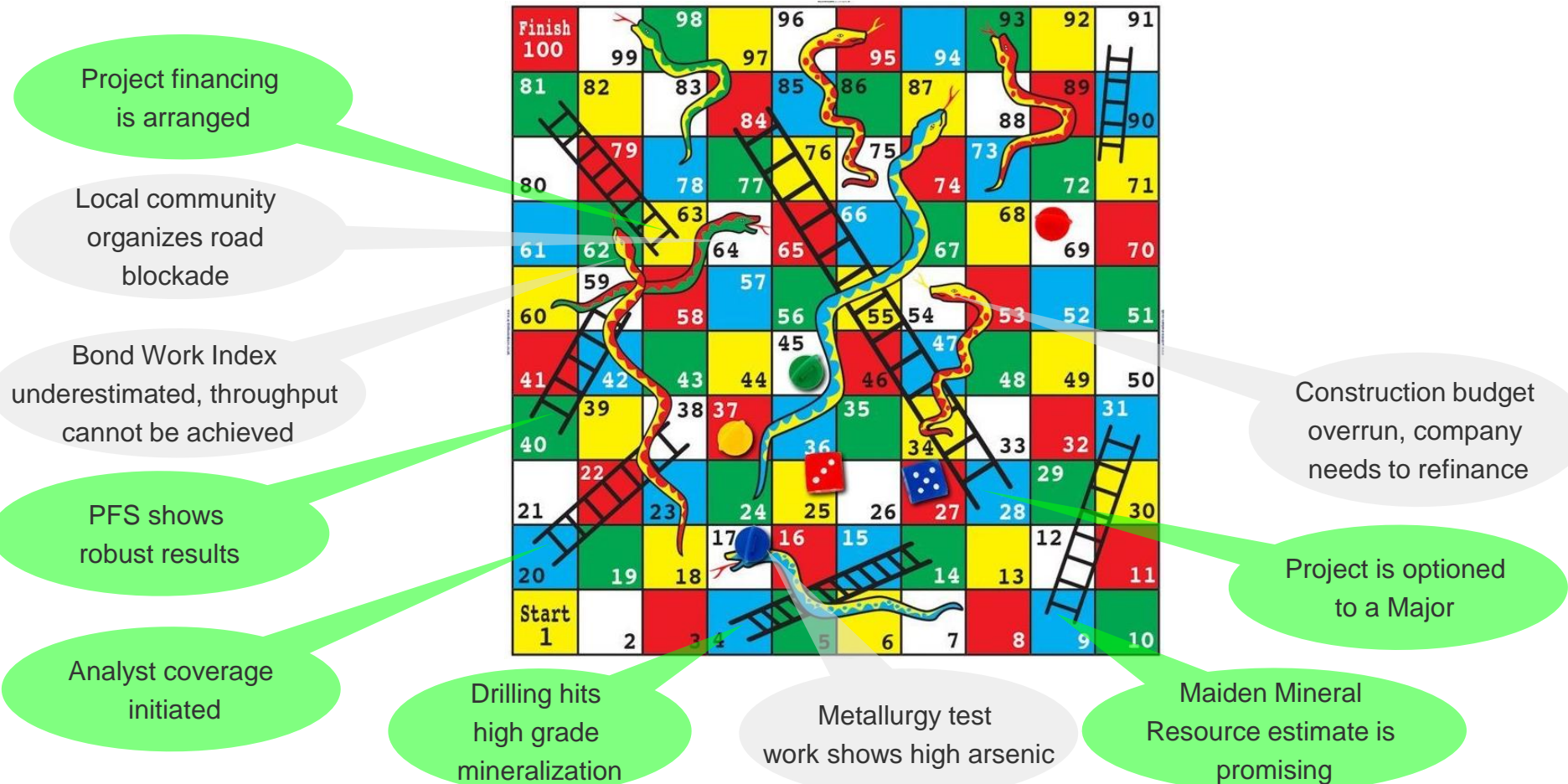
Commodity Diversification – Is it Worth It?

- At an asset level, having by-products is a significant advantage (provided that they haven't been sold into a stream)
- At a corporate level, the jury is out whether multi-commodity companies are superior than single commodity players
- Generally from an operational level, it makes little difference, except in certain situations
- Some companies evolve to excel at certain mining or processing methods



Sherritt's Moa (L) and Ambatovy (R) nickel assets

- A time when the initial momentum from the PEA can start to wane, a lot of heavy lifting needed to bring it from a deposit into an operation



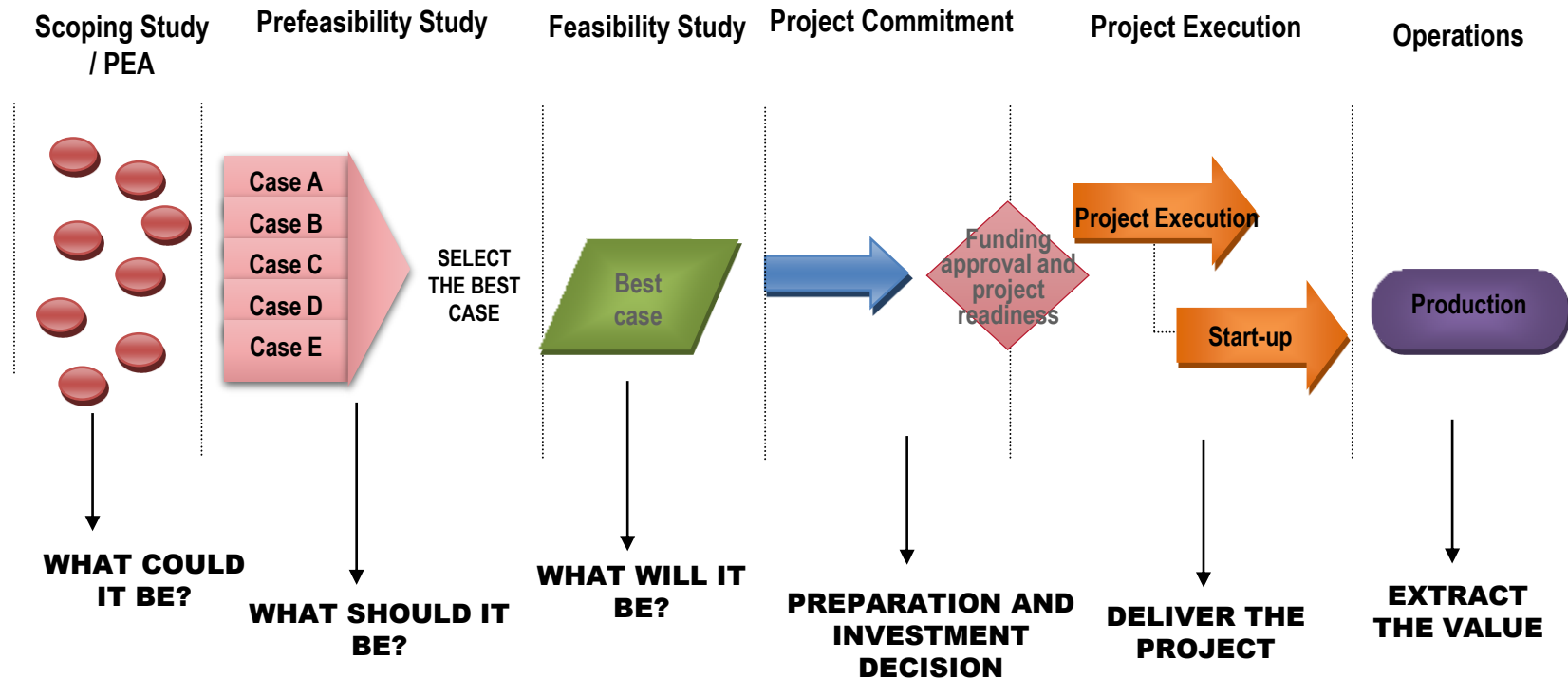
Transition from Explorer to Developer

- Paradox between exploration companies and mine developers and operators
- Very few companies have made the transition successfully (i.e. created value)
- Successful transition requires the right people in place, the right project, and a well-considered financing plan



Key Principles of the Evolution of Studies

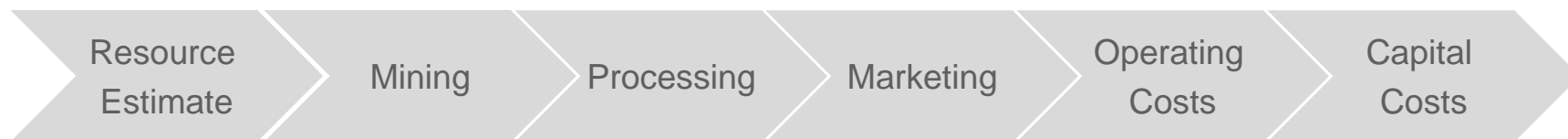
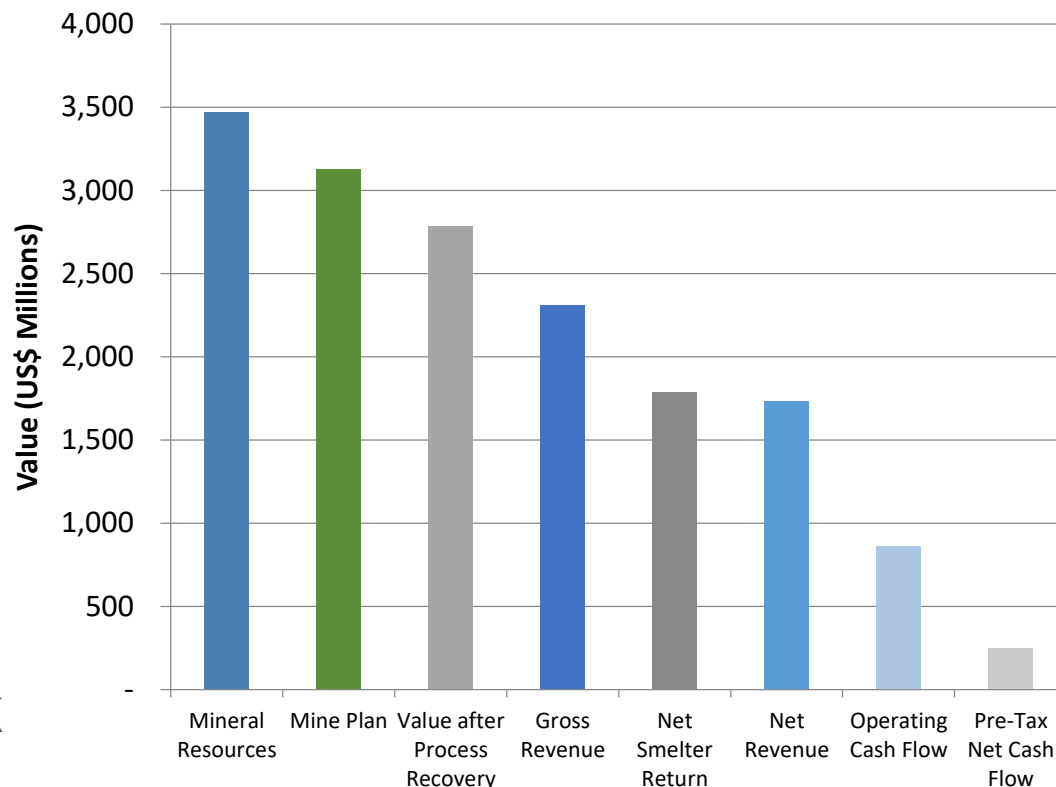
- Capital Projects are considered and developed in a phased approach



“In-Situ Value” put into Context

- The concept of “In-Situ Value” is misleading, but also helpful when evaluating projects
- There can be a massive mineral deposit with enormous “In-Situ Value” that has little chance of ever being developed
- Understanding where value is being lost and captured over the operating cycle is critical
- Prohibited disclosure on the TSX

Connecting “In-Situ Value” to Free Cash Flow



Where Do Things Go Wrong?



- Head Grade – Resource/Reserve models
 - Basic errors or incorrect assumptions in resource estimation
- Mining extraction overestimated and mining dilution underestimated
- Productivity and misapplication of mining method
- Processing, including metallurgy, equipment selection, and ramp up
- Capital costs – Project Execution Plan and Project Controls
- Operating costs
- People and Technology
 - Management team
 - Lack of experience
 - Substituting software for judgment
- External Pressures
 - Time and cost constraints

Question for the Group



- You are a mining executive and your capital project team presents you with two scenarios to develop a deposit.
- Which of the two options is superior?
- What other questions or information is needed to make an informed decision?
- From the lens of different stakeholders, is one more favourable?

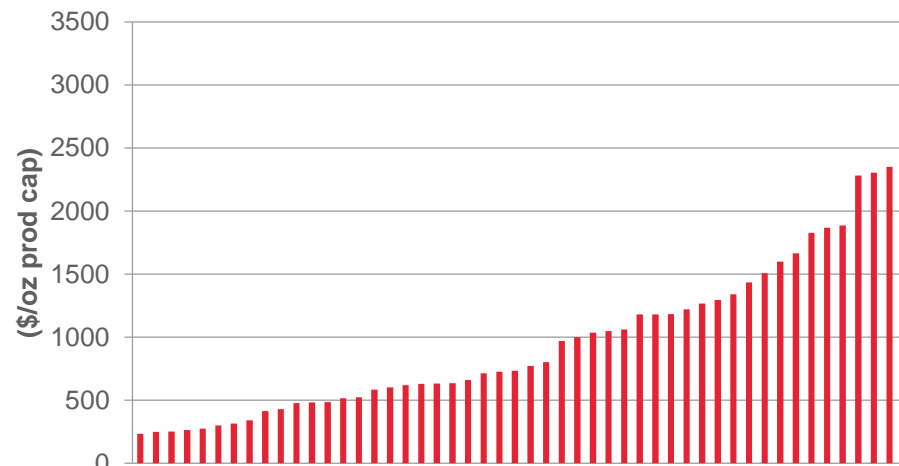
Parameter	Units	Option 1	Option 2
Initial Capital Cost	US\$ millions	250	450
Construction Period	yrs	2	3
Mine Life	yrs	20	8
Throughput	tpd	5,000	10,000
Head Grade	g/t Au	1.3	1.2
Metallurgical Recovery	%	95%	93%
Annual Production	koz / yr	69	126
Revenue @ US\$1,250/oz Au	US\$ millions	87	157
Operating Costs	US\$/t	35	20
AISC	US\$/oz	881	557
Cost Curve Position	%	55	40
Pre-Tax IRR	%	19%	20%
Pre-Tax NPV @ 10%	US\$ millions	150	167
Payback Period	yrs	4.8	4.0

Capital Cost Intensity

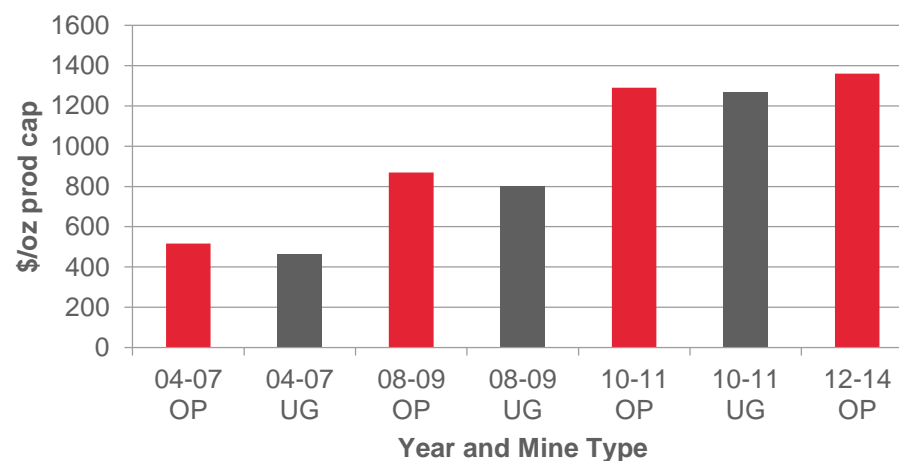
- Management's ability to bring production online is a key value driver in mining
- A "Rule of Thumb", and nothing more, to look at what a project might cost
 - i.e. Company plans to build a 100 koz/yr gold mine, what are they reporting as capital costs, and is it in line with industry average
- Capital Cost Intensity calculated by:

$$\text{Capital Cost Intensity} = \frac{\text{Total Initial Capital Spend}}{\text{Nominal Production Capacity}}$$
- RPA studied gold projects, across regions, mine types, and timelines
- Attempt to compare "apples to apples", however it skews data when co-products or long-life assets are involved, and also depends heavily on project location
- Capital Intensity has clearly risen from mid 2000's, across mine types

Capital Cost Intensity for Gold Projects

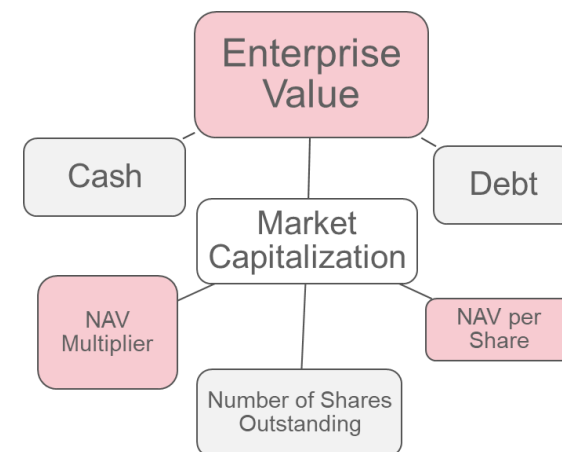


Capital Intensity by Year



Choice of Financing

- Raising money for further exploration or mine construction in an accretive manner, without destroying value for existing shareholders, is complex and challenging
- Continuum of choices from Equity to Debt, each with advantages and disadvantages, and it can be a combination of several options

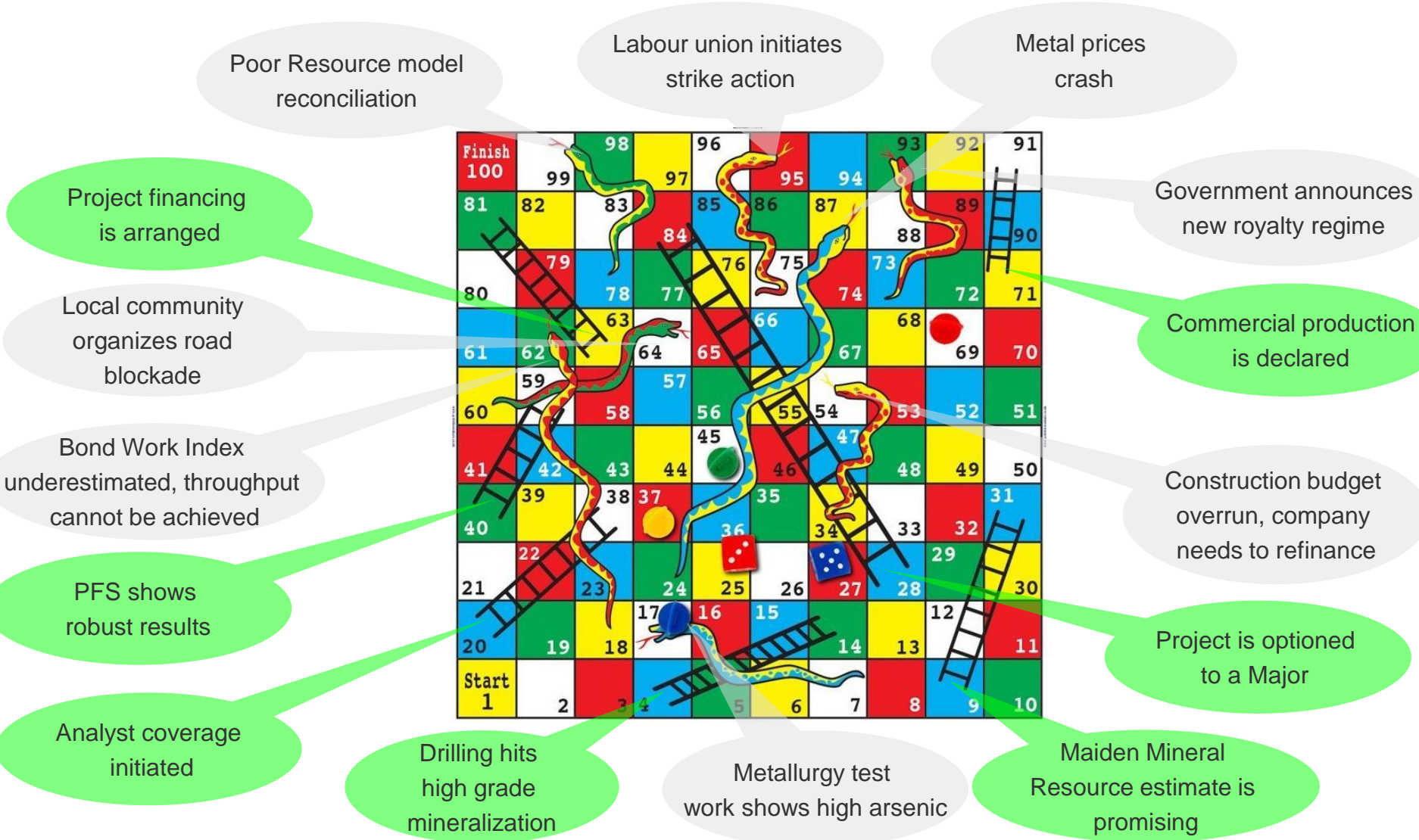


Equity → Debt

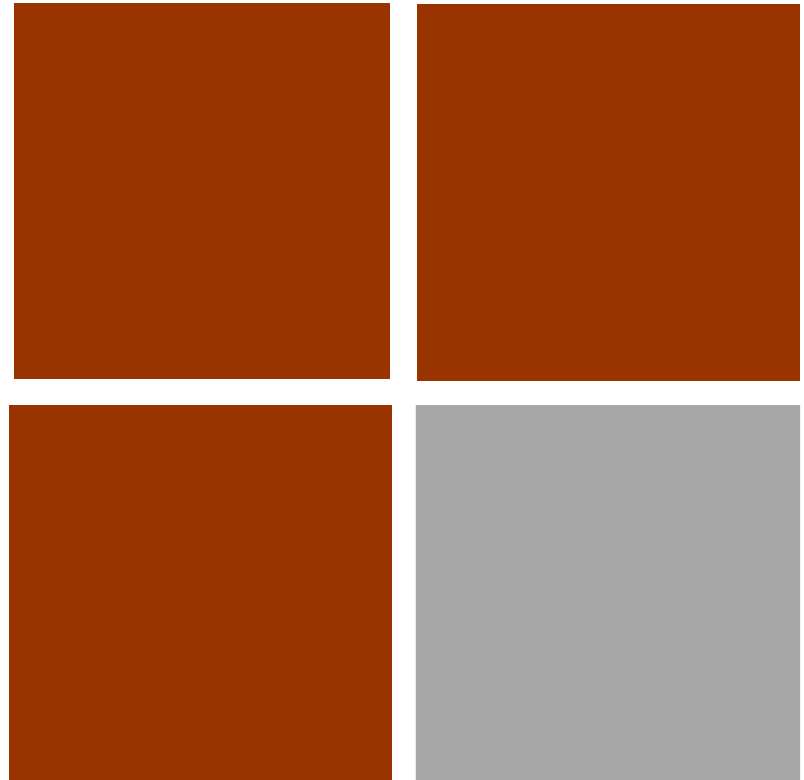


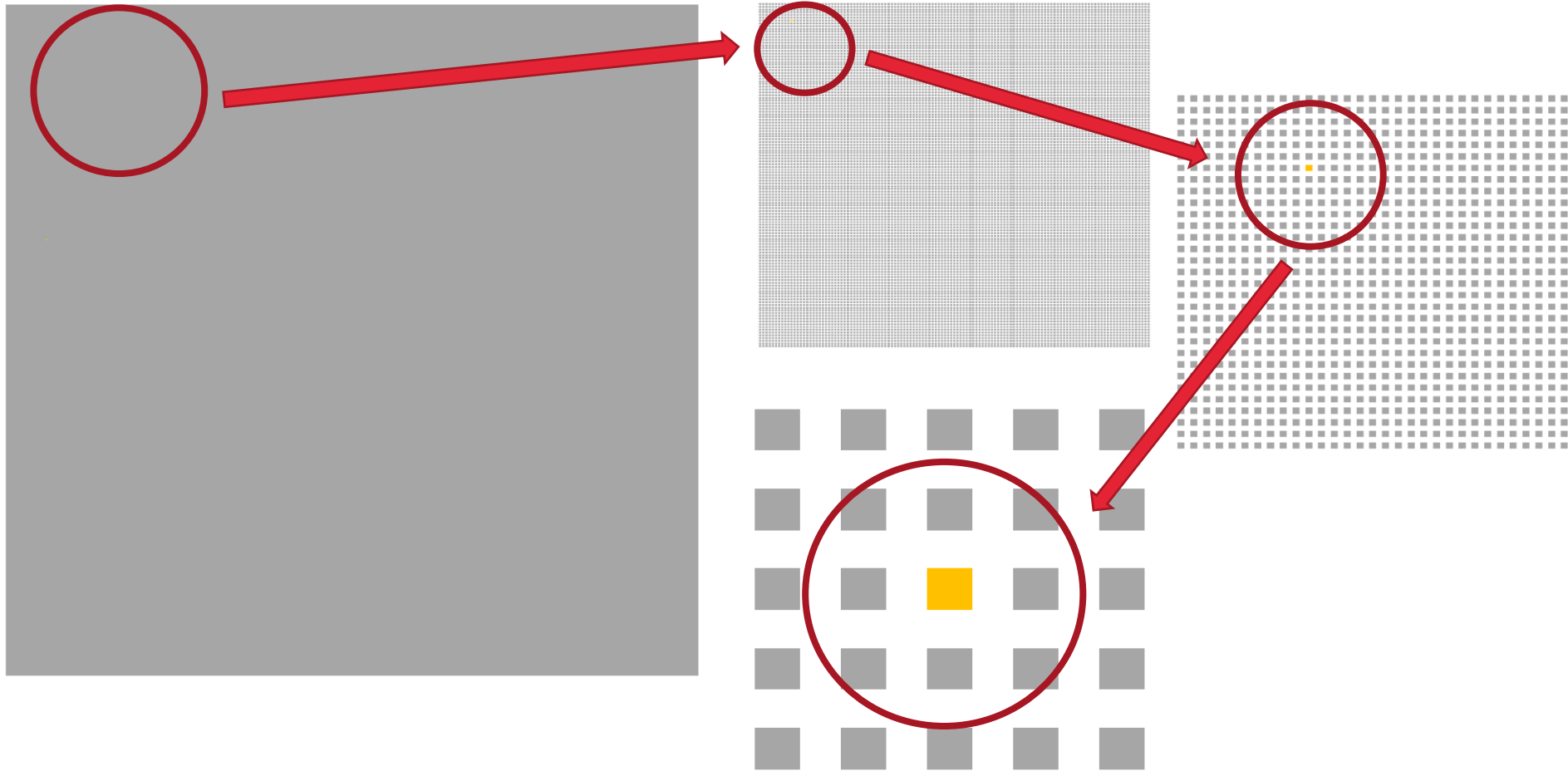
Source: Financing Fundamentals in Mining, November 2014, CIBC Capital Markets

Mine Operations



- One of the few areas that a mining executive can exert any influence or control
- A typical head grade of a large scale open pit could be in the range of 1 g/t Au, with a 3:1 strip ratio (waste:ore)
- **Can anyone spot the gold?**



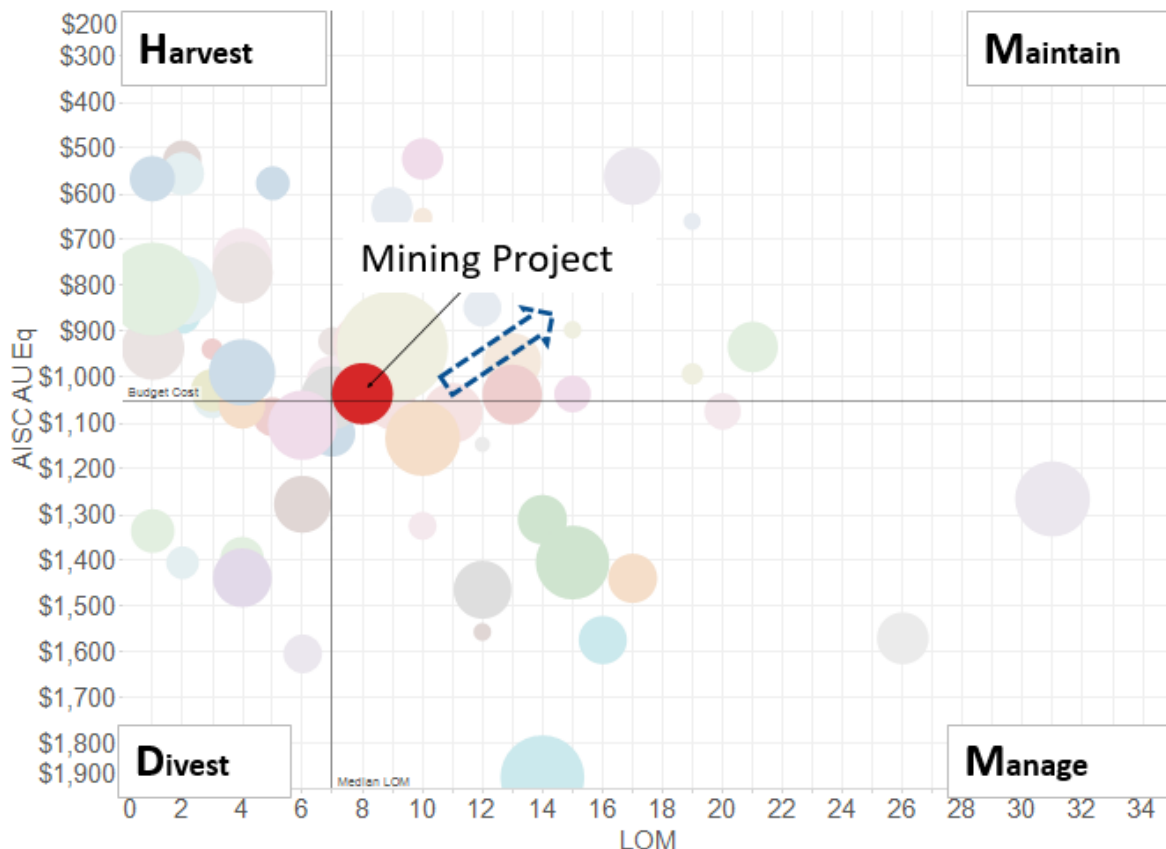


Using the previous example, can anyone spot the gold yet?

- Since commercial production in 2013, all of the gold produced from one of Canada's largest open pit gold mines could fit into a small bin
- Small improvements to fleet optimization, recovery, grinding, consumables, can be the difference between being cash flow negative and positive



- Mines generally take millions to hundreds of millions of dollars per year to operate
- Operating costs are one of the few areas that a manager exerts any control over
- Most mines have no control over the price they sell their commodities, although there is some control over the form (e.g. doré v. concentrate)



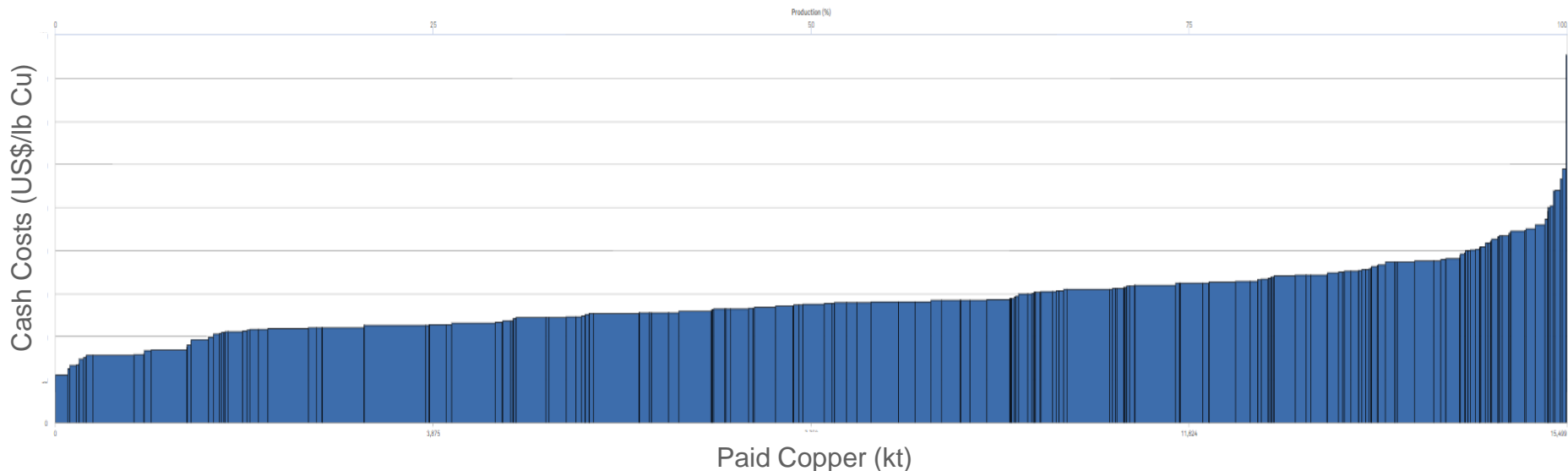
Source: SNL Metals and Mining
 Adapted from BCG Stars and Dogs Matrix
 With input from Outliers Mining Solutions

Operating Cost Curve



- Generally, an operation wants to be as far to the left as possible
- Large scale, simple operations with predictable head grades and recovery, in stable jurisdictions, also make great “star” assets even if they are in the bottom half of the cost curve

2017 Copper Production Ranked on Total Cash Cost



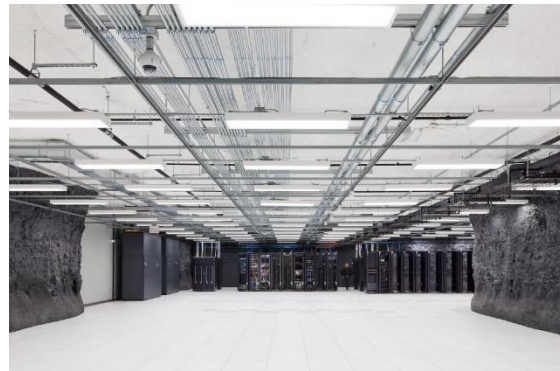
Source: S&P Global Market Intelligence

Closure and Reclamation

- Mine closure and reclamation is inevitable, as the Mineral Resource is depleted, or commodity prices fall to uneconomic levels
 - The mine has no value, or negative value (remediation cost), right?



Recreation Complex



Data Storage



Events Complex and Tourism



Marijuana Facility



Research Laboratory



Museum

- If all else fails, start mining Bitcoin!

Chinese bitcoin miners eye sites in Quebec, Manitoba

Cryptocurrency miners attracted by low energy costs, worries that Beijing may crack down

Thomson Reuters · January 12



✓ Technical Factors

- Metal production
- Cost position
- Defining in-ground asset base
- Operational efficiency

✓ Capital Allocation

- Mergers and acquisitions
- New project construction
- Managing pipeline

✓ Reputation

- Delivery on commitments
- Social license
- Building trust and confidence



- Over the course of a mining project, enormous *FIRST GENERATION* value can be created for all stakeholders
- There will be several peaks and valleys along the way
- **Managers and Executives:** know your strengths as a company, and play to them
- **Investors:** know what the company is good at, understand what you are investing in, and keep an eye open when a company starts to deviate from its stated strategy

Presenter Contact Information



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- *The specialty firm of choice for resource and reserve work*
- All stages:
 - exploration and resource evaluation
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- Clients are financial institutions, governments, major mining companies, exploration and development firms, law firms, individual investors, and private equity ventures
- Offices in Canada, United States and United Kingdom
- Head office in Toronto
- 100% employee owned

- Our mission
 - to apply our broad and deep experience to provide objective, independent advice.
- Our vision
 - to enable mining industry operators and investors to make the right decisions for business success.
- Our proof
 - accurate, credible technical reports that are accepted and relied on time and again, among financial institutions and major regulatory bodies worldwide.
- At RPA, we:
 - Deliver what we promise
 - Provide unsurpassed quality
 - Communicate effectively with clients and other stakeholders
- All of these characteristics are embodied in our motto:

Rock solid resources. Proven advice.

- Mineral resource/reserve estimates and audits, compliant with worldwide reporting codes
- Mine design and optimization
- Metallurgical assessment and process review
- Estimation of project capital and operating costs, financial modeling and analysis
- Preliminary economic assessments, scoping, prefeasibility, and feasibility studies
- Valuation of mineral properties
- M&A due diligence reviews of mining and exploration projects
- Lender advisory services
- Expert witness services
- Design and management of exploration programs
- Reporting for public disclosure, including NI43-101 Technical Reports, Competent Persons Reports, and Mineral Expert Reports
- QA/QC audits and reporting
- Operations benchmarking, optimization programs and troubleshooting
- Strategic planning and advice for boards and senior management