SLRCONSULTING.COM

Is the Net Present Value of a Preliminary Economic Assessment Indicative of the Market Value of a Mineral Property?

William E. Roscoe
Mining Advisory, SLR Consulting (Canada) Ltd.

October 2025

Overview

- Definitions and concepts
  - Preliminary Economic Assessment (Canada) = Scoping Study (other countries)
  - Valuation vs Evaluation
  - Background
- Transacted mineral properties with PEAs
  - Comparison of NPV with transaction value; discount rates
- Non-transacted mineral properties with PEAs
  - Comparison of NPV with adjusted market capitalization; discount rates
- Discussion of Findings
- Concluding remarks

Cautionary Remarks

- Information used in this presentation is from the following public sources and subscription services, as well as company websites.
  - SEDAR – Canadian system for electronic document analysis and retrieval
  - EDGAR - US electronic data gathering, analysis, and retrieval
  - S&P Global Market Intelligence – database subscribed to by SLR Consulting
- The views expressed in this presentation are the personal views of the author and do not necessarily represent the views of SLR or other SLR employees.
- The names of the gold properties used in this study have been excluded so as not to distract from the concepts and analysis presented herein.

Acknowledgements

- The presenter gratefully acknowledges the contributions of his co-authors and colleagues: Pierre Landry (Victoria), Graham G. Clow (Toronto), and Paul Chamois (Toronto)
- The presenter also wishes to acknowledge the support of SLR Consulting (Canada) Ltd. Mining Advisory and the financial support of the Management and Economics Society of the Canadian Institute of Mining, Metallurgy and Petroleum.

Valuation vs Evaluation

- Valuation is distinct from Evaluation with reference to a Mineral Property
  - Valuation is the value of a Mineral Property in money or monetary equivalent. The words “value” and “valuation” can be used to refer to the estimated value or to the preparation of the estimated value (IMVAL Template 2021; CIMVAL Code 2019).
  - Evaluation is a broad physical, technical, legal, economic, and/or other assessment of a Mineral Property that is generally done for an investment decision. Evaluations include feasibility studies, prefeasibility studies, preliminary economic assessments, technical assessments, and scoping studies (IMVAL Template).
- An Evaluation may be used in the process of a Valuation or as a basis for a Valuation but is not a valuation *per se* (CIMVAL Code).

Evaluation Studies

- A **Preliminary Economic Assessment (PEA) or Scoping Study** is an early-stage evaluation of a Mineral Property which may include all categories of Mineral Resources. It includes assumptions and limited technical, financial, and permitting detail. The purpose is to justify additional expenditures to advance the property and to identify where more information is needed for more detailed evaluation.
- PEA and Scoping Studies can have accuracy ranges of ±30% to ±50% or more for capital and operating costs and represent higher risk than more advanced studies.
- More advanced evaluations include **Prefeasibilty or Preliminary Feasibility Studies (PFS)** and **Feasibility Studies (FS)**, which are much more detailed and represent lower risk than a PEA.
- Such evaluation studies include a Discounted Cash Flow (DCF) analysis which results in a Net Present Value (NPV) at an appropriate discount rate, which accounts for various risks.

Background

- Most PEAs on mineral properties located in Canada and USA use a discount rate of 5% to derive the NPV.
- This begs the question: **Is the NPV of a PEA or Scoping level study indicative of the market value of a mineral property?**
- This presentation explores this question by comparing the NPV of mineral properties with PEAs in Canada and USA with (a) the market value if the property has transacted and (b) the adjusted market capitalization (AMC) if the property has not transacted but is the major asset of a publicly traded company.
- If the NPV is different from the market value of a transacted property or from the AMC of a non-transacted property, what implied discount rate is needed to make the NPV equal to the market value or the AMC?
- We have compiled data sets on transacted properties and non-transacted properties with PEAs using the proprietary database of S&P Global Market Intelligence that SLR Consulting subscribes to as well as public sources such as SEDAR, EDGAR, and company websites.

Transacted Gold Properties with PEAs

- Compiled PEA and transaction data on numerous gold properties
- Located in Canada and USA; PEA dates from 2013 to 2023
- Transaction dates from 2016 to 2023, mostly within 1-2 years after PEA
- 16 transacted properties are included - 10 asset deals and 6 corporate deals
- For corporate deals, the PEA property was the major asset of company acquired
- Deal prices are adjusted to 100% basis if not for 100% of the property
- Deal price or transaction price defines the market value of the property
- Transaction date was the date of the announcement of the deal
- NPVs in the PEA are after-tax
- NPVs were reported at a discount rate of 5%, except for three at 7%, 7.5%, and 8%
- **How does the NPV compare with the market value of the transaction?**
- **What implied discount rate would make the NPV equal to the transaction value?**

Transacted PEA Properties

Canadian Properties Data (in chronological order)

Property Code	PEA Year	Deal Year	Discount Rate	After-Tax NPV US$M	Deal Price US$M	Ratio Deal Price to NPV	Impled Discount Rate for NPV=Price
A	2013	2016	8.0%	12.4	1.9	0.15	36%
B	2013	2021	5.0%	189.7	39.6	0.21	10%
G	2017	2017	7.5%	80.0	9.0	0.11	35%
H	2017	2018	7.0%	24.6	4.1	0.17	20%
J	2018	2020	5.0%	208.3	90.6	0.43	12%
K	2019	2019	5.0%	303.0	254.7	0.84	7%
L	2020	2021	5.0%	108.1	39.9	0.37	13%
O	2020	2021	5.0%	321.0	39.4	0.12	24%
P	2022	2023	5.0%	112.0	10.0	0.09	24%
Q	2023	2023	5.0%	1,170.0	41.2	0.04	30%
Average				**252.9**	**53.0**	**0.25**	**21%**
Median				**150.9**	**39.5**	**0.16**	**22%**

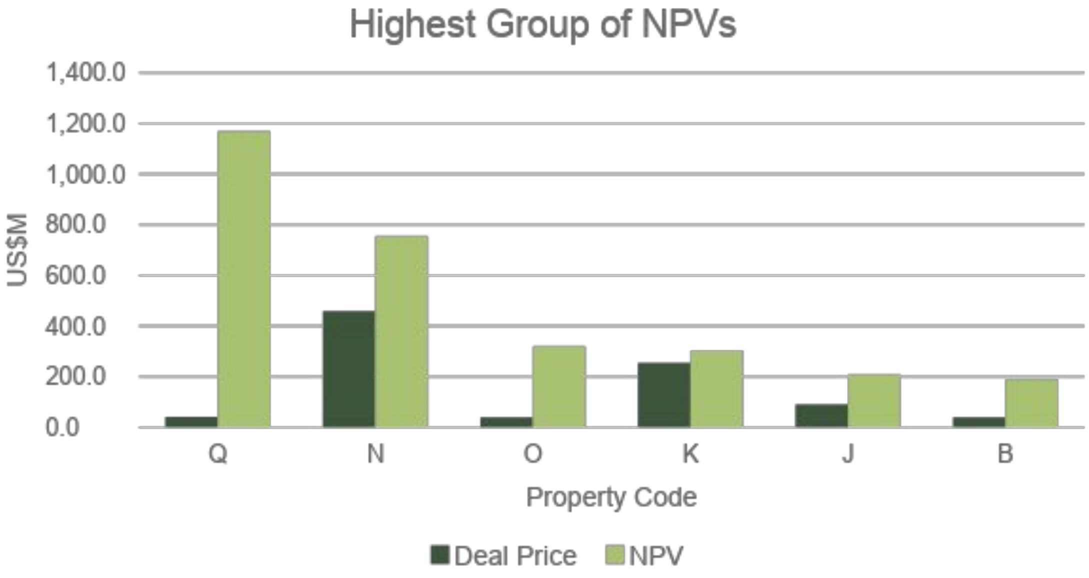
Transacted PEA Properties

USA Properties Data (in chronological order)

Property Code	PEA Year	Deal Year	Discount Rate	After-Tax NPV US$M	Deal Price US$M	Ratio Deal Price to NPV	Implied Discount Rate for NPV=Price
C	2015	2016	5.0%	14.1	2.8	0.20	17%
D	2016	2017	5.0%	54.9	3.4	0.06	33%
E	2016	2016	5.0%	56.4	43.5	0.77	8%
F	2016	2016	5.0%	97.0	17.1	0.18	13%
I	2018	2021	5.0%	69.6	10.0	0.14	22%
N	2020	2021	5.0%	755.0	459.6	0.61	10%
Average				**174.5**	**89.4**	**0.33**	**17%**
Median				**63.0**	**13.6**	**0.19**	**15%**
Canada and USA Properties							
Average				**223.5**	**66.7**	**0.28**	**20%**
Median				**102.5**	**28.3**	**0.17**	**19%**

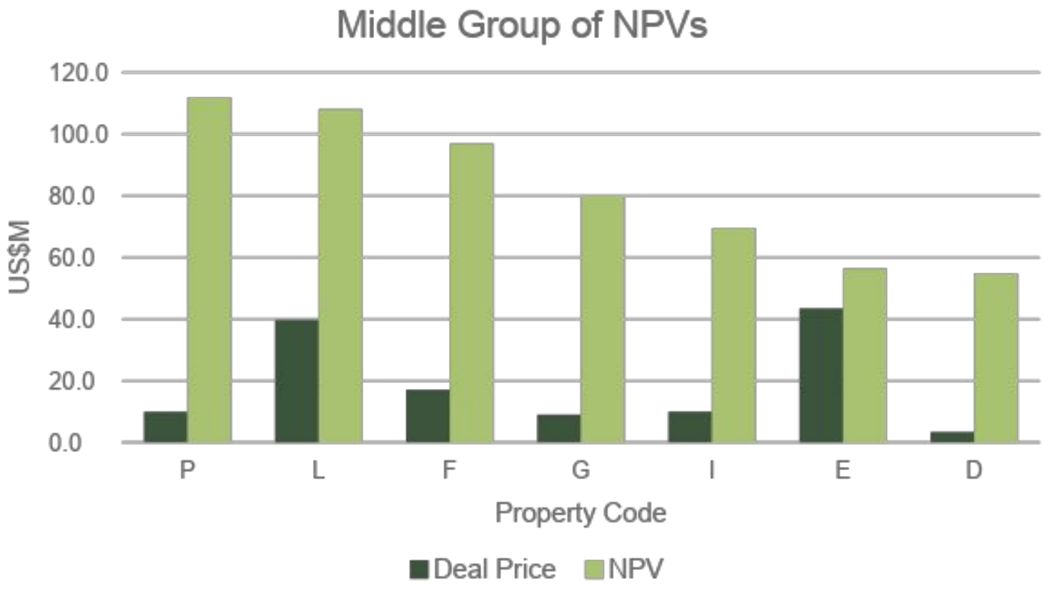
Transacted PEA Properties

Deal prices are almost all significantly lower than NPVs



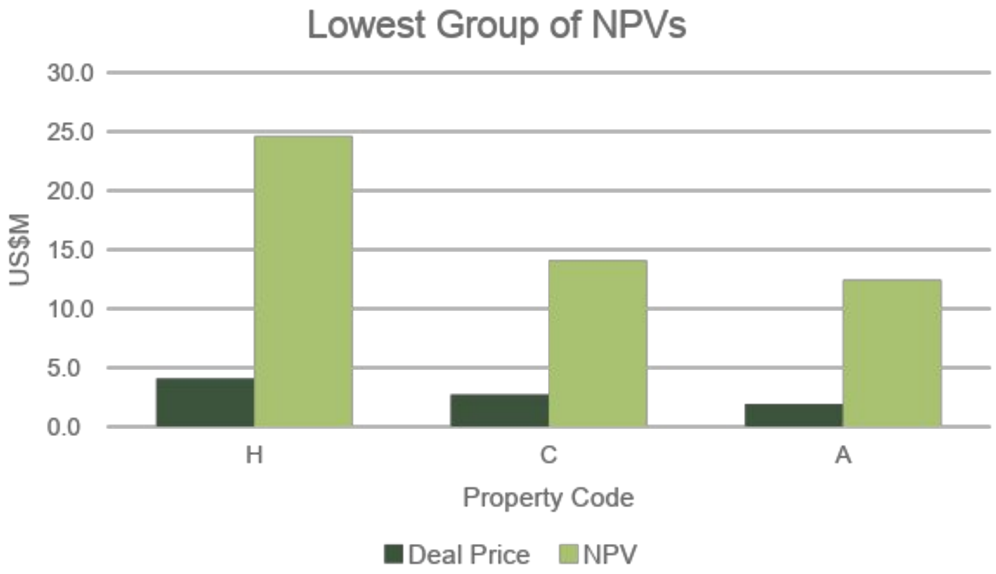
Transacted PEA Properties

Deal prices are almost all significantly lower than NPVs



Transacted PEA Properties

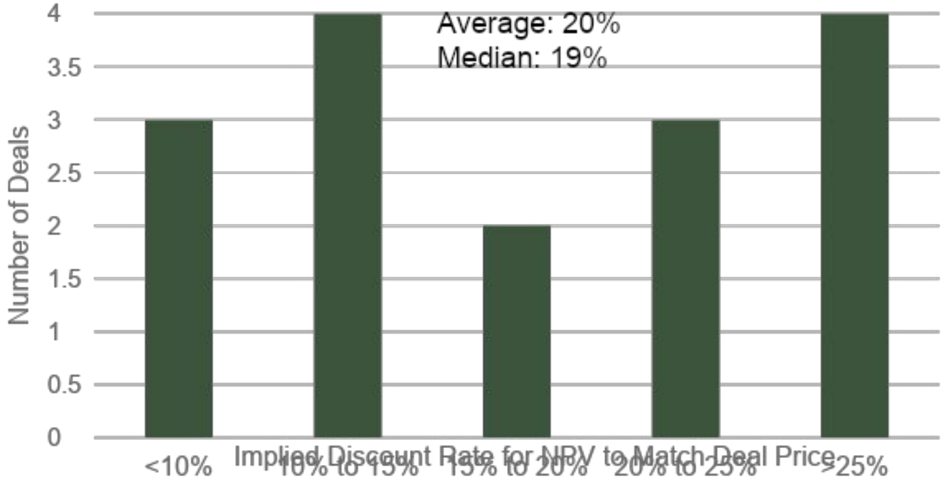
Deal prices are almost all significantly lower than NPVs



Transacted PEA Properties

Histogram of implied discount rates needed for NPV to match transaction price

- Middle 50% of the implied discount rates are from 13% to 24%



Non-Transacted Gold Properties with PEAs

- Compiled PEA and company data on numerous Mineral Properties
- Located in Canada and USA; PEA dates from 2016 to 2024
- 48 non-transacted properties are included (28 in Canada; 20 in USA)
- PEA property was the major asset of company holding the property
- Adjusted market capitalization was used as a proxy for property market value
- Adjusted market capitalization was calculated for each PEA property
  - As of the date of the announcement of the PEA
  - Shares outstanding times average share price for the week after announcement
  - Adjusted by working capital (cash and debt)
- NPVs in the PEA are after-tax and represent a 100% interest
- NPVs were reported at 5%, except for two at 6% and one at 7%
- **How does the NPV compare with the adjusted market cap of the property owner?**
- **What implied discount rate would make the NPV equal to the adjusted market cap?**

Non-Transacted PEA Properties

Canadian Properties Data (in chronological order)

Property Code	After-Tax NPV US$M	Adjusted Mkt Cap US$M	Ratio Adj Mkt Cap to NPV	Implied Disc. Rate for NPV=Adj Mkt Cap	Property Code	After-Tax NPV US$M	Adjusted Mkt Cap US$M	Ratio Adj Mkt Cap to NPV	Implied Disc. Rate for NPV=Adj Mkt Cap
2	64.1	15.6	0.24	11%	24	179.5	33.0	0.18	20%
4	513.3	44.6	0.09	14%	27	329.2	15.5	0.05	27%
5	66.5	46.6	0.70	10%	28	583.2	101.7	0.17	20%
6	66.6	14.0	0.21	41%	29	255.9	79.5	0.31	16%
7	227.0	65.9	0.29	14%	30	1,221.8	771.2	0.63	9%
8	24.3	4.4	0.18	20%	31	191.3	135.2	0.71	8%
11	201.9	34.1	0.17	19%	33	473.8	191.2	0.40	14%
12	14.1	4.6	0.32	20%	35	190.4	28.5	0.15	14%
15	302.5	156.1	0.52	11%	36	429.7	75.6	0.18	18%
16	101.7	44.2	0.43	16%	39	288.5	29.1	0.10	21%
18	484.2	207.2	0.43	16%	43	548.2	76.4	0.14	15%
19	83.3	11.1	0.13	34%	44	168.0	25.4	0.15	24%
22	278.6	22.9	0.08	30%	46	343.2	9.4	0.03	20%
23	596.5	122.3	0.20	15%	47	671.3	129.4	0.19	17%
					Average	**317.8**	**89.1**	**0.26**	**18%**
					Median	**267.3**	**44.4**	**0.19**	**17%**

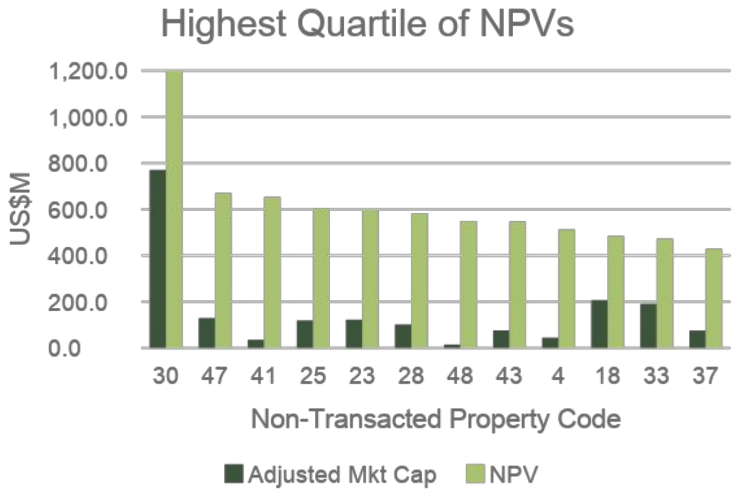
Non-Transacted PEA Properties

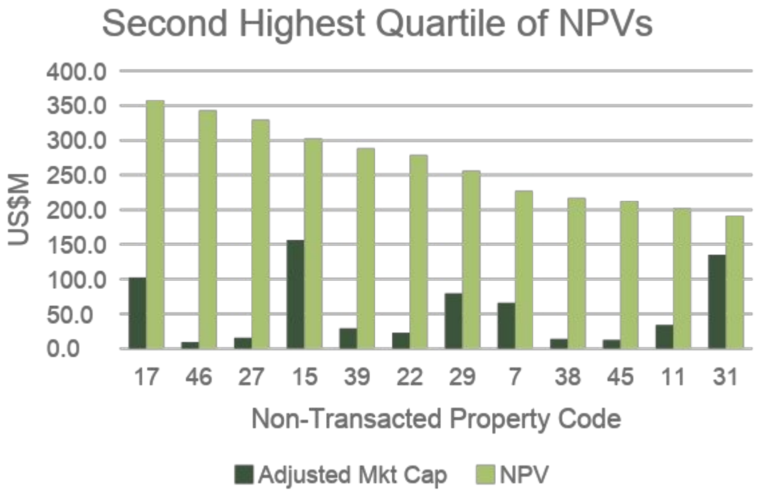
USA Properties Data (in chronological order)

Property Code	After-Tax NPV US$M	Adjusted Mkt Cap US$M	Ratio Adj Mkt Cap to NPV	Implied Disc. Rate for NPV=Adj Mkt Cap	Property Code	After-Tax NPV US$M	Adjusted Mkt Cap US$M	Ratio Adj Mkt Cap to NPV	Implied Disc. Rate for NPV=Adj Mkt Cap
1	187.7	6.6	0.04	17%	26	87.6	42.8	0.49	13%
3	38.4	7.9	0.21	25%	32	64.0	20.0	0.31	49%
9	9.3	4.0	0.43	15%	34	17.6	3.1	0.18	16%
10	69.6	8.3	0.12	21%	37	46.1	6.9	0.15	29%
13	129.5	53.1	0.41	14%	38	217.0	13.8	0.06	19%
14	83.9	3.5	0.04	28%	40	121.0	66.4	0.55	17%
17	357.6	102.4	0.29	21%	41	654.0	35.5	0.05	33%
20	36.3	5.3	0.15	27%	42	61.8	8.4	0.14	33%
21	153.6	14.6	0.09	32%	45	212.4	12.5	0.06	20%
25	606.0	119.2	0.20	19%	48	550.0	14.7	0.03	20%
				USA	**Average**	**185.2**	**27.4**	**0.20**	**23%**
					Median	**104.3**	**13.2**	**0.15**	**21%**
				Canada + USA	**Average**	**262.5**	**62.9**	**0.23**	**20%**
					Median	**190.9**	**27.3**	**0.18**	**19%**

Non-Transacted PEA Properties

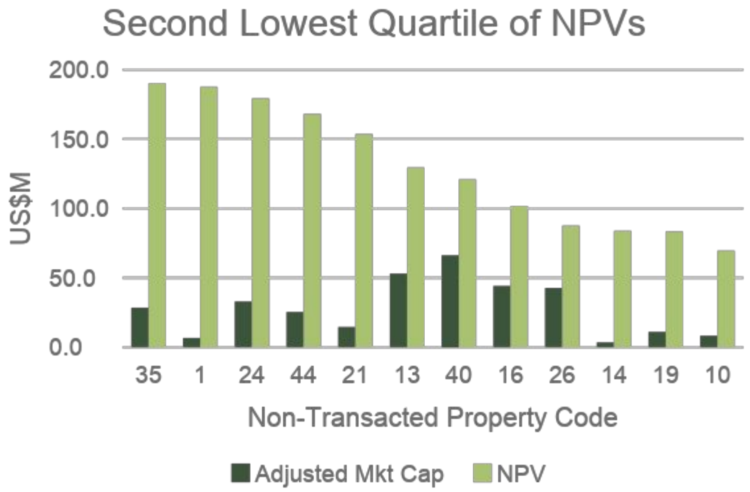
Adjusted Market Caps are almost all significantly lower than NPVs

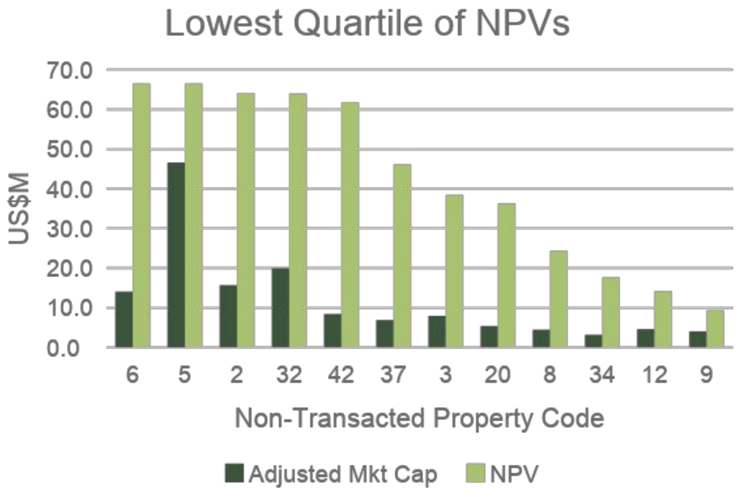




Non-Transacted PEA Properties

Adjusted Market Caps are almost all significantly lower than NPVs

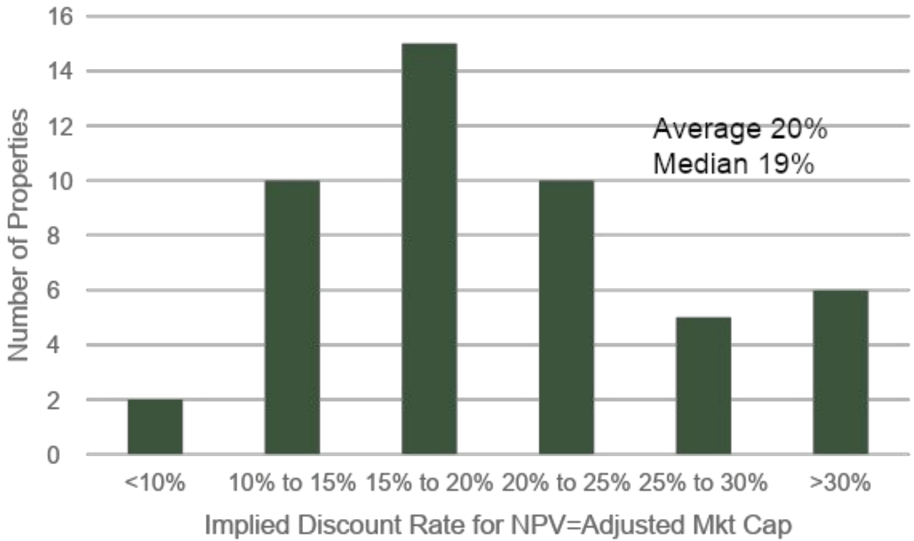




Non-Transacted PEA Properties

Histogram of implied discount rates needed for NPV to match Adjusted Market Cap

- Middle 50% of the implied discount rates are from 15% to 24%



Transacted and Non-Transacted PEA Gold Properties

Summary of Observations		
Parameter	**Transacted Properties**	**Non-Transacted Properties**
Number of Properties	16	48
PEA Discount Rates	13@5%, 3@7%-8%	45@5%, 2@6%7 %
NPV in PEA		
Average US$M	224	263
Median US$M	103	191
Deal Value or AMC		
Average US$M	67	63
Median US$M	28	27
Ratio of Deal Value or AMC to NPV		
Average	0.28	0.23
Median	0.17	0.18
Implied Discount Rate for NPV = Deal Value or AMC		
Average	20%	20%
Median	19%	19%
Middle 50%	12% to 30%	15% to 24%

Discussion of Findings

There is a major disconnect between the PEA NPV at 5% and:

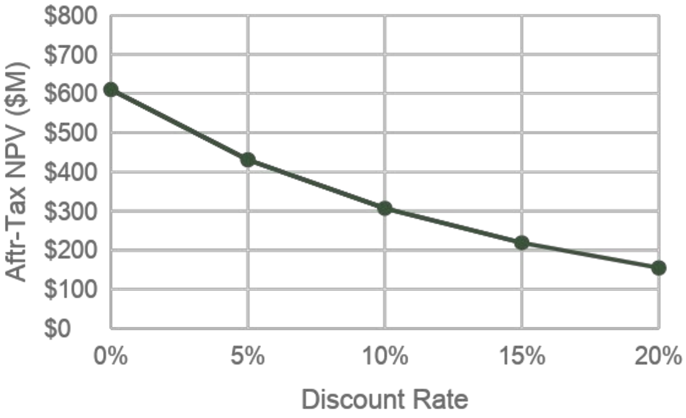
- Property value as shown in market transactions (16 properties)
- Adjusted market cap (AMC) as a proxy for property value (48 properties)

- Ratio of property values to NPV at 5% are low:
  - Average 0.28 and median 0.17 for transacted properties
  - Average 0.23 and median 0.18 for non-transacted properties
  - Similarity of ratios suggests that AMC is a reasonable approximation of property value overall
- Implied discount rates for NPV to match transaction value or AMC are much higher than 5%
  - Average implied discount rate is 20% with a median of 19% in an overall range of 7% to 49%
  - Middle 50% of implied discount rates is in the order of 15% to 25%

- Is the NPV of a PEA indicative of the market value of a mineral property?
  - The market clearly tells us that 5% is too low for valuation of a mineral property

Sensitivity of NPV to Discount Rate

- NPV is very sensitive to discount rate in most PEAs
- The example below shows sensitivity up to 20%:
    - NPV at 15% discount rate is approximately 50% of NPV at 5%
- Discount rate for valuation based on a PEA should use a discount rate that adequately reflects cost of capital, uncertainty of a property at the PEA/Scoping level, and country risk
- This review suggests discount rates for valuation in the order of 15% to 25% for PEAs on gold properties in Canada and USA



Concluding Remarks

This study demonstrates that NPV of a PEA/Scoping study at a 5% discount rate is not indicative of the market value of a gold property

- Data has been compiled for PEAs on 64 gold properties in Canada and USA over the past decade – 16 of them transacted and 48 not transacted
- There is a major disconnect between the NPVs at 5% to 8% and the market values of transacted properties and the AMCs of non-transacted properties
- An appropriate discount rate to derive market value using these PEAs should be more like 15% to 25%
- A 5% discount rate seems to be used for comparison to peer projects that also use a 5% discount rate

Making Sustainability Happen

SLRCONSULTING.COM

William E. Roscoe

Principal Geologist

E: wroscoe@slrconsulting.com

CIMF FICM

CIM FOUNDATION | FONDATION ICM

Distinguished Lecturers

References and Related Presentations

Referred to in this presentation and predecessors

- CIM Special Committee on the Valuation of Mineral Properties (CIMVAL) (2019); CIMVAL Code for the Valuation of Mineral Properties, adopted by CIM Council November 29, 2019.
- CIM Standing Committee on Reserve Definitions (2014); CIM Definition Standards for Mineral Resources & Mineral Reserves, adopted by CIM Council May 19, 2014.
- International Mineral Valuation Committee (IMVAL) (2021); International Mineral Property Valuation Standards Template' Fourth Edition April 14, 2021.
- Landry, Pierre, William E. Roscoe, and Graham G. Clow (2023); Net Present Value in Early Stage Technical Studies vs Market Value (Copper), presented at MINEXCHANGE 2023 SME Annual Conference & Expo, February 28, 2023.
- Roscoe, William E. (2021); Quantifying Risk in Preliminary Assessments of Gold Projects, presented at CIM Virtual Convention, May 4, 2021.
- Roscoe, William E., Grant A. Malensek, Pierre Landry, and Graham G. Clow (2022); Net Present Value in Early Stage Technical Studies vs Market Value, presented at CIM/ICM BC 2022 Convention & Expo, May 2, 2022.