

2016 Mines and Money Americas

Innovations in Mining Valuations and Finance

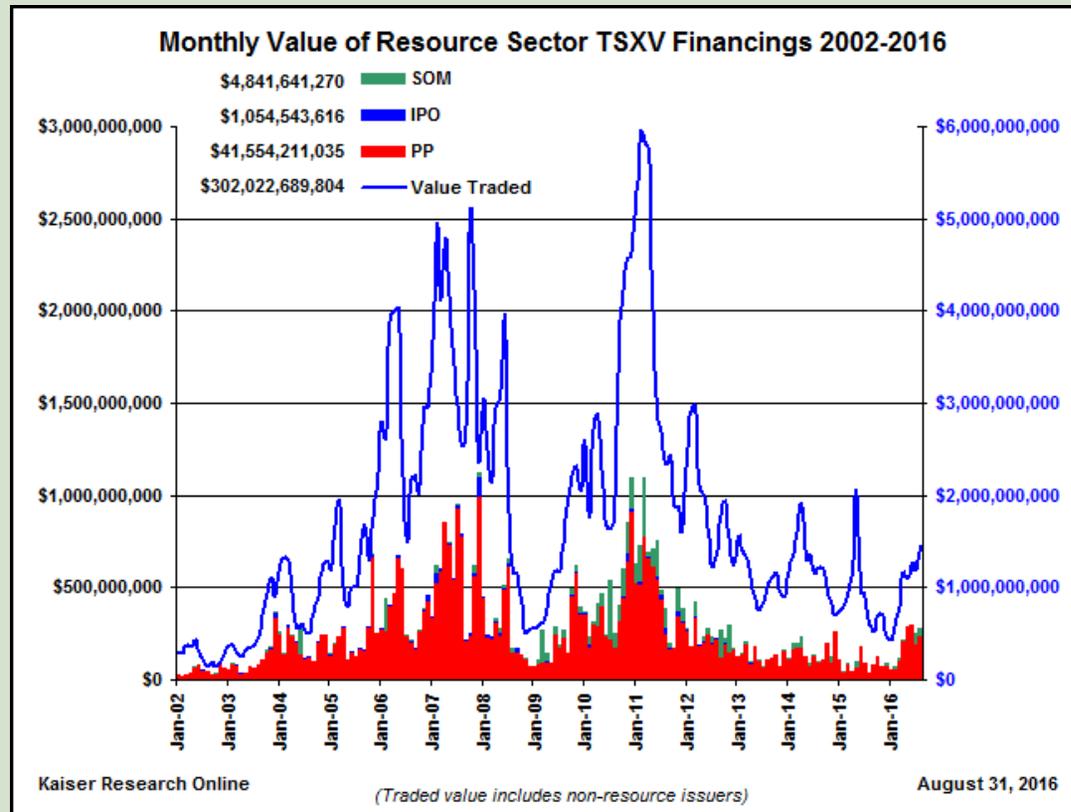
**A Crowd-Sourced Model for Valuing Exploration
Projects and creating greater market efficiency
through better price discovery**

Presented by John Kaiser

September 27, 2016

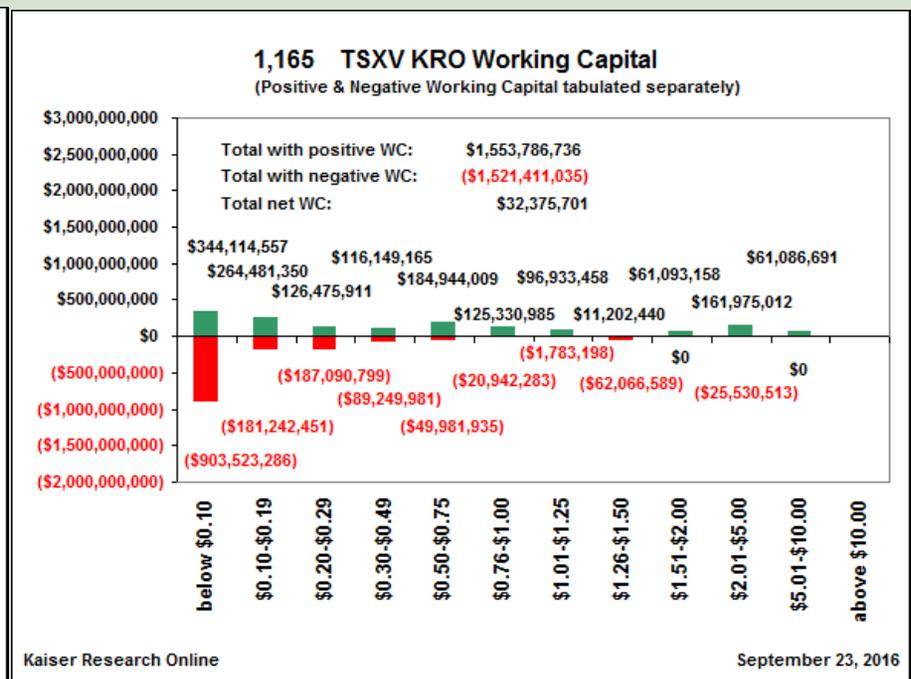
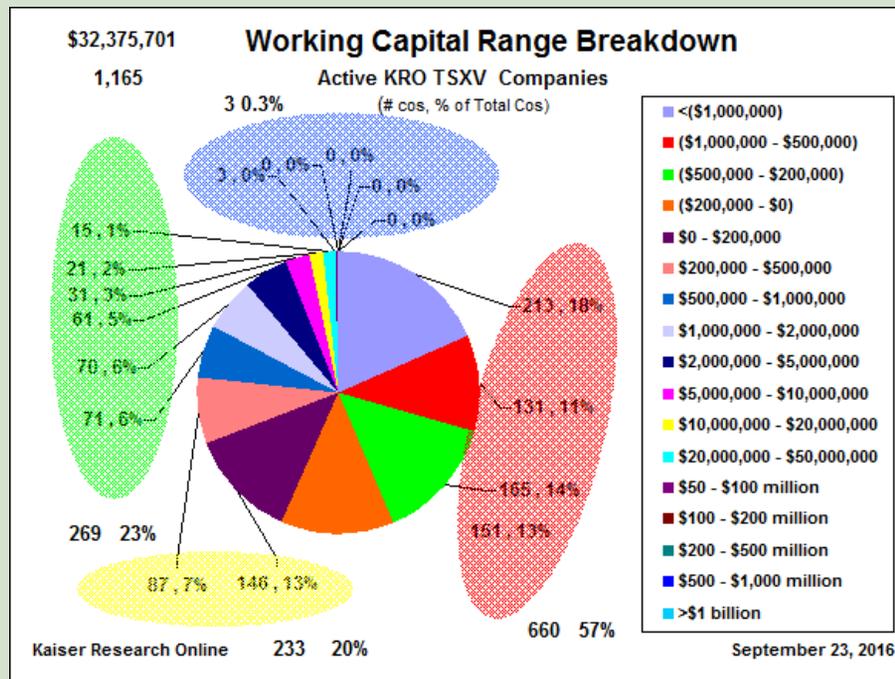
Toronto, Canada

After a 5 year drought TSXV resource junior financing has started to recover



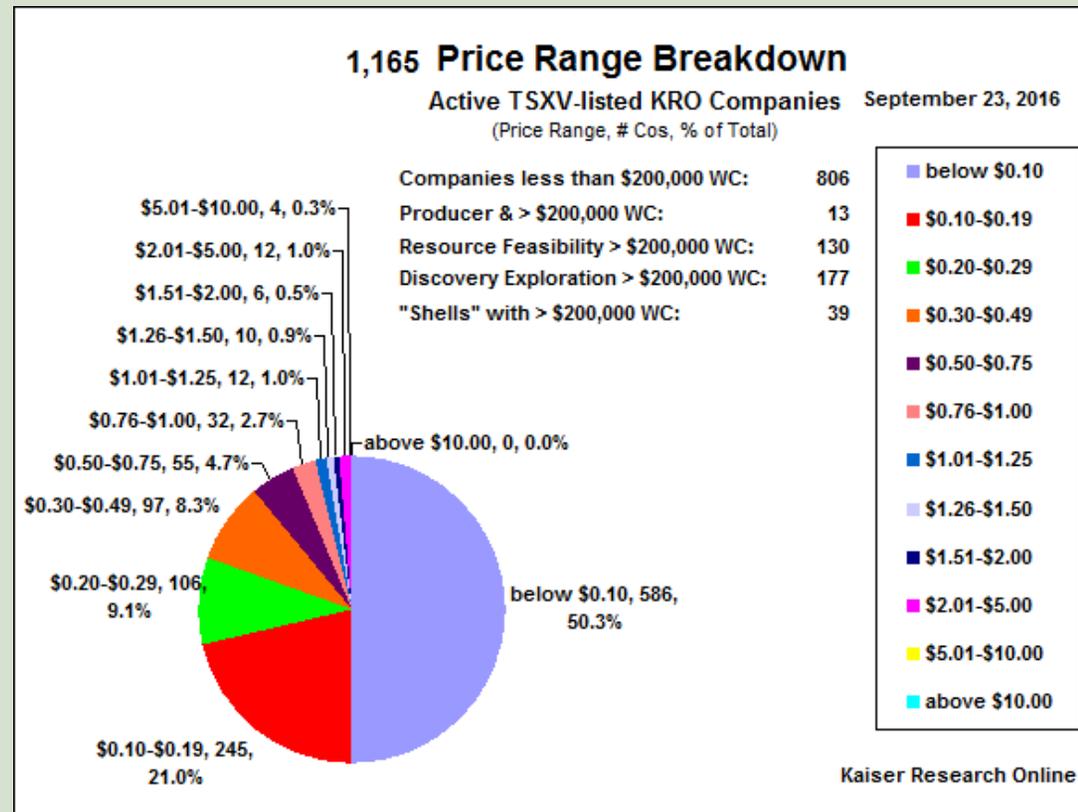
But the capital is flowing into a minority of juniors

The current financial situation for TSXV listed resource juniors



Nearly half of companies with positive working capital are trading below \$0.30

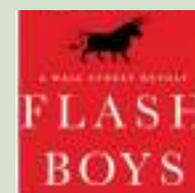
The current price situation for TSXV listed resource juniors



Only 25% have more than \$200,000 working capital

A Broken Capital Market for Canadian Juniors

- **Client Relationship Model** – Suitability and the death of full service advice
- **Market failing as a Price Discovery Mechanism** – order book fragmentation, short-selling on a down-tick, computerized day trading
- **IIROC** – undermining market integrity with bias against upside volatility
- **Disclosure Overload & War on Forward Looking Statements** - junior market no longer works as a casino, a lost generation of investors who understand how to think about exploration plays
- **Choked Funding Gateways** – accredited investor restriction, insane paperwork, “existing shareholder” exemption inadequate
- **Domination by financial “cartels”** – loss of entrepreneurial independence, shrinkage of the sector into a small pool of juniors backed by conflicts of interest
- **Independent Advice** – is there still such a thing?



Assumptions for the Future

- **CRM** – hopeless: resource junior investors must operate through zero-advice discount brokerages, companies must look outside brokerage firms unless their project is advanced enough for institutional capital
- **Choked Funding Gateways** – accredited investor restriction should be abolished, or “existing shareholder” requirement dropped, private placement paperwork digitized so crowd-funding portals can operate efficiently
- **Market failing as a Price Discovery Mechanism** – the market activity visuals need offsetting externalized fundamental outcome expectations
- **IIROC** – need to alter assumption that every market move without a press release is “insider trading” or “market manipulation”
- **Disclosure Overload** – need something to bridge the gaps between 43-101 events
- **Domination by financial “cartels”** – let the wisdom of crowds dictate who gets money so that merit rather than subservience determines who gets capital
- **Independent Advice** – enable crowd sourced “experts” to build reputation

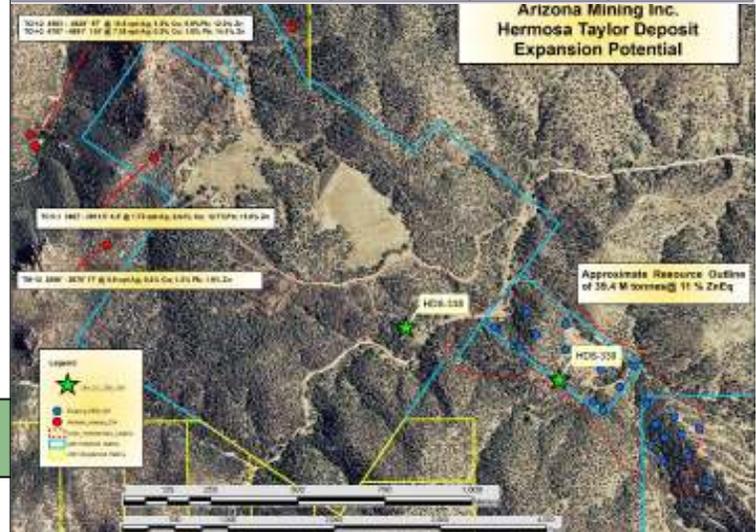
Requirements for a Solution

- **Valuation** – an online tool that makes it easy for investors to generate a LOM DCF based after-tax NPV using assumptions for what the potential fundamental outcome may look like
- **Risk Adjustment** – a model that adjusts the value of the imagined fundamental outcome to reflect the uncertainty associated with the project's exploration stage
- **Public Accessibility** – an online system for sharing a visualized outcome in a public space, presenting all the outcomes within a spectrum of bearish to bullish, and enabling all to see the underlying assumptions
- **Plausibility Determination Mechanism** – a crowd-based system whereby individuals can critique the plausibility of a visualized outcome's assumptions, and judge the credibility of such plausibility assessments
- **Fundamentals linked Audience Mood Capture** – enable the audience watching the activity of the visualizers to share their likes and dislikes in a public space
- **Reputation based Experts** – enable anonymous individuals to rise and fall as stars based solely through the reputation they evolve in the arena

Consider Arizona Mining Inc and its Hermosa-Taylor zinc-lead-silver discovery



Tonnes (Mt)	Pb%	Zn%	Cu%	Ag g/t
72.3	3.21	3.23	0.10	50.78
59.5	3.63	3.63	0.11	55.78
48.7	4.04	4.03	0.12	61.25
39.4	4.48	4.48	0.14	66.91
27.2	5.24	5.26	0.16	76.35
12.1	6.88	6.84	0.21	97.90
6.6	8.26	7.80	0.27	113.75
2.2	10.37	9.86	0.34	133.64



Valuation: Discounted Cash Flow Model (DCF)

$$\sum_{n=1}^m \frac{\text{Annual Cash Flow}}{(1 + \text{Discount Rate})^n}$$

Minus Capital Cost

= Net Present Value

n = year of cash
 m = mine life (years)

Annual Revenue	
less	Operating Costs
=	Pre-Tax Cash Flow
less	Taxes
=	After Tax Cash Flow

Note: if n=0 then the capital cost can be included as an initial negative value in the cash flow series because anything to the power of 0 =1. VBA functions start with n=1.

Detailed Visualized Outcome (KRO Members Only)								Cost Scenario					
VU = Very Unsure		SU = Somewhat Unsure		SS = Somewhat Sure		VS = Very Sure			Currency	USD Cost	Exchange Rate		
The confidence indicator is intended to convey the visualizer's degree of uncertainty with regard to a particular assumption.								CapEx:					
								\$400,000,000	VU	USD	\$400,000,000	1.000	
								Sustaining Capital:					
								\$100,000,000	VU	USD	\$100,000,000	1.000	
								Mining Cost (\$/t rock):					
								\$40.00	SU	USD	\$40.00	1.000	
								Mining Cost (\$/t ore):					
								\$40.00		USD	\$40.00	1.000	
								Processing Cost (\$/t):					
								\$13.00	SU	USD	\$13.00	1.000	
								Other Cost (\$/t):					
								\$11.00	SS	USD	\$11.00	1.000	
								Total OpEx (\$/t):					
								\$64.00		USD	\$64.00	1.000	
								Zinc Concentrate Cost (\$/t con):					
								\$210.00		USD	\$210.00	1.000	
								Lead Concentrate Cost (\$/t con):					
								\$210.00	SU	USD	\$210.00	1.000	
								Metal 1 Con Cost Note: \$60/t transport cost (Trail smelter), \$150/t smelter treatment charge is half way between \$200 high and current \$100/t. Concentrate grades based on bench scale metallurgical studies by AZ.					
								Metal 2 Con Cost Note: \$60/t transport cost, \$150/t smelter treatment charge.					
Mining Scenario								Risk Factors - Risk-Adjusted Discount Rate: 8.0%					
Tonnage:		80,000,000		SU	Strip Rate:		0.0		VS	Infrastructure:	Very Low	0.5	SU
Operating Rate (tpd):		10,000		SS	Mining Type:		Underground		VS	Technical:	Very Low	1.0	SU
Mine Life (years):		21.9			Startup:		2022		VU	Management:	Very Low	0.5	SS
Tax Treatment:		DDBM - double declining balance		VU	Tax Rate:		42.0%		SS	Financing:	Low	1.0	SS
<p>Operating Rate Note: Management initially played with a 8,000-10,000 tpd mining rate but has changed its focus to a 6,000-8,000 tpd rate, probably because that is within reach of the zone so far outlined. It is possible that if drilling expands the tonnage and improves grade, the higher mining rate will be considered for the PEA.</p> <p>Mining Type Note: The CRD sulphide zone at Hermosa-Taylor starts at about 250 m depth and dips at 25 degrees to the northwest. Just over 2,000 m from the pit base on claims beyond the Trench patented claims several older Asarco holes intersected the CRD zone at depths of 1,300-1,600 m, which offers a strong case for the hypothesis that the CRD zone continues at least another 1,300 m down dip from the limit of the Feb 2016 resource estimate. In addition, because 2015 drilling was confined to a strip of patented claims, the CRD zone so far outlined may represent only a third of the width of the zone.</p> <p>Est Startup Year Note: Expect deposit delineation and PEA in 2016, a PFS in 2017, and an EIS-FS in 2018. Although Arizona can be a difficult place to permit an open-pit mine, Taylor's location on patented claims and its underground mining nature promise to generate less permitting opposition than an open-pit mine on unpatented land under the administration of the forest service.</p> <p>Tax Rate Note: Federal 35%, state 7%.</p>													
				Risk Level	Risk Weight	Confidence							
Environmental Permitting:				High	1.5	SU							
Social License:				Low	1.0	SS							
Title:				Low	1.0	SU							
Tax:				Very Low	0.5	SS							
GeoPolitical:				Very Low	1.0	VS							

Visualized Outcome Summary: Arizona Mining - Hermosa-Taylor

Deposit Scenario: 80,000,000 t @ 7.00% Zinc, 7.00% Lead, 90.0 g/t Silver, 0.14% Copper

Mining Scenario: Underground 10,000 tpd 21.9 yrs, CapEx \$400.0 million, SustCapEx \$100.0 million, OpEx \$64.00/t (USD)

LOM Payable: 8.9 billion lb zinc, 10.9 billion lb lead, 198.0 million oz silver, 120.0 million lb copper

Economic Outcome (USD): Revenue Model at OV designated Metal Prices

	Annual Average	Life of Mine (LOM)	LOM Stats
Recoverable Revenue:	\$1,156,650,906	\$25,351,252,736	\$317/t ore Recoverable Value:
Smelter/Transport Costs:	(\$256,900,388)	(\$5,630,693,440)	22.2% of Recoverable Revenue
Gross Payable Revenue:	\$899,750,518	\$19,720,559,296	77.8% of Recoverable Revenue
Royalties:	(\$26,992,516)	(\$591,616,779)	3.0% of Gross Payable Revenue
Net Payable Revenue:	\$872,758,002	\$19,128,942,517	75.5% of Recoverable Revenue
Mining Cost:	(\$146,000,000)	(\$3,200,000,000)	61% of OpEx - \$40.00/t ore
Processing Cost:	(\$47,450,000)	(\$1,040,000,000)	20% of OpEx - \$13.00/t ore
Other Cost:	(\$40,150,000)	(\$880,000,000)	17% of OpEx - \$11.00/t ore
Sustaining Cost:	(\$4,545,455)	(\$100,000,000)	2% of OpEx - \$1.25/t ore
Total Operating Cost:	(\$238,145,455)	(\$5,220,000,000)	27% of Net Payable Revenue - OpEx - \$65.25/t ore
Pre-Tax Cash Flow:	\$634,612,548	\$13,908,942,517	73% of Net Payable Revenue - \$173.86/t ore
Taxes:	(\$258,537,270)	(\$5,673,755,857)	41% of Pre-Tax Cash Flow - \$70.92/t ore
After-Tax Cash Flow:	\$376,075,278	\$8,235,186,660	43% of Net Payable Revenue - \$102.94/t ore

Note: Concentrate transport costs, smelter treatment costs and retention are subtracted from recoverable revenue to get gross payable revenue to which the uncapped royalty rate for the project is applied. The annual average of LOM sustaining cost is expensed as an annual operating cost. Annual average figures reflect full production years.

Input 30 plus numerical variables along with qualifying notes to design your orebody and mine, click submit, and generate an after-tax NPV and IRR using Life-of-Mine annual averages.

What good is that?

The project is still pre-economic study.

Not the same thing as Risk Factor adjusted Discount Rate

Risk Factors - Risk-Adjusted Discount Rate: 8.0%				
	Risk Level	Risk Weight	Confidence	Note
Environmental Permitting:	High	1.5	SU	Permitting a mine in the USA is always a problem given the cost-dumping, self-centered "not-in-my-backyard-but-give-me-cheap-my-goods" mindset of America's elite. However, the location on patented claims and the underground nature of the mine, coupled with experienced management in terms of mine building and permitting suggests this could be easier built than an open-pit mine.
Social License:	Low	1.0	SS	The patented claims imply no aboriginal issues, though "retired" people living in the general area may resist a mine because it gives them something to do. The most unhappy group is likely to be drug smugglers and human traffickers, but Trump's plan to have Mexico build a great big wall could put an end to that complaint.
Title:	Low	1.0	SU	The project was acquired out of a bankruptcy in 2006. Title problems should have arrived by now.
Tax:	Very Low	0.5	SS	With 42% combined federal and state income tax already, the chance of higher income tax rates is very low, though the imposition of a government royalty is always a background risk.
GeoPolitical:	Very Low	1.0	VS	Given the nonsense spewed by leading presidential nomination candidates, one has to wonder about the risk of instability sweeping the USA. However, global geopolitical chaos is a plus for Hermosa-Taylor because it will underline the wisdom of developing a major new domestic supply of zinc and lead.
Infrastructure:	Very Low	0.5	SU	The fact that the much bigger Hermosa-Central plan yielded a positive PFS (at base case prices) indicates few problems for the much smaller scale Hermosa-Taylor operation in terms of power, rail and water.
Technical:	Very Low	1.0	SU	The CRD sulphide deposit does not appear to have any metallurgical issues, and seems to track the contact between the carbonates and overlying volcanics quite nicely. A key technical question is to what extent a continuous sweet spot is present with a mineable grade at or above the inferred resource grade.
Management:	Very Low	0.5	SS	AZI has an impressive management team: CEO Jim Gowans is an accomplished mine builder, having built the Red Dog and Polaris zinc mines, Chairman Richard Warke has two buyouts worth \$2 billion in his recent track record, one of them Augusta's Rosemont mine in Arizona, plus a huge equity stake in AZI, so raising \$15-\$20 million in 2016 is plausible at higher stock prices. Don Taylor knows Hermosa inside-out, Johnny Pappas helped get Romarco's Haile gold project permitted despite a "wetlands" obstacle course.
Financing:	Low	1.0	SS	\$10 million sale of 1% NSR to Osisko funds PEA. Management has track record raising feasibility scale funding for 100% owned project, but dilution risk exists.

We use the discount rate to adjust for company-project specific risk. Note: the algorithm is very simple - it adds the risk weight factors assigned to the risk type based on the user choice.

Risk Factor Weight Table				
	Very Low	Low	High	Very High
Environmental Permitting:	0.5	1.0	1.5	2.0
Social License:	0.5	1.0	1.5	2.0
Title:	0.5	1.0	1.5	2.0
Tax:	0.5	1.0	1.5	2.0
GeoPolitical:	0.5	1.0	1.5	2.0
Infrastructure:	0.5	1.5	2.5	4.0
Technical:	1.0	2.5	4.0	5.5
Management:	0.5	1.5	3.0	4.0
Financing:	0.5	1.0	1.5	2.0

The risk adjusted discount rate is the sum of the weight of the risk level assigned to each risk factor.

What we need to adjust for is the risk associated with the availability of information which is defined by the exploration stage.

Rational Speculation Model – Uncertainty Ladder for Metal Projects

Exploration Cycle Stages		Success Probability		Outcome Target Fair Value Channels (\$ Millions)		
		Chance	Leverage	\$100	\$500	\$2,000
1	Grassroots	0.5-1%	100-200	<\$1	\$2.5-5	\$10-20
2	Target Drilling	1-2.5%	40-100	\$1-2.5	\$5-12.5	\$20-50
3	Discovery Delineation	2.5-5%	20-40	\$2.5-5	\$12.5-25	\$50-100
4	Infill Drilling	5-10%	10-20	\$5-10	\$25-50	\$100-200
5	PEA & Metallurgy	10-25%	4-10	\$10-25	\$50-125	\$200-500
6	Prefeasibility	25-50%	2-4	\$25-50	\$125-250	\$500-1,000
7	Permitting, Marketing & Feasibility	50-75%	1.3-2	\$50-75	\$250-375	\$1,000-1,500
8	Construction	75-100%	1	\$75-100	\$375-500	\$1,500-2,000
9	Production	100%		\$100	\$500	\$2,000

Note: the fair value range in each exploration stage row for each outcome target column is calculated by multiplying the target value by the success chance. ie stage 4 target \$500: $0.05 \times \$500 = \25 , $0.1 \times \$500 = \50

Risk Adjustment: Intrinsic Value vs Speculative Value

Intrinsic Value = Discounted Cash Flow Model (DCF) applied to a mine

Fair Value of a Bet = probability X value of a potential outcome

Speculative Value = probability of a potential mine X such a mine's DCF value

The 6 Numbers you need to Gamble on Discovery Exploration

- **After Tax Net Present Value (NPV)**
- **After Tax Internal Rate of Return (IRR)**
- **Discount Rate**
- **Project Net Interest**
- **Fully Diluted Shares**
- **Stock Price**

Future Stock Target: $NPV \times Net\ Interest / Fully\ Diluted$

Implied Market Value: $Fully\ Diluted \times Stock\ price / Net\ Interest$

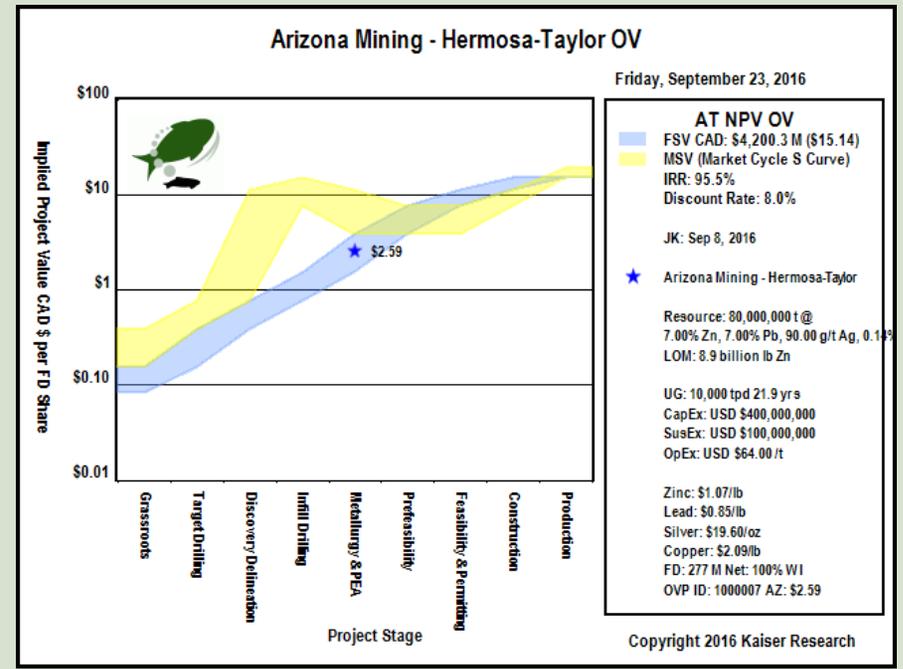
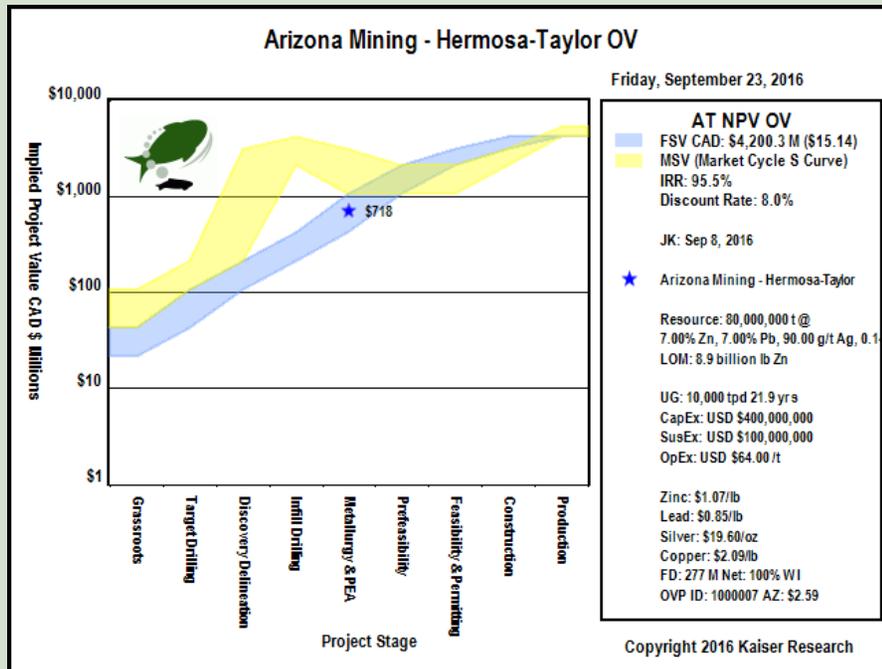
Fair Speculative Value Stock Price Range: CAD \$1.51 - \$3.79

MSV (Market Cycle S Curve): Market Speculative Value represents the typical market pricing pattern of a new discovery as it moves through its exploration-development cycle. The *irrational* pricing behavior of the yellow channel contrasts with the *fair speculative value* of the blue channel as defined by the *rational speculation model* because during the pre-economic study stages there is great uncertainty about how *big* the discovery will turn out.

Fair Speculative Value Ladder

USD OV NPV	CAD OV NPV	Exch Rate	Diluted	Net Interest
\$3,189,067,706	\$4,200,321,076	1.3171	277,374,031	100.00%
Project Stage	Uncertainty Range	CAD FSV Range	CAD FSV per Share Range	CAD MSV per Share Range
Grassroots	0.5% - 1.0%	\$21,001,605 - \$42,003,211	\$0.08 - \$0.15	\$0.15 - \$0.38
Target Drilling	1.0% - 2.5%	\$42,003,211 - \$105,008,027	\$0.15 - \$0.38	\$0.38 - \$0.76
Discovery Delineation	2.5% - 5.0%	\$105,008,027 - \$210,016,054	\$0.38 - \$0.76	\$0.76 - \$11.36
Infill Drilling	5% - 10%	\$210,016,054 - \$420,032,108	\$0.76 - \$1.51	\$7.57 - \$15.14
PEA & Metallurgy	10% - 25%	\$420,032,108 - \$1,050,080,269	\$1.51 - \$3.79	\$3.79 - \$11.36
Prefeasibility	25% - 50%	\$1,050,080,269 - \$2,100,160,538	\$3.79 - \$7.57	\$3.79 - \$7.57
Permitting & Feasibility	50% - 75%	\$2,100,160,538 - \$3,150,240,807	\$7.57 - \$11.36	\$3.79 - \$7.57
Construction	75% - 100%	\$3,150,240,807 - \$4,200,321,076	\$11.36 - \$15.14	\$7.57 - \$11.36
Production	100%	\$4,200,321,076	\$15.14	\$15.14 - \$18.93

Rick Rule: “the intrinsic value of an exploration junior is zero”



John Kaiser: “the speculative value of an exploration junior is the value of a plausible potential outcome times its uncertainty”

Public Accessibility, Plausibility Determination, and Consensus

Who cares what one individual thinks, even if you can examine each assumption underlying the visualized outcome?

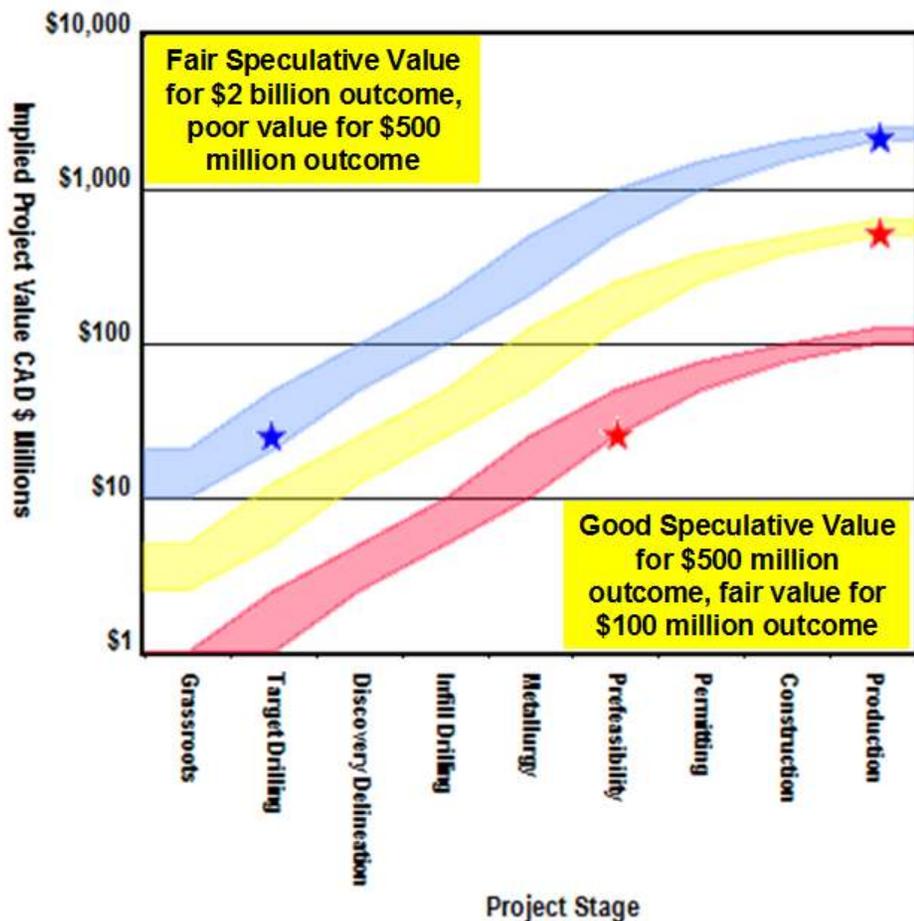
What we need is an online platform where individuals register as members, research a company-project, use the online forms to input their assumptions for a plausible outcome, and share that outcome to the BoomTown space for that project where other members can look up the assumptions and post their own critiques.

The result will be a crowd-member sourced outcome whose plausibility the crowd has quantified, first by critiquing individual assumptions, and then rating the credibility of the plausibility critics.

If a BoomTown attracts enough Visualized Outcomes, a bearish to bullish distribution of outcomes weighted by crowd “follows” will emerge which yields a Consensus Outcome

The relationship between the Consensus Outcome risk-adjusted by the uncertainty ladder and the implied market value becomes the basis for market bets by an international audience of speculators who can finally see what they are betting with or against.

Mineral Exploration Cycle



The speculative value depends on the stage of the project, the value implied by the market, and the visualized outcome.

Basic Gambling Principle = a fair bet is one where the payout matches the odds, a good bet is one where the payout is less than the odds, and a good bet, one you only find when the market is inefficient or rigged, is one where the payout greatly exceeds the underlying odds.

An Arena of Reputation based Experts

The **platform's disclaimer** declares: every member who shares is assumed to have a conflict of interest and by sharing an outcome is pursuing the goal of influencing the market and the behavior of the crowd.

A **key requirement**: all members of the Outcome Visualization Platform are anonymous and operate with a pseudonym – divulging one's identity forfeits sharing privileges

But if everybody is anonymous and assumed to be untrustworthy, will not the project BoomTowns be flooded with garbage outcomes by pumpers and bashers?

A new member starts with a zero reputation that can only be developed through public activity within the OV Platform which tracks everything and makes tools available to members for the study of a "Player's" track record. The ability to influence the market and/or the platform's audience will be a function of a reputation earned over time. **Garbage visualized outcomes do not build reputations.**

By definition all OV Players are untrustworthy "bad dudes". As Players develop strong reputations they can choose to cultivate that reputation, usually by evolving into "Guardians", or set the crowd up for a self-serving betrayal that destroys the reputation permanently. It will not be like the real world because the OV Platform never forgets. The emergent property of the OV Platform is that the Consensus Outcome will converge on what is eventually published as a QP signed off 43-101 estimate or study. Players who end up closest to the 43-101 outcome receive a reputation boost. Each 43-101 forces a reset.

The Disruptive Nature of the OV Platform

CRM Problem: brokers as a source of advice become irrelevant once investors can research crowd based expectations for exploration projects, especially earlier stage ones.

Choked Funding Gateways: once retail investors can see the BoomTown expectations they will want to give capital directly to companies through private placements. They will insist the accredited investor restriction be relaxed or the “existing shareholder” stipulation be abolished. Crowd-funding portals will run the financing books on behalf of investors and companies. The fee collecting intermediaries loathed by regulators as untrustworthy will play no role.

Market failure at Price Discovery: the Consensus Outcome for a BoomTown will enable the market to see the relationship between market value and fair speculative value. Algo trading will lose its downside bias because individual value seekers will recognize good value emerging as the result of a downtrend. Algo programs will themselves use information from the OV Platform to avoid trading outside fair value channels.

IIROC: the regulators will be able to refer to BoomTown activity and expectations in trying to determine if market volatility is due to leaked inside information or just a function of shifting expectations, and will no longer need to be so trigger-happy in trying to maintain the integrity of the market.

The Disruptive Nature of the OV Platform continued

Disclosure Overload: the constant adjustment and resubmission of visualized outcomes by Players in response to new information, critiques or even the BoomTown's changing complexion will cause outcomes to converge on agreement with most assumptions and focus the disagreement on the handful that matter for the 43-101 outcome. This will educate audiences and enable it to ignore irrelevant details.

Financial Cartels: once the crowd can independently convert a junior's disclosures into BoomTown expectations within a platform that allows comparative searching and analysis, audiences will gravitate toward good stories without being steered by financial cartels. It will attract new groups of financial "backers" to the resource juniors and provide competition that lessens the heavy-handedness of the current situation.

Lost Generation: the gaming aspect of the OV Platform will attract younger audiences who will get a rapid education about what makes the exploration sector and mining industry tick. Because exploration juniors deliver fundamental outcomes over longer time periods, they will represent a "slow gambling" opportunity that is an alternative to volatility trading and rivals Fantasy Sports because of the linkage between BoomTown and the market.

The Disruptive Nature of the OV Platform continued

Independent Advice: while the Players, Guardians and Spectators will remain anonymous, the OV Platform will include a Think Tank populated by individuals with disclosed identities who can develop blog or newsletter style businesses whose commentaries include BoomTown activity. These can be free or subscription or individual item fee based. Given that between the ASX and TEX/TSXV there will be over 2,000 companies with 5,000 plus projects, there can be a proliferation of experts equivalent to sports commentators discussing the action in the arena. A central administrative function played by the OV Platform will overcome the entry barriers for new independent observers who rely on membership revenue rather than company sponsorship fees.

Stock Forums: hubs such as Stockhouse, Hot Copper and CEO.ca suffer because they are just a stream of unstructured comments. Once the OV Platform generates highly structured content in the form of visualized outcomes shared with a BoomTown, these externalized expectations will become the focus of discussions with the stock forums, which in turn will enable “mystery” and “rumors” to become part of the junior exploration sector. This aspect of the junior market has been eroded by the rise of the Internet and the demise of full service brokers willing or allowed to cover the high risk high reward juniors.

What Next?

I am currently involved in a startup that is developing an online version of the Outcome Visualization Platform. A prototype is expected to be ready for testing in December. Anybody interested in becoming a beta tester should contact me. A commercial release is planned for H2 of 2017. Active beta testers will be granted membership privileges in the commercial platform.

- Geologists
- Engineers
- IR Representatives
- Students
- Fund Managers
- Retail Investors
- Company Executives
- Journalists
- Financial Professionals
- Regulators
- Traders
- Gamers
- Teachers
- Academics
- Government
- Lawyers
- Anybody who gets how cool this will be

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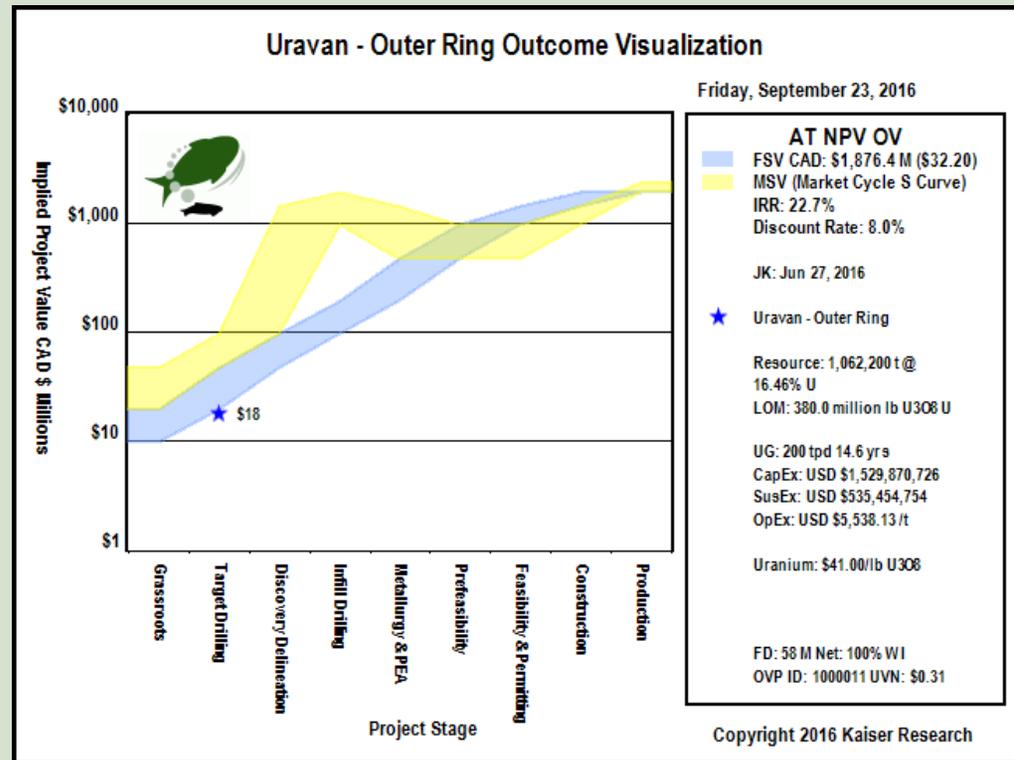
346 Rheem Blvd #107,
Moraga, CA, 94556, USA

Email: jkaiser@KaiserResearch.com

Twitter: @KaiserResearch

Skype: KaiserResearch

Tel: (925) 631-9748



When the market wind blows resource juniors should bend like reeds rather than break like trees.