

DIG DEEPER
Webinars

TOOLS, TECHNIQUES AND GAPS IN EVALUATING MINE CLOSURE

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The Problem:

Identifying the current tools, techniques and gaps in the evaluation of mine closure

Existing tools and techniques **may be inadequate**

- limitations of DCF NPV tools and other methods

Evaluations incorporate expenditure and value, AND:

- ESG, SLO, community perceptions, government exposure, sentiment, circularity, sustainability, etc.

Once we know what tools are currently used and how these tools are applied, then we can gauge their effectiveness and associated **gaps**.

Then we can **refine** existing and **develop** improved tools and methods to benefit all stakeholders.

The Problem & Process

Identify **gaps** in the existing tools and techniques used to determine mine closure values:

- ESG (identification and quantification);
- community (social) aspects and needs;
- discounting factors used in DCF NPV; and
- the determination of intangible values (liabilities and assets).

Key areas requiring further consideration:

1. Develop a framework to identify direct and indirect ESG factors.
2. Under the “S” in ESG (i.e. “social”), develop a road map to guide companies on how best to assist the community reach a sustainable presence and existence.
3. Develop appropriate tools to quantify mine closure assets and liabilities (costs and value).
4. Provide a framework and recommend solution-based-processes to identify and evaluate intangibles that contribute to risk and uncertainty around mine closure.

The role of mine closure intangibles in ESG implementation and achieving net benefits

1. **Valuation and planning lens** – What methodologies could be used to understand and incorporate intangibles into planning cycles?
2. **Intangibles lens** – How can we identify intangibles that influence closure decisions along the mine life cycle?
3. **ESG lens** – What ESG factors are taken into consideration when planning for closure (both tangible and intangible)?

Intangibles lens

- When and how are residual factors (intangibles) incorporated into mine closure planning activities?
- What residual (intangible) factors typically do not receive attention throughout the closure planning phase(s)?
- *What methodology/ies are employed in an attempt to quantify intangible uncertainties once they have been identified?*

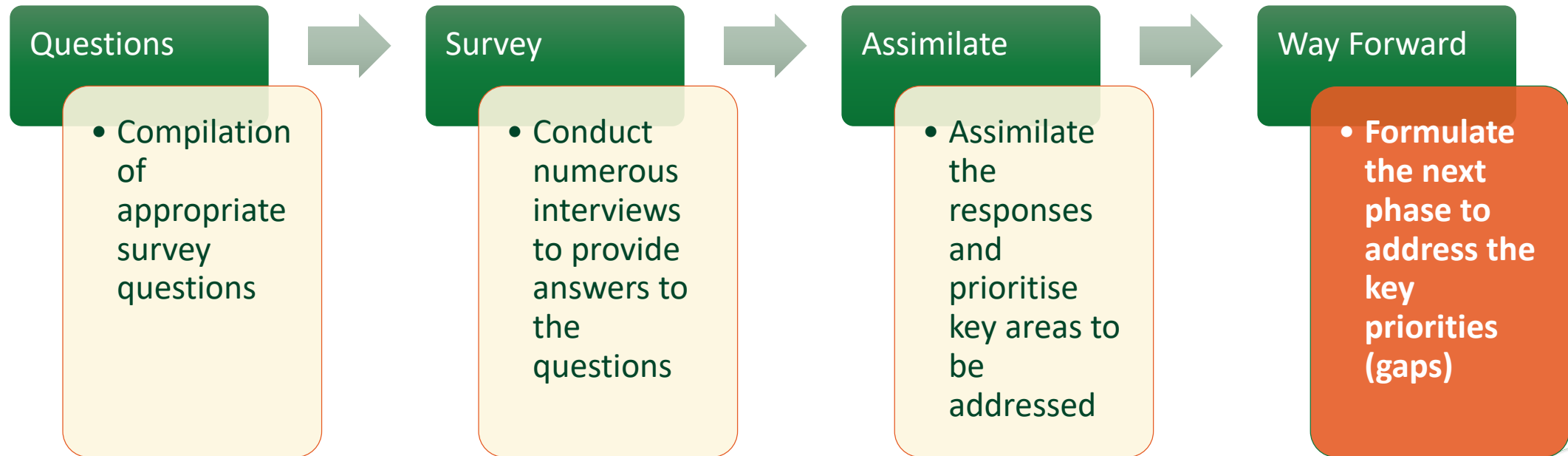
ESG lens

- Are ESG factors handled as a collective, or are they handled individually?
- Are we seeing changes in business processes due to these ESG factors, or is action mostly reporting-based?
- What are the key ESG factors currently influencing closure decisions?

Valuation and planning lens

- Differentiate between Risks and Uncertainties
 - **Risk** - decision-making situations under which all potential outcomes and their likelihood of occurrences are known to the decision-maker;
 - **Uncertainty** - situations under which either the outcomes and/or their probabilities of occurrences are unknown to the decision-maker.

The Research Process



Top 3 Key Findings

Finding 1

- Current tools and methodologies are inadequate. They do not appropriately guide mining companies to take necessary remedial or any other action to achieve an optimal outcome

Finding 2

Necessity to identify and quantify direct and indirect ESG factors (notably intangibles)
Post closure, how best to assist mining communities achieve a sustainable state

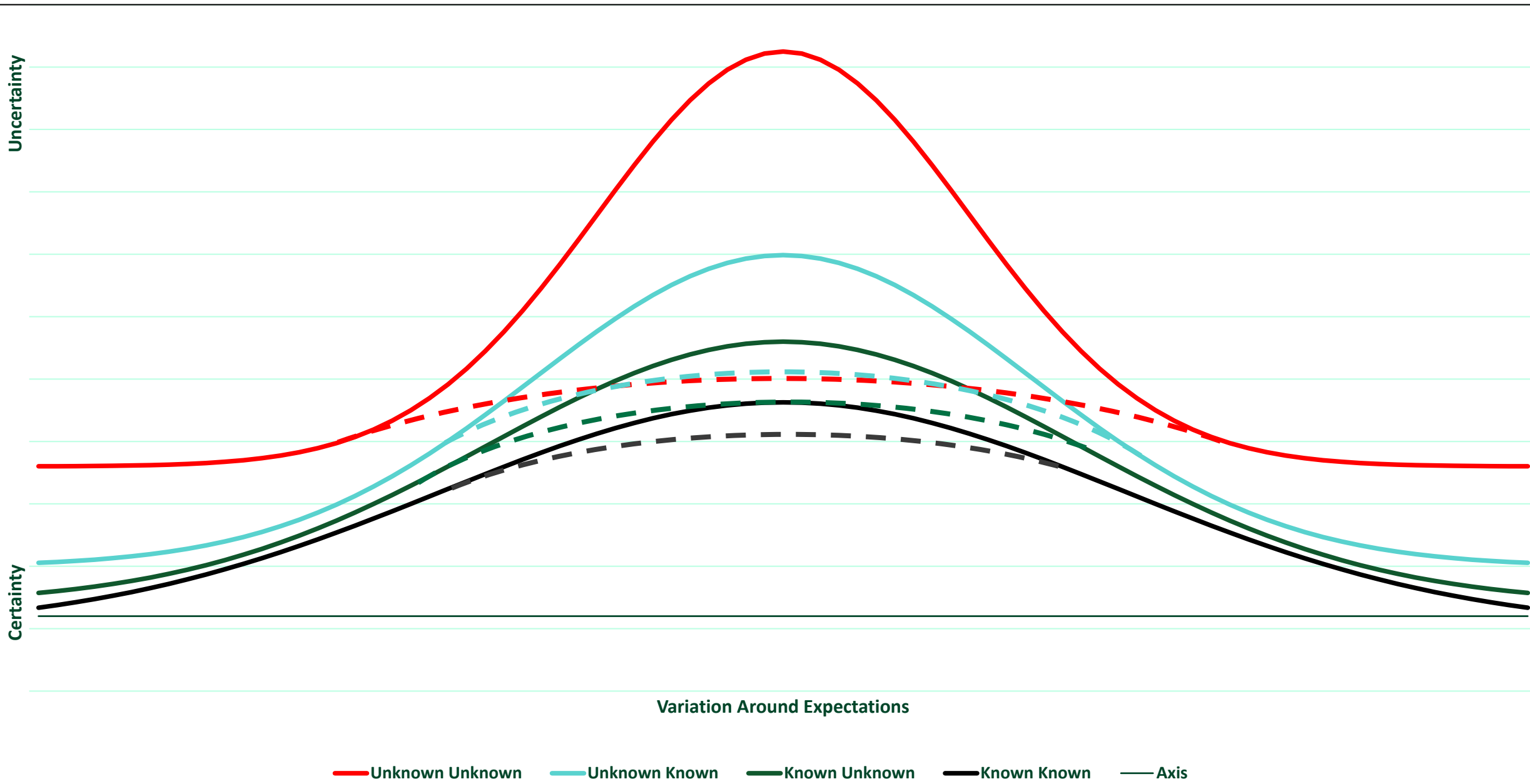
Finding 3

- Necessity for tools and methodologies to be developed to appropriately qualify and then quantify mine closure assets and liabilities to complement (or replace) DCF NPV

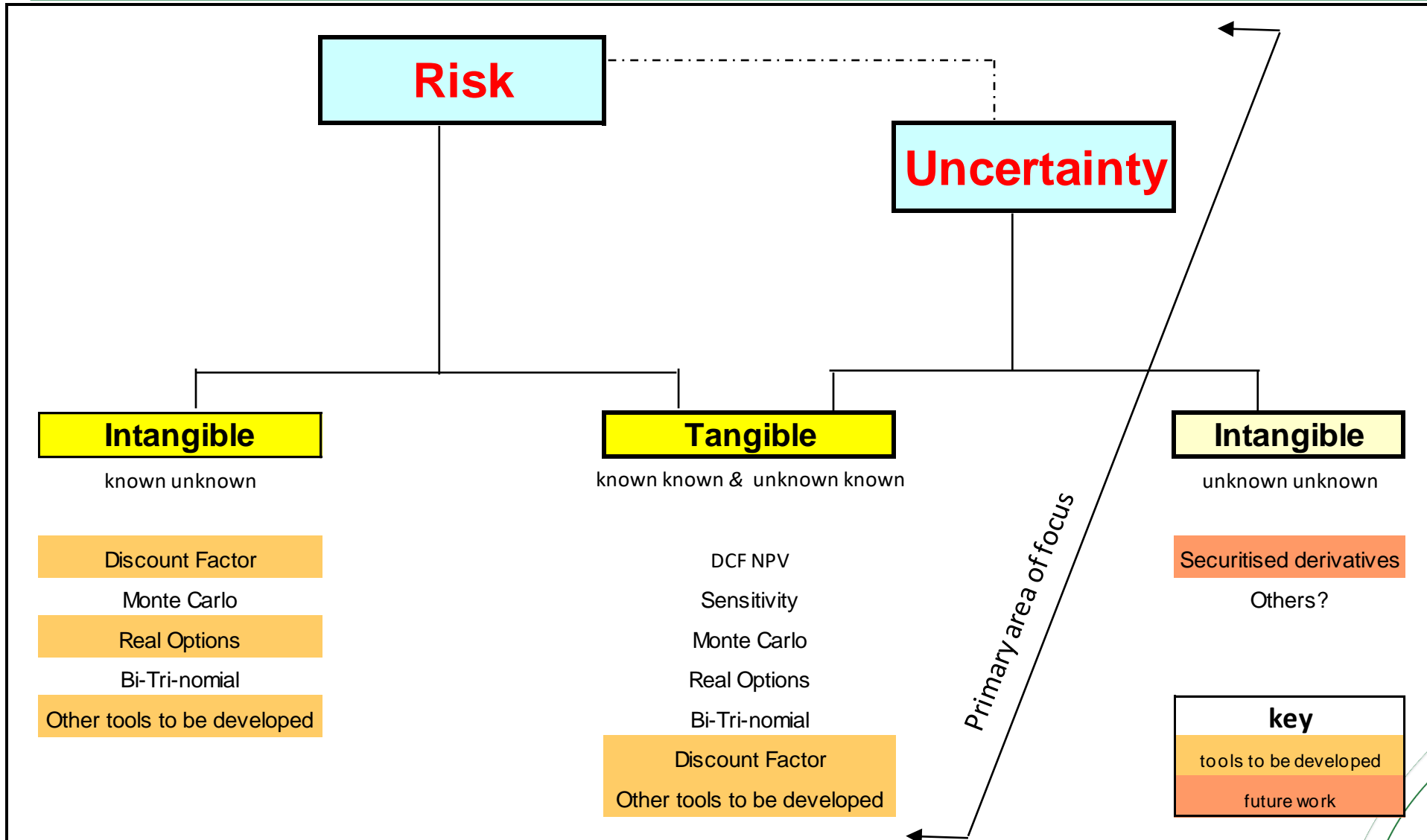
Terms Clarified (Risks & Uncertainties – Tangible & Intangible)

- **Tangible Risk – Known Known:** Risks that exist and the outcome may be predicted.
- **Tangible Uncertainty – Known Unknown:** Uncertainties that exist and the outcome may not be predicted.
- **Intangible Risk – Unknown Known:** Currently unknown risks that give rise to an outcome that can be predicted.
- **Intangible Uncertainty – Unknown Unknown:** Unknown uncertainties that may arise in the future. Neither their occurrence nor their varied outcome can be predicted.

Risks and Uncertainties – Tangible and Intangible



Risks and Uncertainties – Tangible and Intangible



The Way Forward

Is DCF NPV appropriate?

- If yes, then how can it be improved on?
- If no, then what?

If “yes”, we need to address discounting factors for Intangible Uncertainties *et al.*

- Separate WACC from discount rates, and quantify tangibles, intangibles, risks and uncertainties, where they are inadequately addressed in cash flows.

Where can Government get more involved on a post-closure basis?

- Potentially mining companies relinquish ownership “x” years after closure and are awarded a closure certificate. Then the Govt takes the land and remedies any residual aspect using funds from mining contributions generated over life of operations.

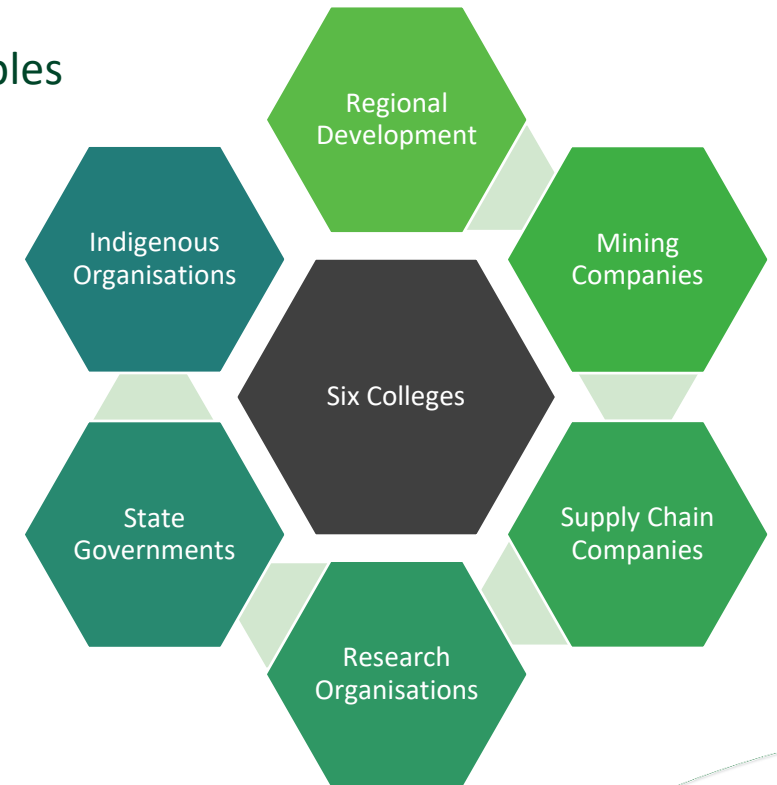
Can we introduce financial derivative products that mining companies (and all other stakeholders) can own and trade (acquire or sell) that mature (or convert) to provide a post closure solution?

- Convertible instrument, investable through an exchange, does not necessarily convert to \$\$\$s, but may convert into an “actionable” event (e.g. a cleanup).

How can we use these Findings?

The identified gaps will guide further research into the identification and quantification of risks and uncertainties incorporating tangibles and intangibles

Miners	improve accuracy when planning for closure; supports closure applications / submissions; identifies key focus areas
METS	articulates what services may be required to achieve closure; provides insights into closure expectations
Indigenous	interactive dialogue to prepare land for post closure; divulges post-closure land use alternatives
Regional Development	alleviates negative perceptions; identifies potential beneficial outcomes after closure
Government	facilitates award of closure certificates; identifies potential areas of concern (residual)
Research	developing the appropriate tools and techniques; quantification of: <ul style="list-style-type: none">- known knowns, known unknowns, unknown knowns- <i>unknown unknowns setting for further research</i>





THANK YOU

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