CanmetMINING
ImpACT

Impacts and Key Initiatives

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CanmetMINING Contribution to the Canadian Mining Industry

In 2019, the Lands and Mineral Sector commissioned a study to determining the relevance of CanmetMINING to the mining industry, identifying and quantifying its value and impact.

What we heard from you? CanmetMINING Strenghts

Strong collaboration across the mining ecosystem

Positive examples include:
- Green Mining Innovation Advisory Committee
- Laboratory Research Network
- Workshops/steering committees to obtain insight into specific research activities

Trusted delivery of exceptional products and services

Specific services noted and lauded include:
- Rock mechanic testing
- Water and diesel particulate testing
- Certified reference materials, proficiency testing program for mineral analysis laboratories

The CanmetMINING brand brings confidence to the data with clients – a trusted third party.

Ability to attract and retain high-quality scientists and technicians

CanmetMINING has world-class expertise in :
- Water treatment/management,
- Rock mechanics/dynamics
- ventilation
- Mineralogical characterization

Challenges to increase the value of CanmetMINING

More program funding needed to advance projects that provide timely value and impact for both CanmetMINING and the ecosystem as a whole

Need focused incentives to ensure IP commercialization.
Recognize and reward collaboration and identify gaps to be filled

Role of various innovation organizations across the mining ecosystem needs more clarity.
CanmetMINING could play the role of national champion

Develop technology roadmaps for the next 20 years in collaboration with stakeholders with a clear role for each organization at each TRL stage

What's new?

CanmetMINING key initiatives

Critical Minerals Including Rare Earths and Chromite

Research and development into technologies that support the development of Canadian resources of minerals deemed 'critical', which will be a main focus for the Canadian Minerals and Metals Plan.

These technologies will enable Canada's transition to a low carbon economy.

• Canmet is a key player in both the Canada-US Critical Minerals Joint Action Plan and the Critical Minerals Taskforce

Mining Value from Waste

Enabling innovation and R&D in the reprocessing and repurposing of mine waste products to simultaneously create value and reduce environmental liability.

• Endorsement from Canadian energy and mines ministers
• Developing a medium term roadmap to define the milestones required to achieve zero waste mining

# Battery Minerals Research and Development

Develop and optimize processes to produce battery grade chemicals and materials from Canadian sources.

• Include an action plan for funding under the CMMP
• Member of the technical review committee for the Charging the Future Challenge

Digital and Artificial Intelligence

Support the adoption of digital technologies and artificial intelligence in the Canadian mining sector.

• Development of tools for mine energy benchmarking, mine ventilation, mine plan optimization, and waste heat recovery in mills

• Collaborating with academia and industry to use AI and machine learning in the areas of microseismic analysis, real-time mine hoist monitoring, and tire rotation optimization

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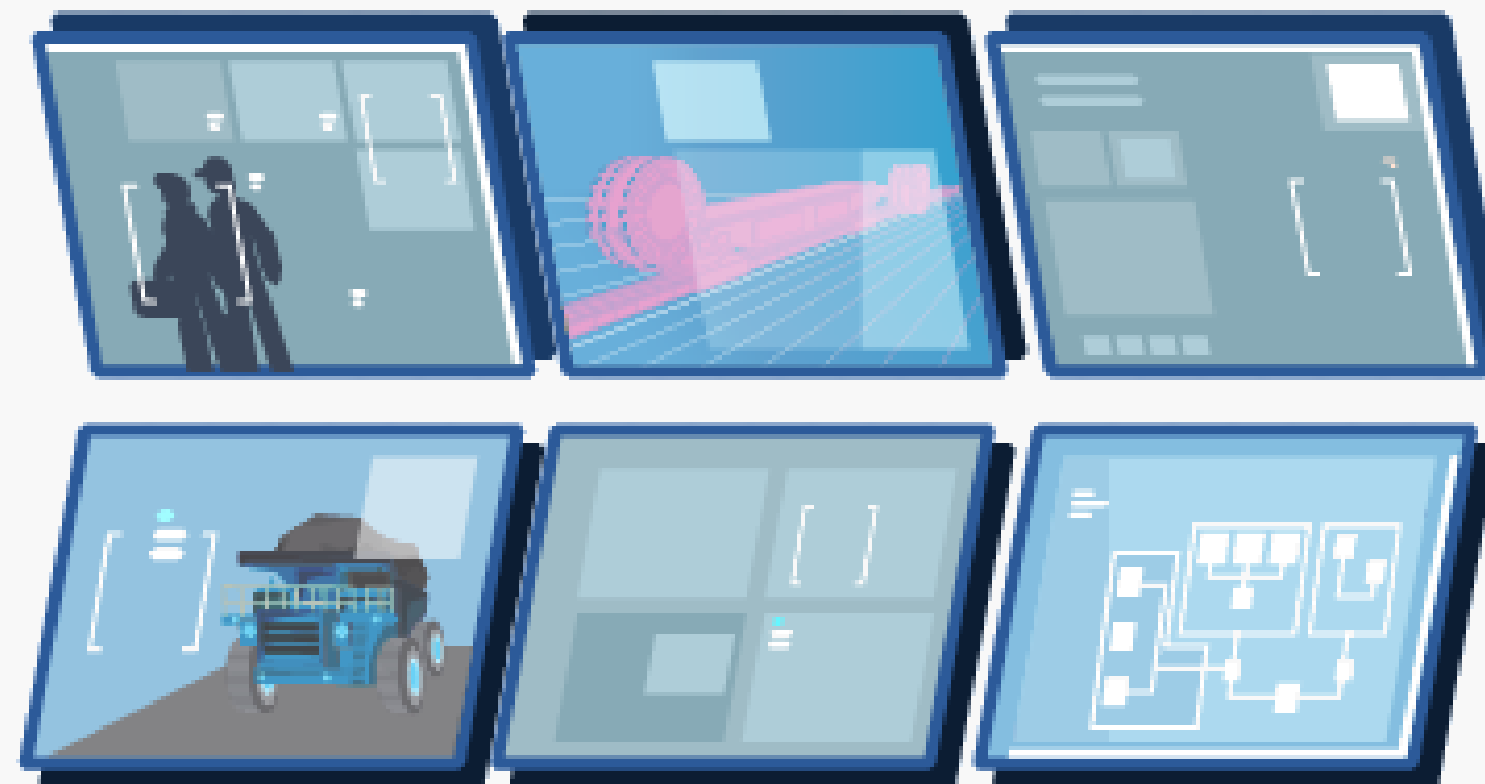
Hydrogen for Mining Applications

Accelerate the adoption and deployment of hydrogen power in mining to reduce the industry's carbon footprint.

- Established a hydrogen steering committee, ongoing collaboration with PTs, Mining 3, CSIRO Australia, H2 Chile, and academia
- Developing an International Network of Expertise on hydrogen power in mining

Canadian Mining Science and Engineering Lab Network

Provide a forum for mineral laboratory leaders to share knowledge, create a culture of open collaboration, and maximize the utilization of laboratory resources

- Signing of MOU in December 18th 2019
- Two ongoing technical projects on ore sorting and bioleaching

Future of Mining

Model Development Summary

Background

- Green Mining Innovation (GMI) hosted a mini-workshop on **November 18** to discuss the development of a model of *the mine of the future*, including its purpose, potential scope, and implementation considerations

- Participants included NRCan staff and external stakeholders

- This laid the ground for a broader discussion at today's workshop on *the mine of the future*

Summary

- The model is to **enable engagement on and attract support for mining innovation** within the GoC; but also to foster collaboration with industry, mobilize the private sector investment for innovation, and raise public awareness

- The model must be **relevant**, **compelling**, and **credible**

- 2050: The timeframe should align with other milestones (i.e. Canada's 2050 GHG target)

- Initial implementation should focus on **a single and simple model** based on a clear vision or goal (e.g. zero waste) that is not constrained by current technologies or other considerations

- Different model 'layers' could support tailored narratives to explore various economic, environmental and social dimensions that could address: **impacts & benefits**, and **key enablers & implications**

Zero Mine Waste

Vision Statement

Develop a new mine that consider all potential environmental effect that will produce **zero waste**. Such an approach will require new ways of developing, extracting and processing, coupled with strategies to minimize and eliminate waste and ultimately eliminate any long-term liabilities either to the company or the governments and society.
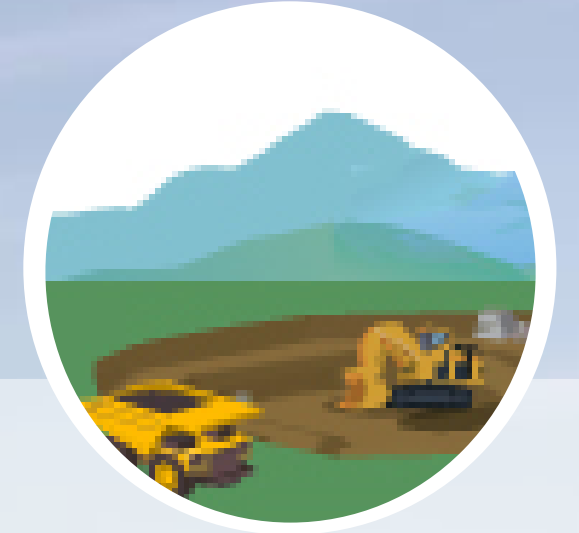
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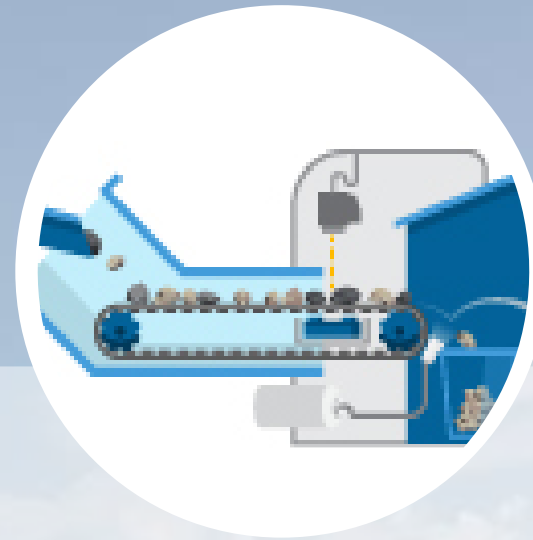
Improved Ore Sorting and Separation

Alternative Power Vehicles

Mine/extraction waste minimization technology

Data optimization and Machine Learning

Clean Technology Adoption

Mine Automation

Next Steps

- Th **other linked models** could be used to explore more specific aspects and details to build the credibility of the vision and get buy in.

- A **key challenge in mining is quantifying the value** in the adoption of transformational technology

- **Near-term:** A visualization model for one or two well-researched baseline mines that would show, in a very credible way, the quantified value that could be realized with certain technological changes (e.g. ore characterization, hydrogen fuel cells, etc.).

- **Long-term:** There may be potential to apply these models and thinking to other natural sectors in Canada