Mining Industry Views on Investing in Minnesota and Scandinavia

Don Elsenheimer
Division of Lands and Minerals

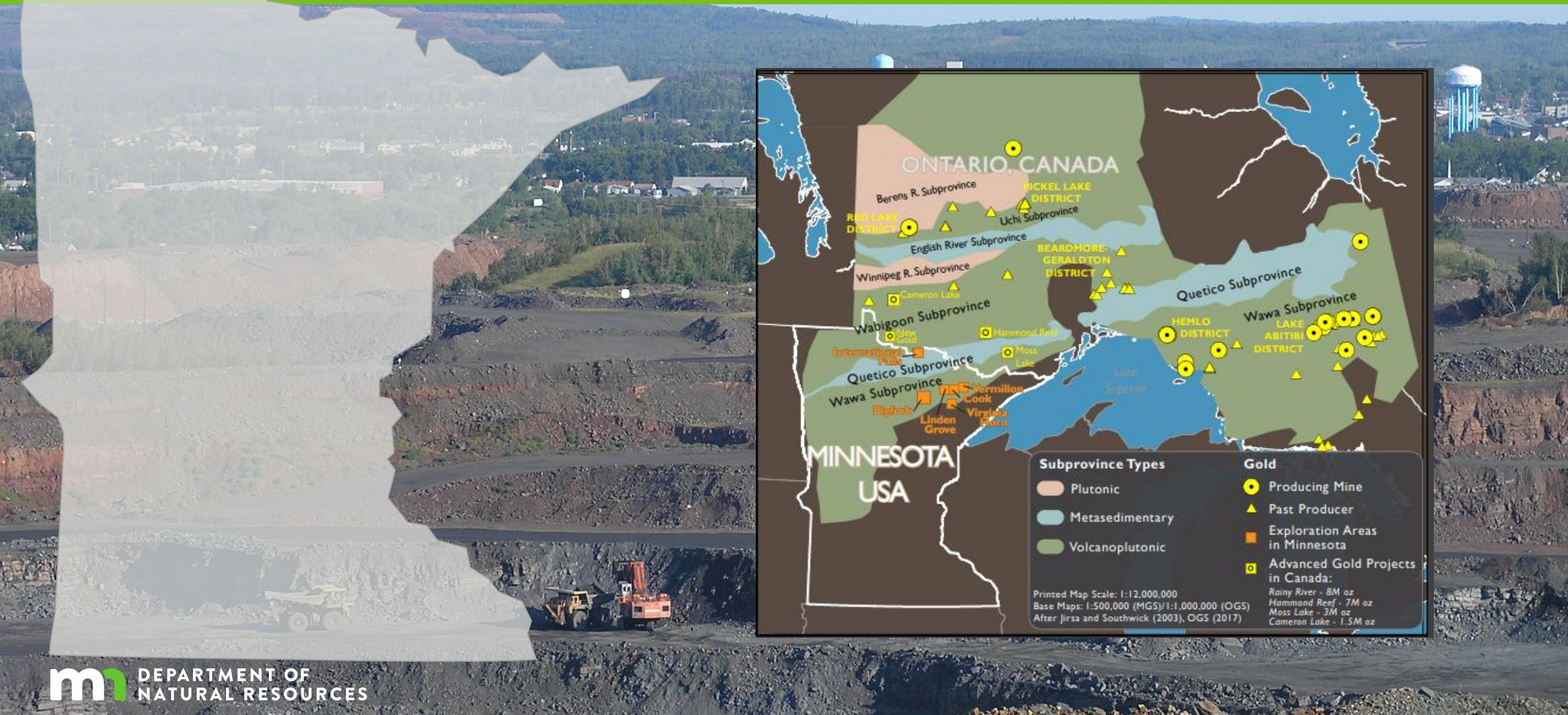
DEPARTMENT OF NATURAL RESOURCES

The Mining Jurisdiction of Minnesota

- 130 year history of continuous iron mining operations
- US$4.1 billion in 2020 nonfuel mineral production (5th amongst U.S. states)
- Duluth complex
  - 2nd largest undeveloped Cu resource
  - 2nd largest undeveloped PGM resource
  - 3rd largest undeveloped Ni resource

DEPARTMENT OF NATURAL RESOURCES

The Mining Jurisdiction of Minnesota



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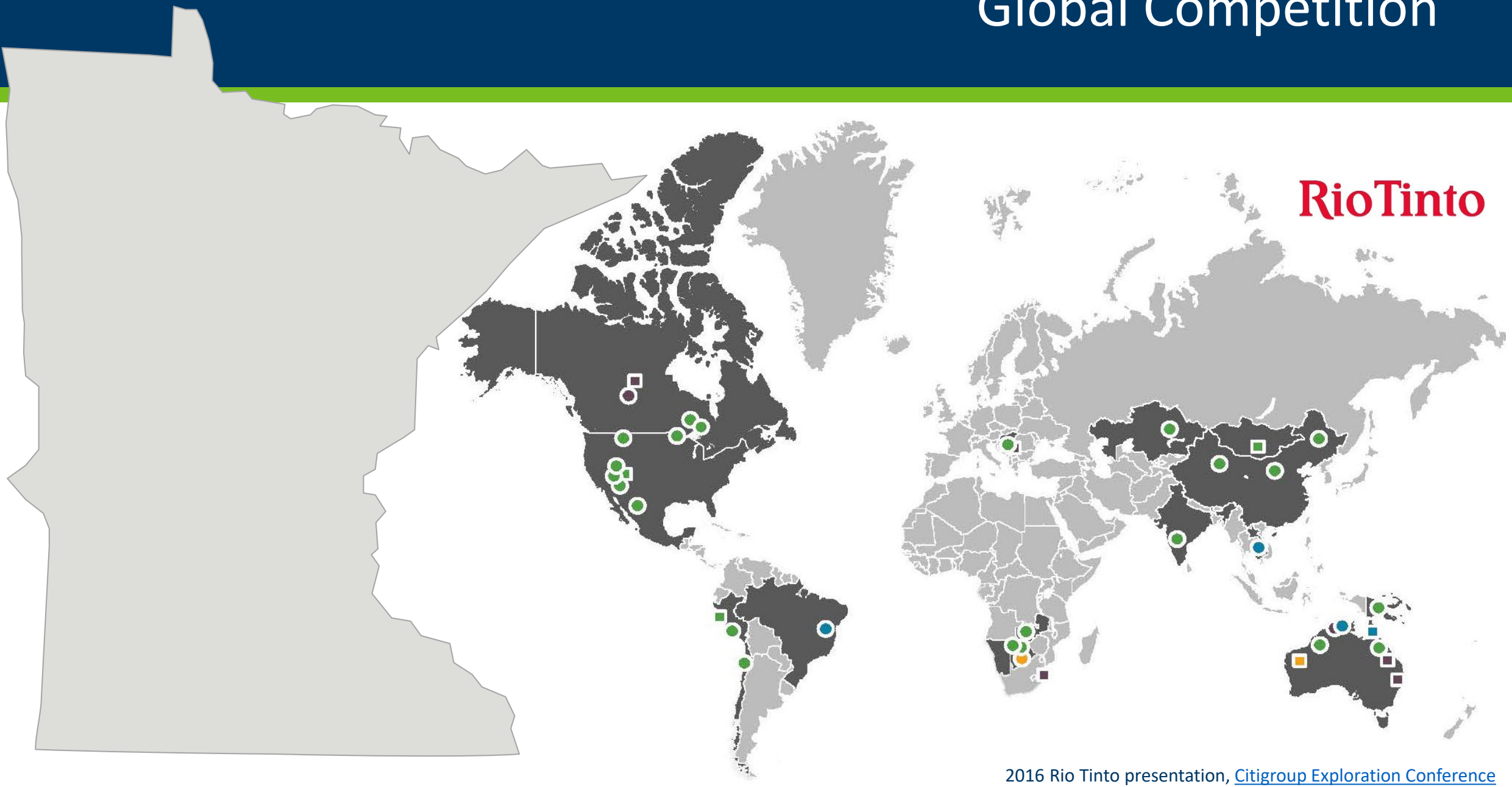
Global Competition



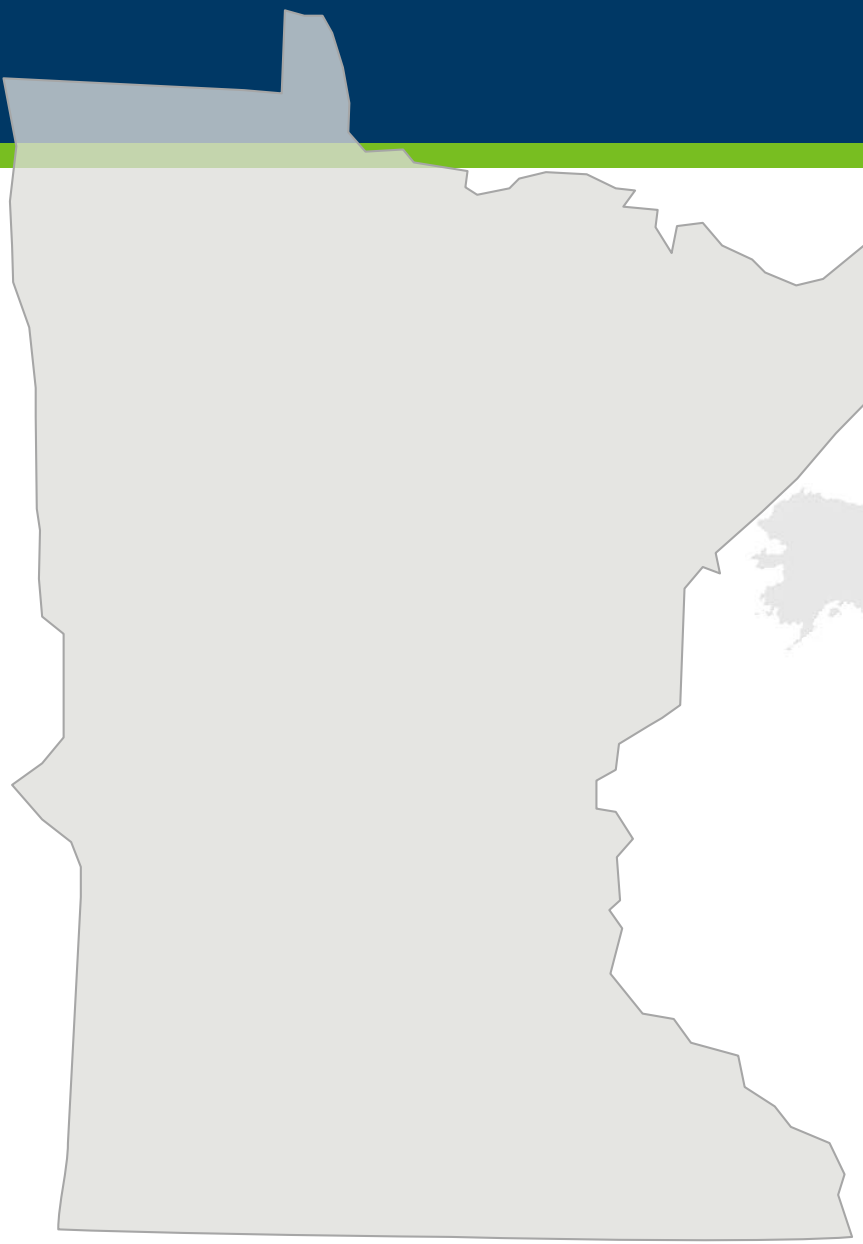
2016 Rio Tinto presentation, Citigroup Exploration Conference

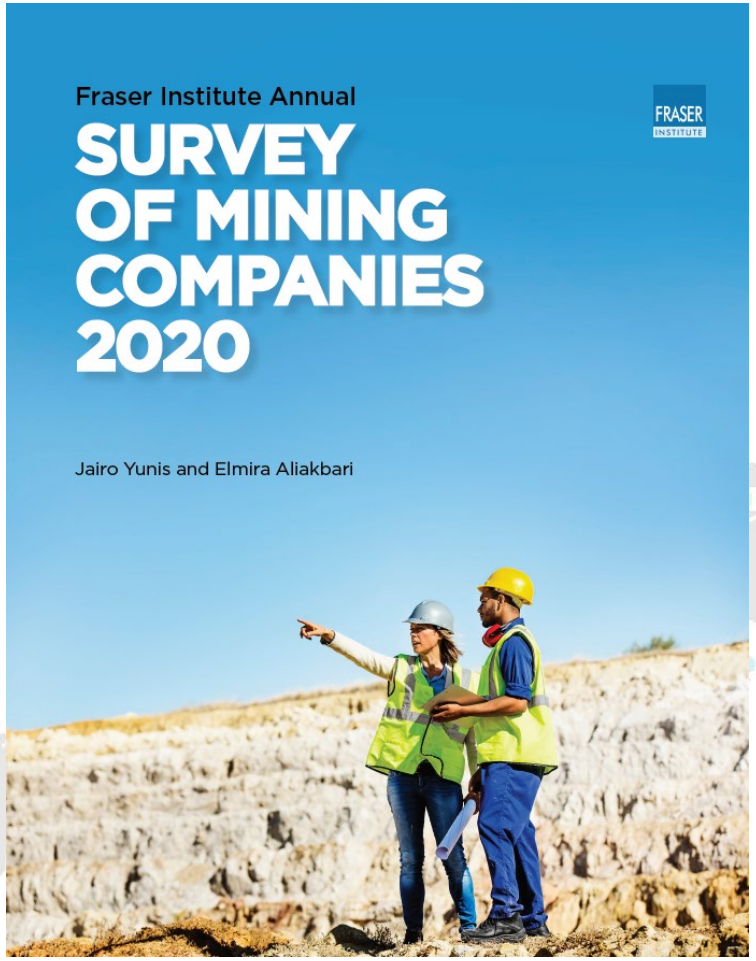
CNBC's Top States for Business, 2019

Factor	Ranking
Workforce	13
Infrastructure	9
Cost of Doing Business	39
Economy	23
Quality of Life	3
Technology	7

https://www.cnbc.com/2019/07/09/top-states-for-business-minnesota.html

Top Locations for Mining?





https://www.fraserinstitute.org/categories/mining

Fraser Institute

- Canadian non-profit think tank
- First survey focused on Canadian provinces and territories
- Minnesota has been part of their annual rankings since they expanded internationally in 1999.

https://www.fraserinstitute.org/categories/mining

Fraser Survey of Mining Companies

Each annual survey is released in late-February, just before PDAC.
It is a popular discussion topic.

https://www.pdac.ca/convention

Fraser Survey of Mining Companies

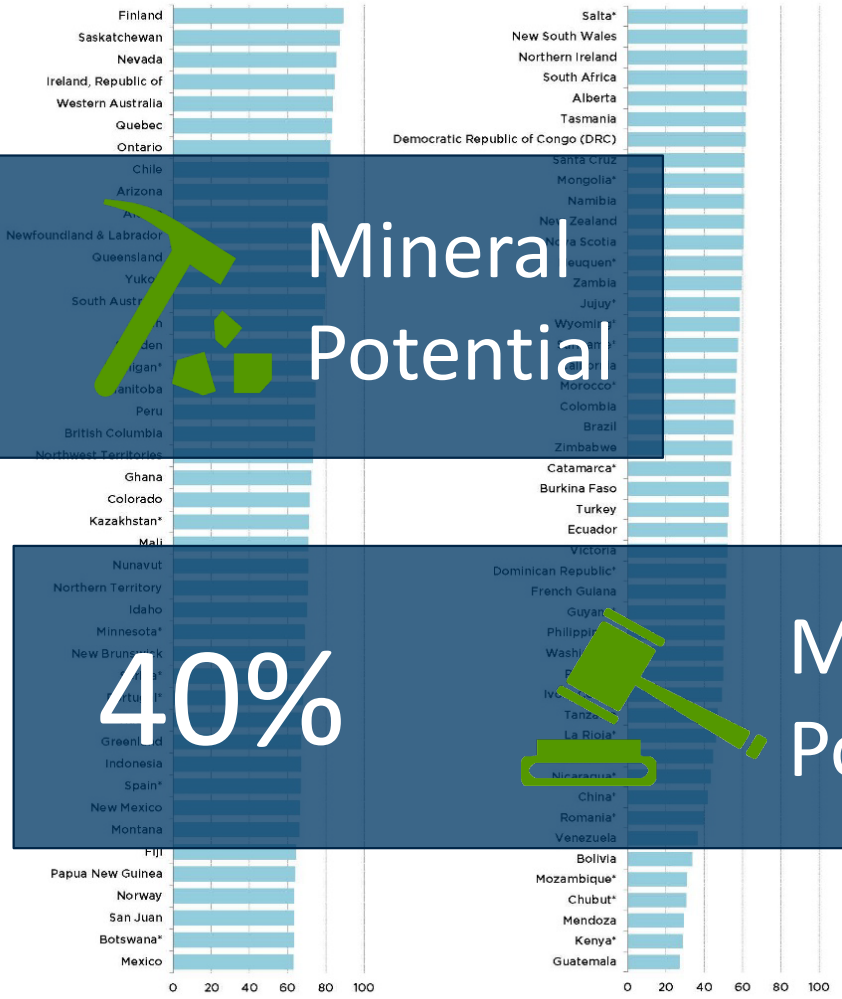
Survey results line up with internal assessments and conversations within the mining community.

Fraser Survey of Mining Companies

https://www.fraserinstitute.org/categories/mining

60% Mineral Potential

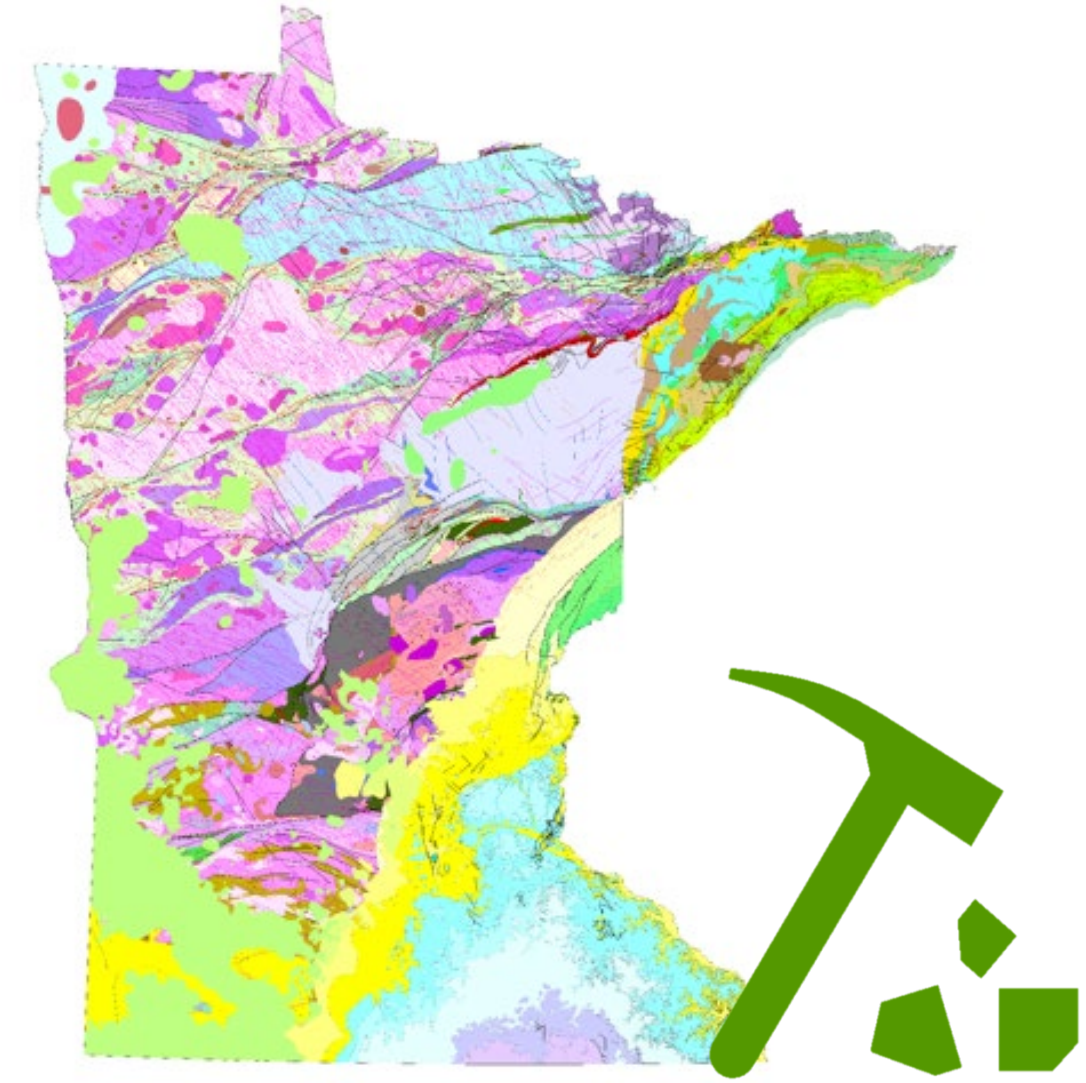
40% Mining Policies



Mineral Potential

Based on “Best Practice Environment”

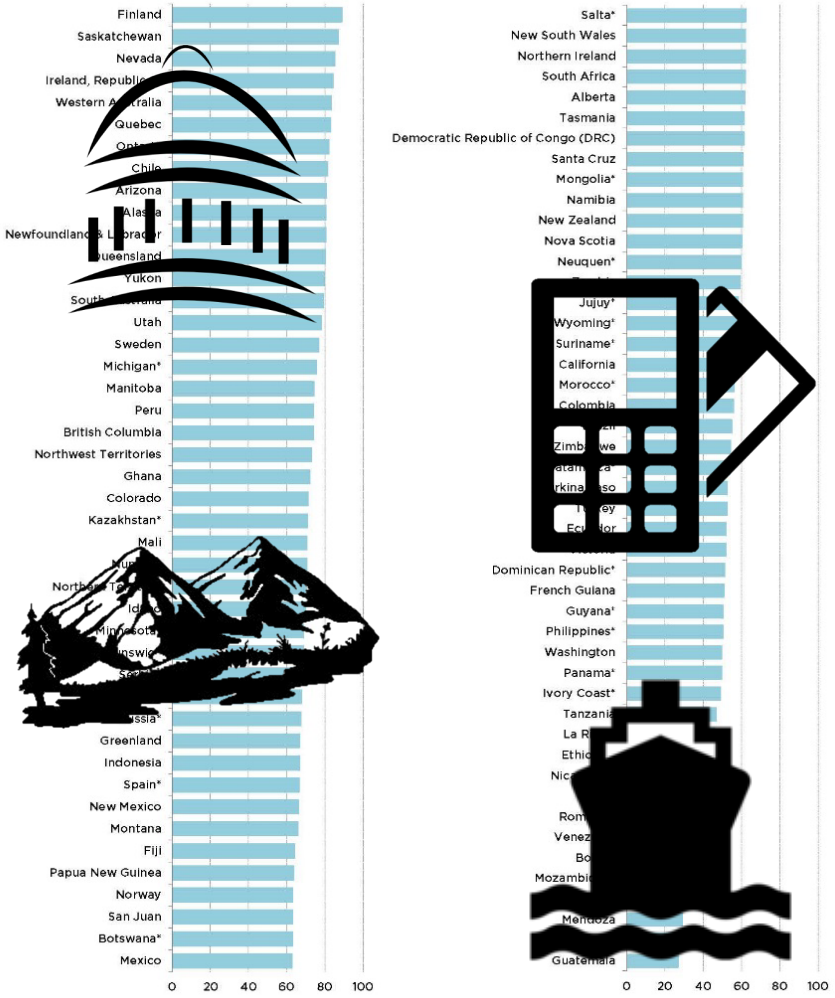
- World class regulatory environment
- Highly competitive taxation
- No political risk or uncertainty
- Fully stable mining regime



MGS Map S-11 (2011)

Mining-related Public Policies

- Sovereign Risk
- Cost of Doing Business
- Land Access
- Operational Support



Sovereign Risk

- Political Stability
- Level of Security
- Legal System
- Uncertainty over administration and enforcement of existing regulations

https://www.miningnews.net/ratings/opinion/1336941/is-sovereign-risk-on-the-rise-in-2018

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Login

British mining boss is held hostage for hours in terrifying ordeal at hands of armed Guatemalan kidnap gang who threatened to set him on fire

- David Howe's car was stopped on a remote dirt track by the 30 strong gang
- The gang punctured tyres, threatened to set him and fellow executive on fire
- Kidnappers locals that form part of a movement opposed to his company
- Freed after the intervention of the British embassy in Central American country

By GERARD COUZENS FOR THE MAILONLINE

PUBLISHED: 12:22 EDT, 16 February 2018 | **UPDATED:** 12:30 EDT, 16 February 2018

https://www.dailymail.co.uk/news/article-5400995/UK-mining-boss-freed-kidnapped-Guatemala.html

Cost of Doing Business

- Taxation Regime
- Trade Barriers
- Labor regulations/agreements
- Regulatory Duplication
- Socioeconomic agreements/community development conditions

https://en.vietnamplus.vn/finance-ministry-proposes-ban-on-raw-mineral-exports/137899.vnp

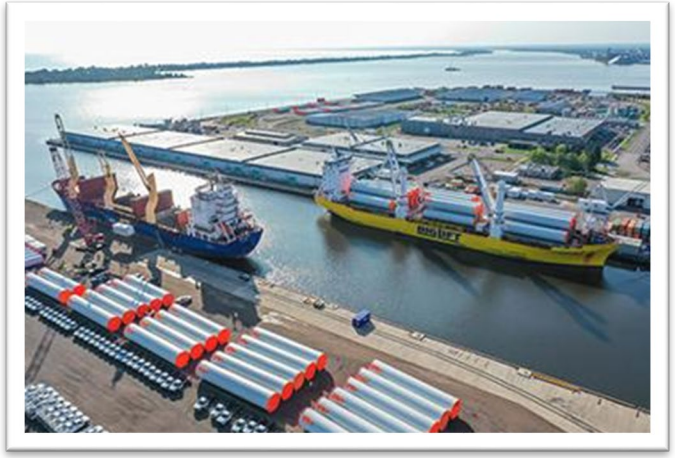
Land Access

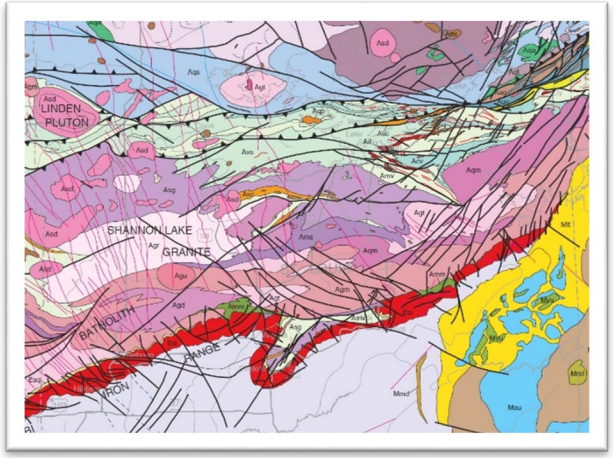
- Uncertainty concerning environmental regulations
- Uncertainty concerning disputed land claims
- Uncertainty concerning what areas will be protected as wilderness, parks, or archeological sites

https://www.miningandenergy.ca/mininginsider/article/land_claims_largest_deterrent_to_mining_investment_in_b.c

Operational Support

- Infrastructure
- Availability of skilled labor
- Quality of the geological database

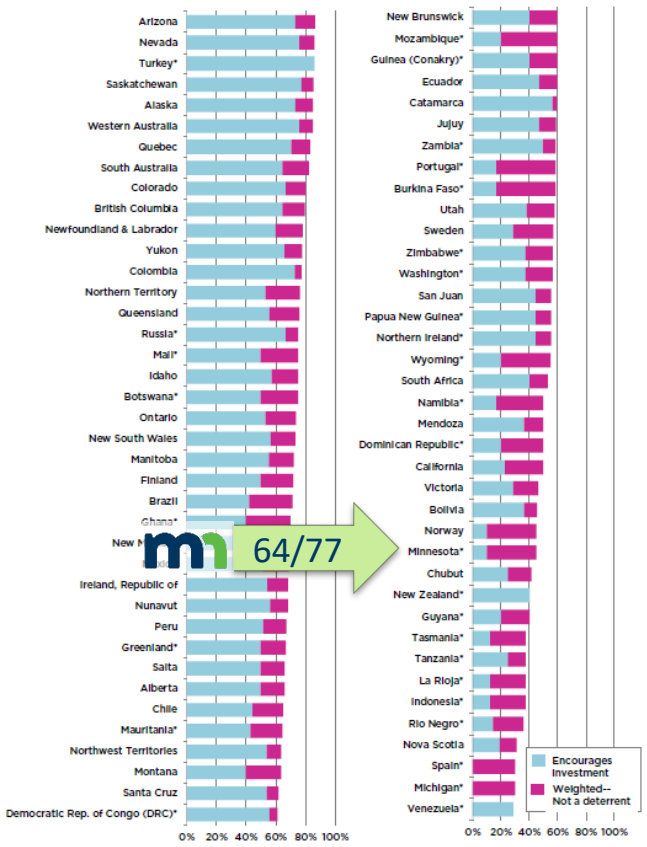




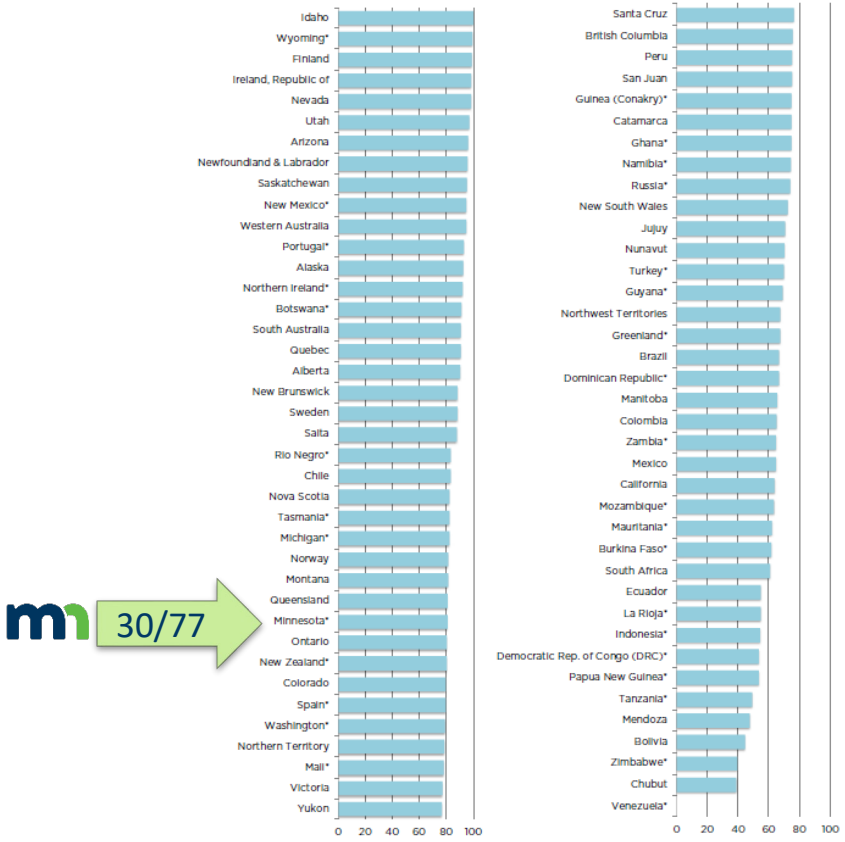
Minnesota’s Fraser Survey Rankings

Minnesota's 2020 Fraser Survey Rankings

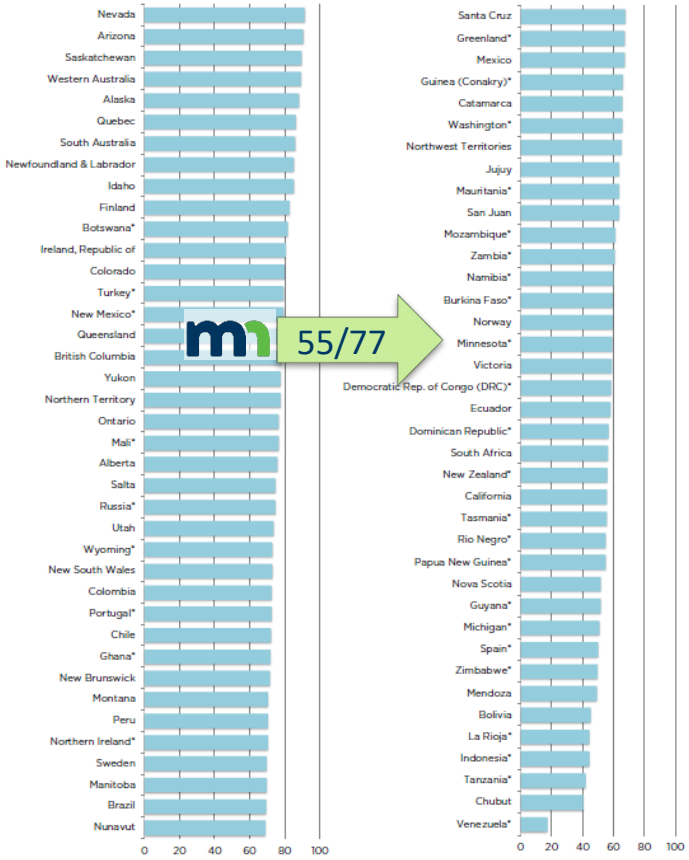
Mineral Potential



Mining Policies

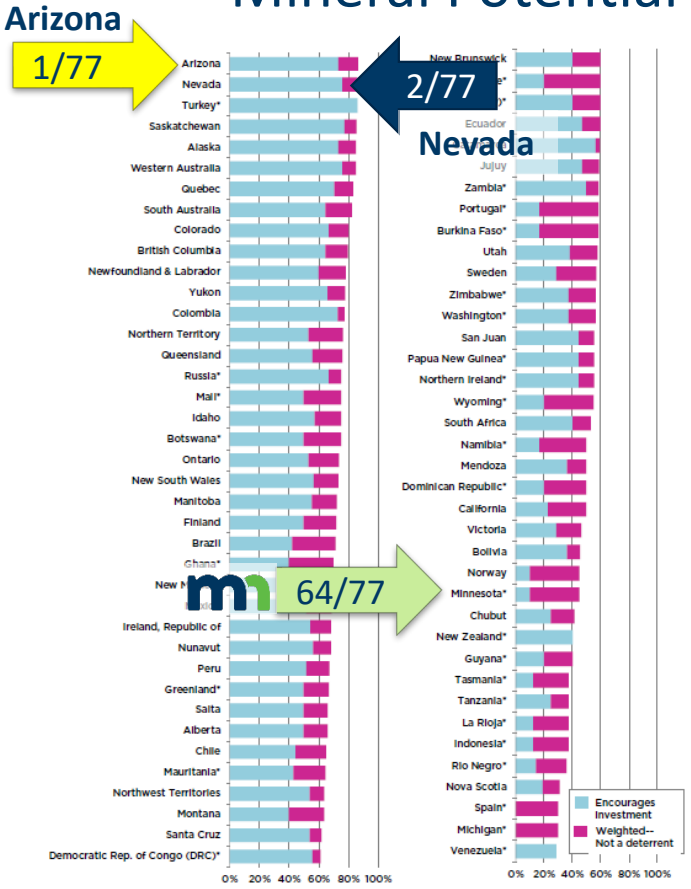


Overall Ranking

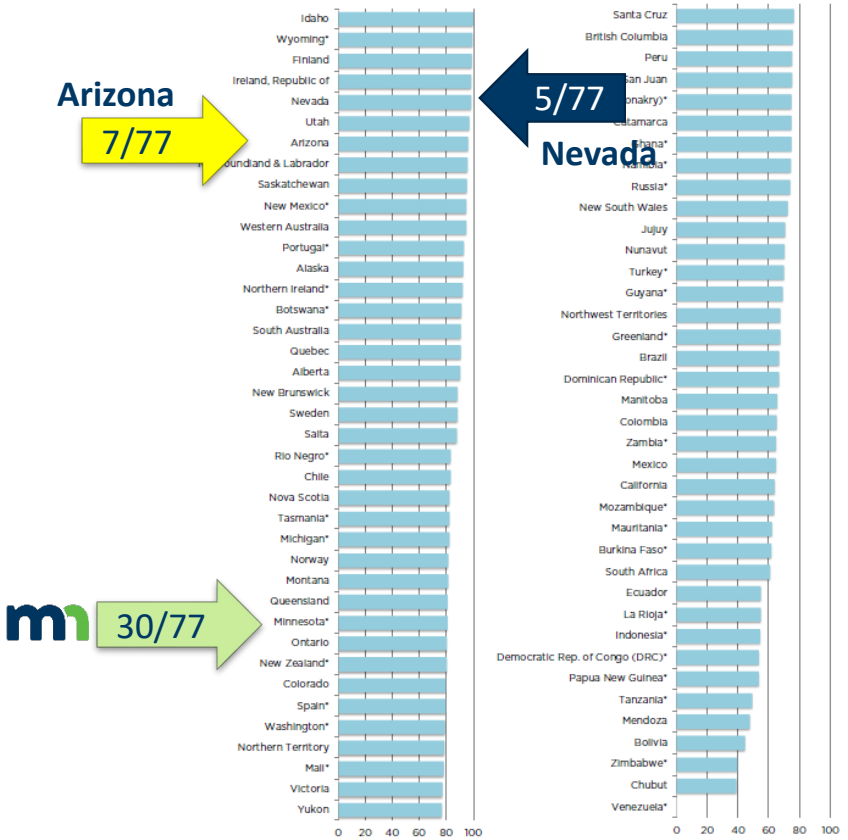


Minnesota's 2020 Fraser Survey Rankings

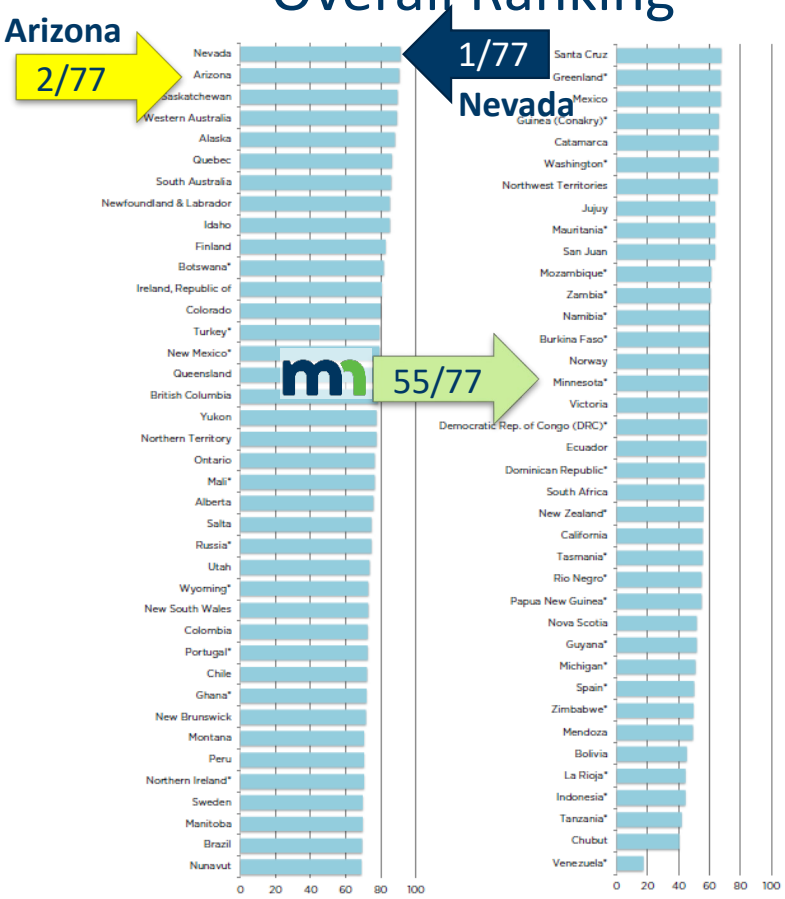
Mineral Potential



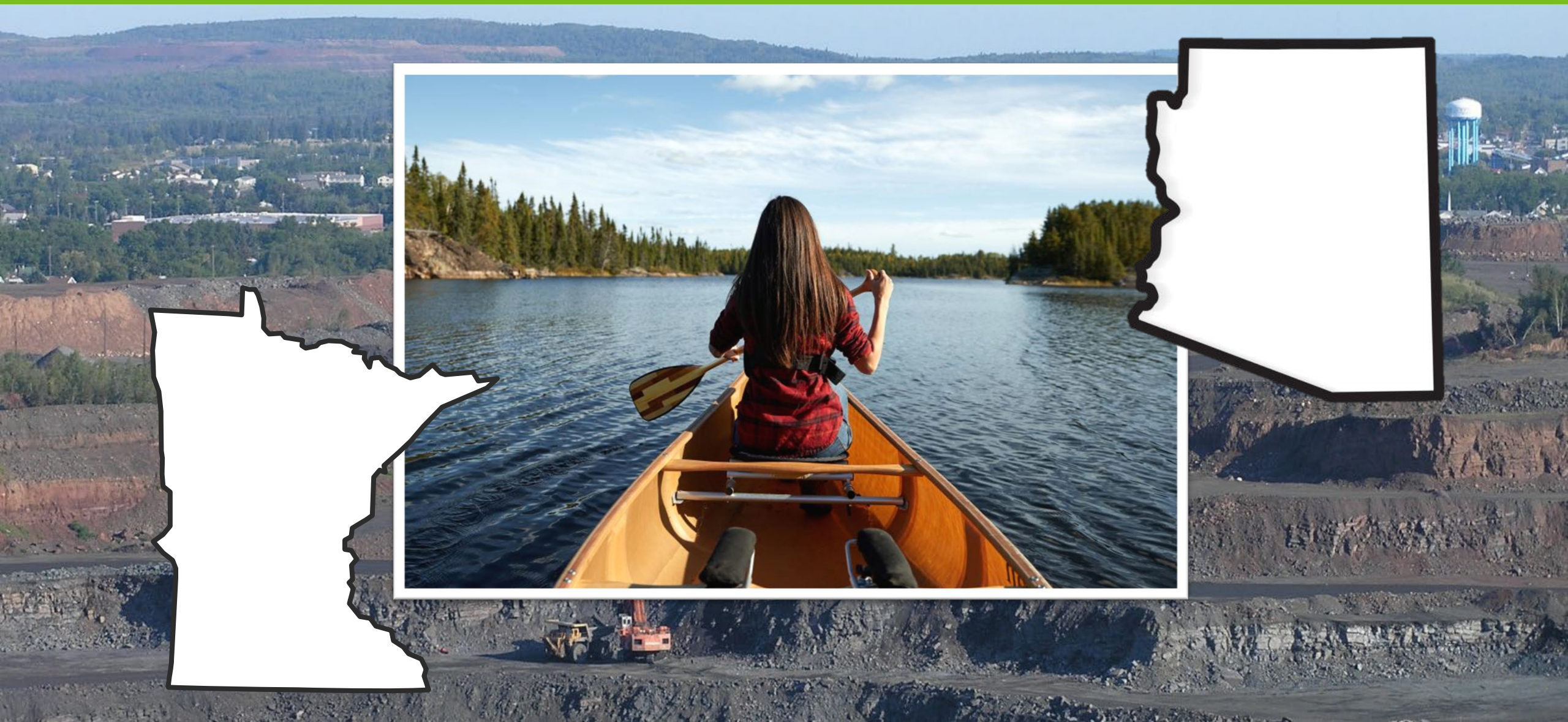
Mining Policies



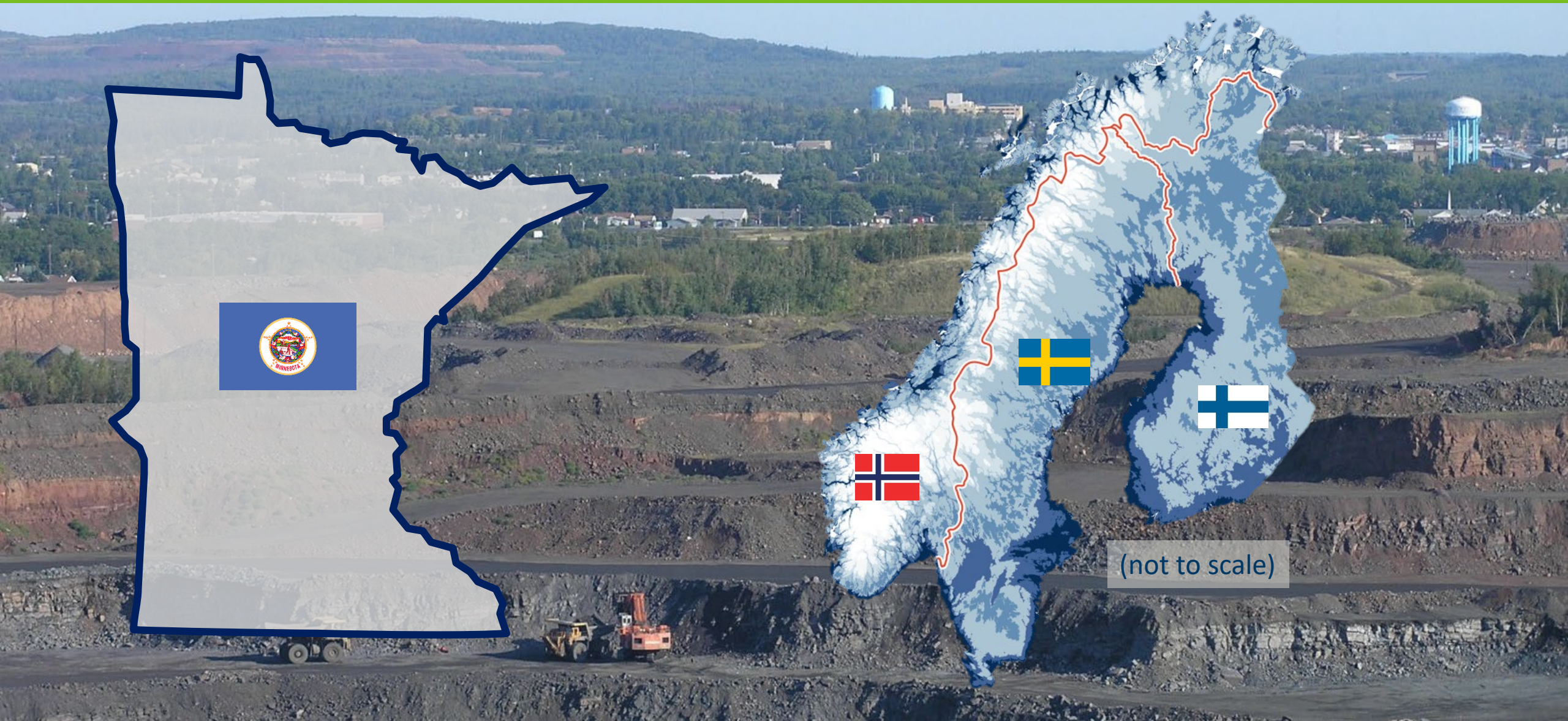
Overall Ranking



A Fair Comparison?



Minnesota vs Scandinavia



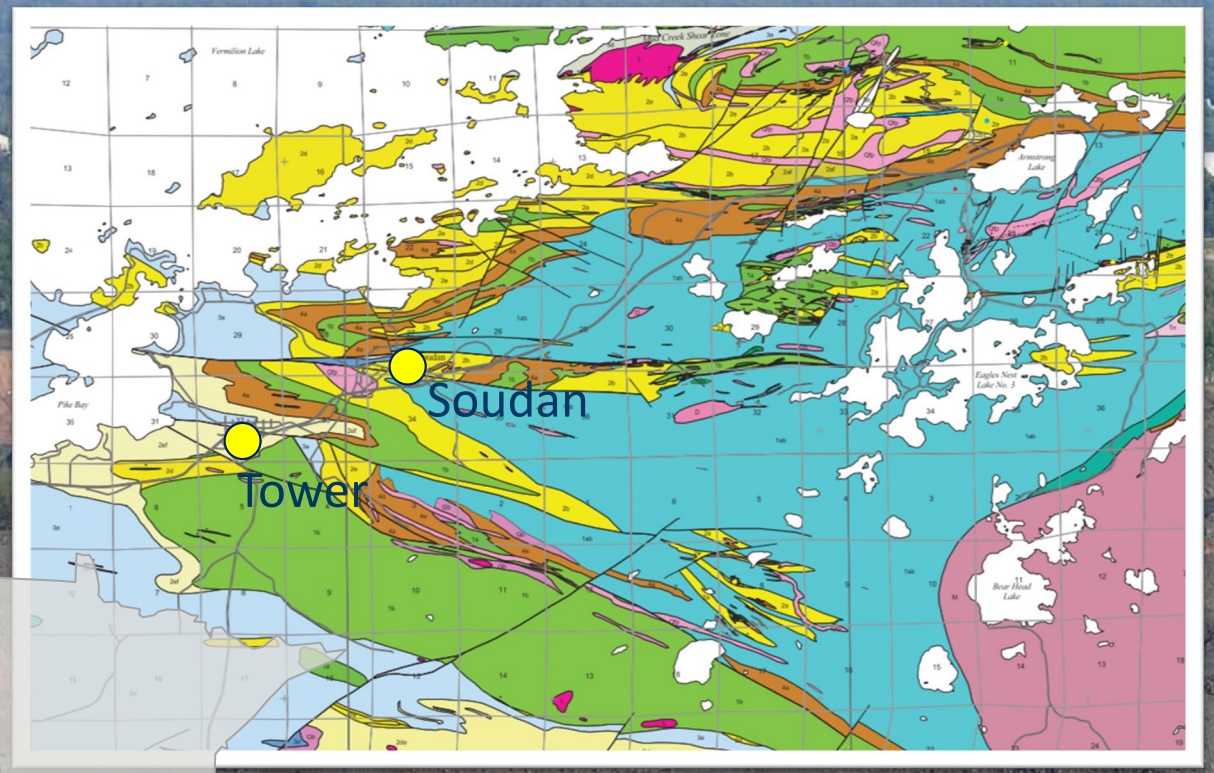
Minnesota vs Scandinavia

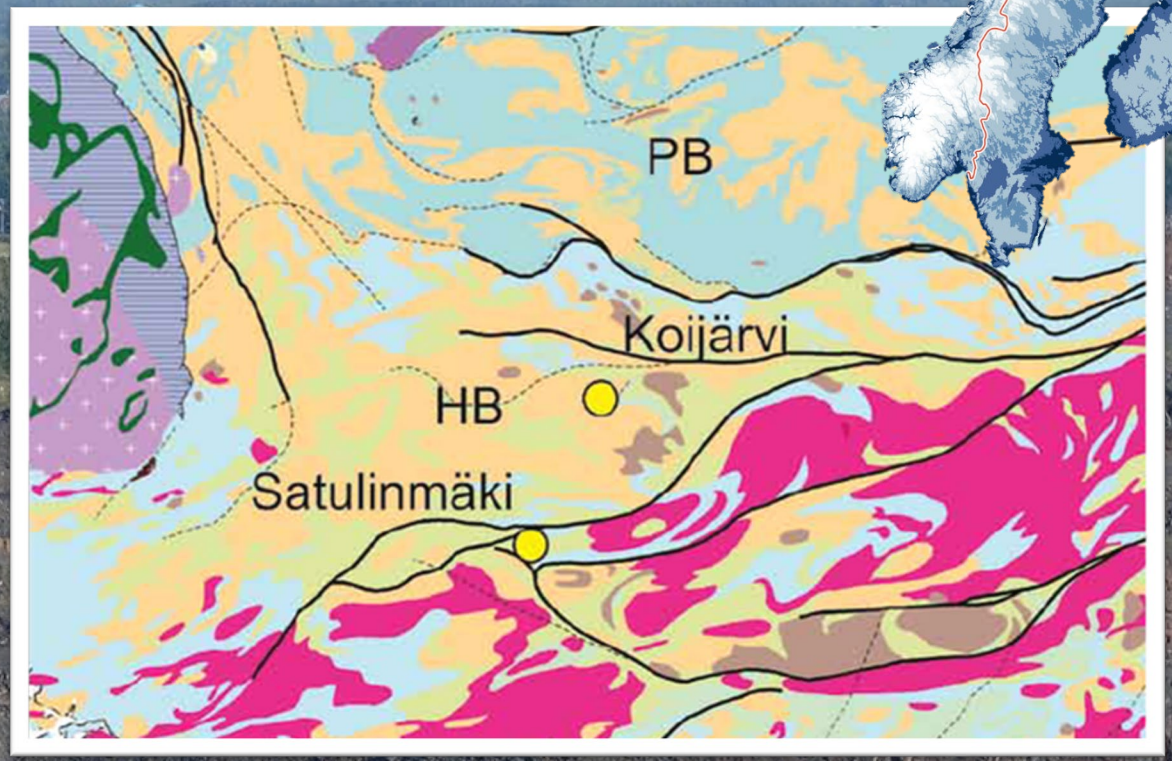
travelguideline.net

Minnesota vs Scandinavia

Wikipedia Commons

Minnesota vs Scandinavia





A Fair Comparison?

Sweden's environmental education is building a generation of Greta Thunbergs

"We tried to create green revolutionaries, make them think in a specific way," one expert said.

https://www.nbcnews.com/news/world/sweden-s-environmental-education-building-generation-greta-thunbergs-n1106876

Green Scandinavia

https://www.visualcapitalist.com/greenest-countries-in-the-world/

Rank	Country	Score
1	Denmark	82.5
2	Luxemburg	82.3
3	Switzerland	81.5
4	United Kingdom	81.3
5	France	80
6	Austria	79.6
7	Finland	78.9
8	Sweden	78.7
9	Norway	77.7
10	Germany	77.2
24	United States	69.3

2020 Fraser Survey Results

Overall Ranking

Country	Raw Score	Global Ranking
Finland	82.75	10
Sweden	69.66	36
Norway	59.65	54
Minnesota	59.29	55

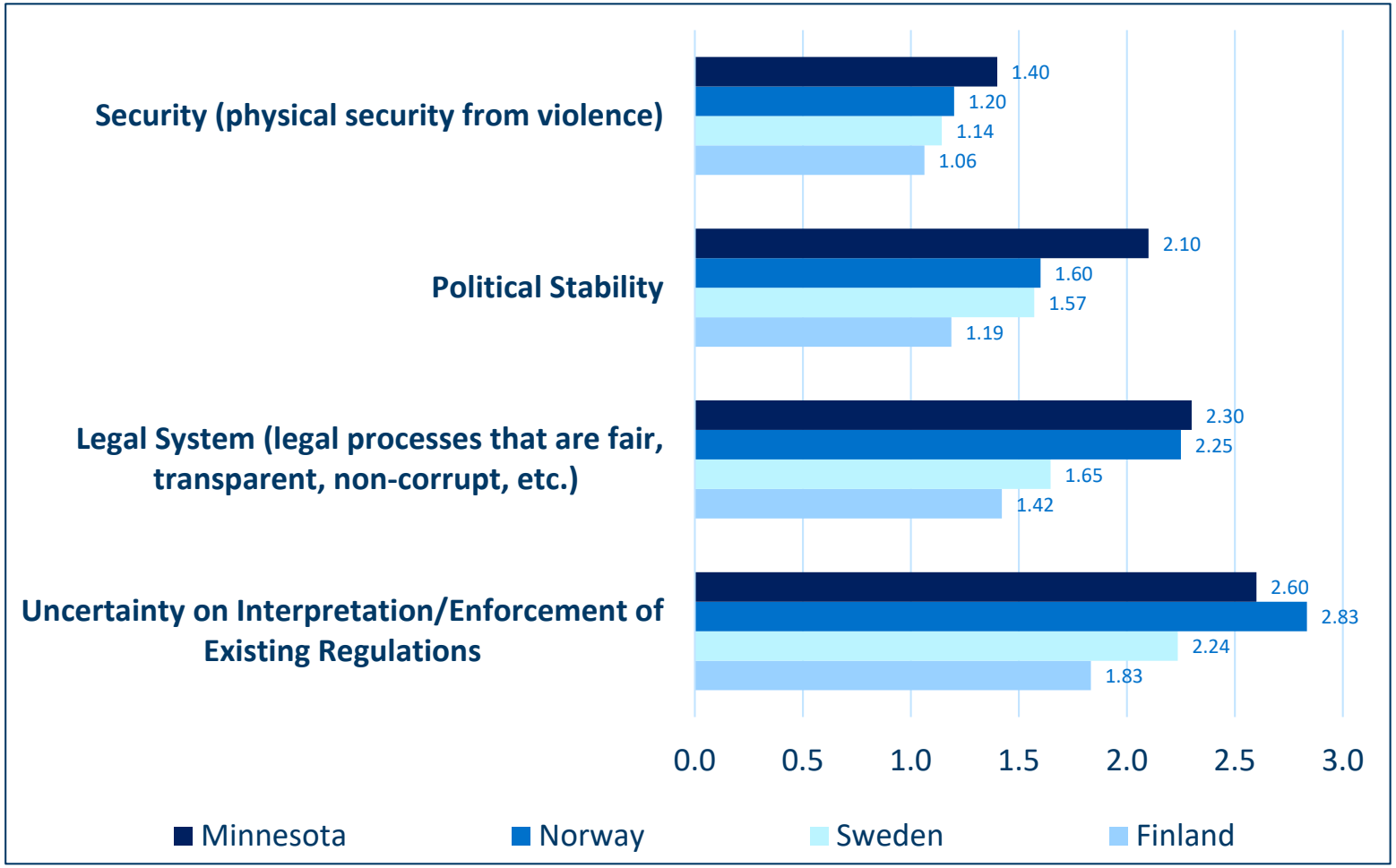
Mining-related Policies

Country	Raw Score	Global Ranking
Finland	99.07	3
Sweden	88.42	20
Norway	81.61	27
Minnesota	80.71	30

Mineral Potential

Country	Raw Score	Global Ranking
Finland	71.88	23
Sweden	57.14	50
Norway	45.00	64 (tie)
Minnesota	45.00	64 (tie)

Public Policy Questions – Sovereign Risk



Average response scores (1-5 scale, lower is better)

1: Encourages investment

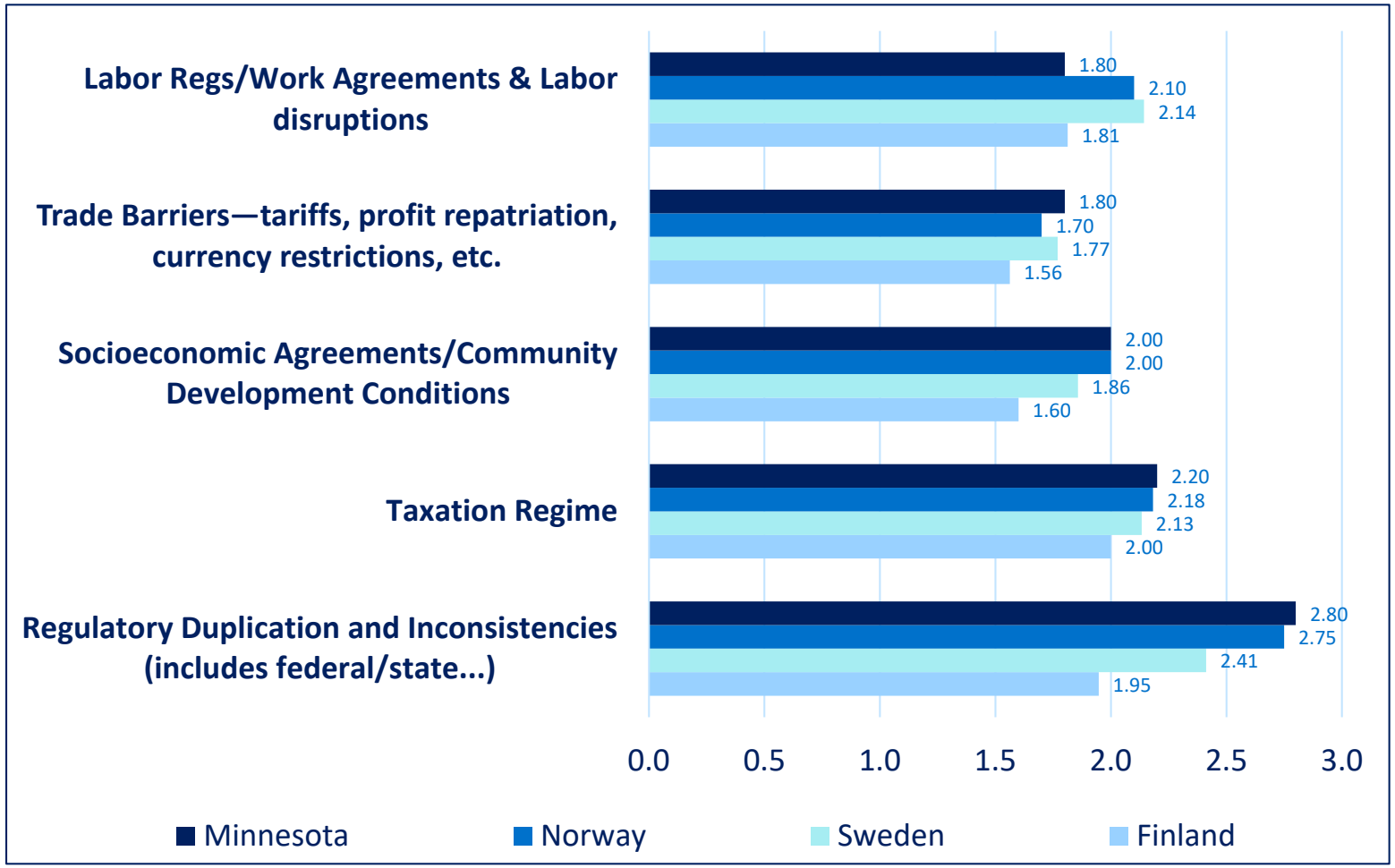
2: Not a deterrent to investment

3: Mild deterrent to investment

4: Strong deterrent to investment

5: Would not pursue investment due to this factor

Public Policy Questions – Cost of Doing Business



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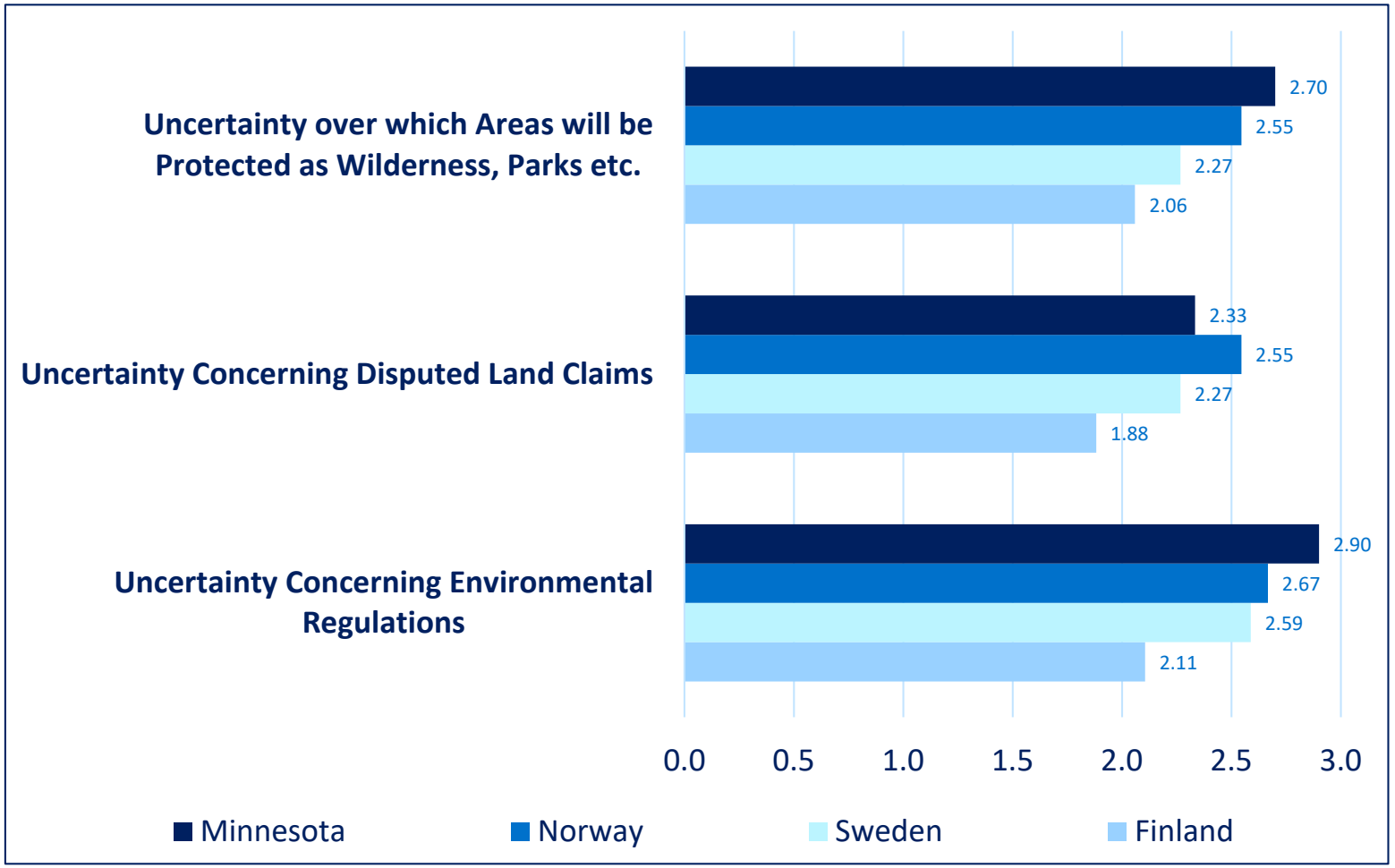
Public Policy Questions – Land Access



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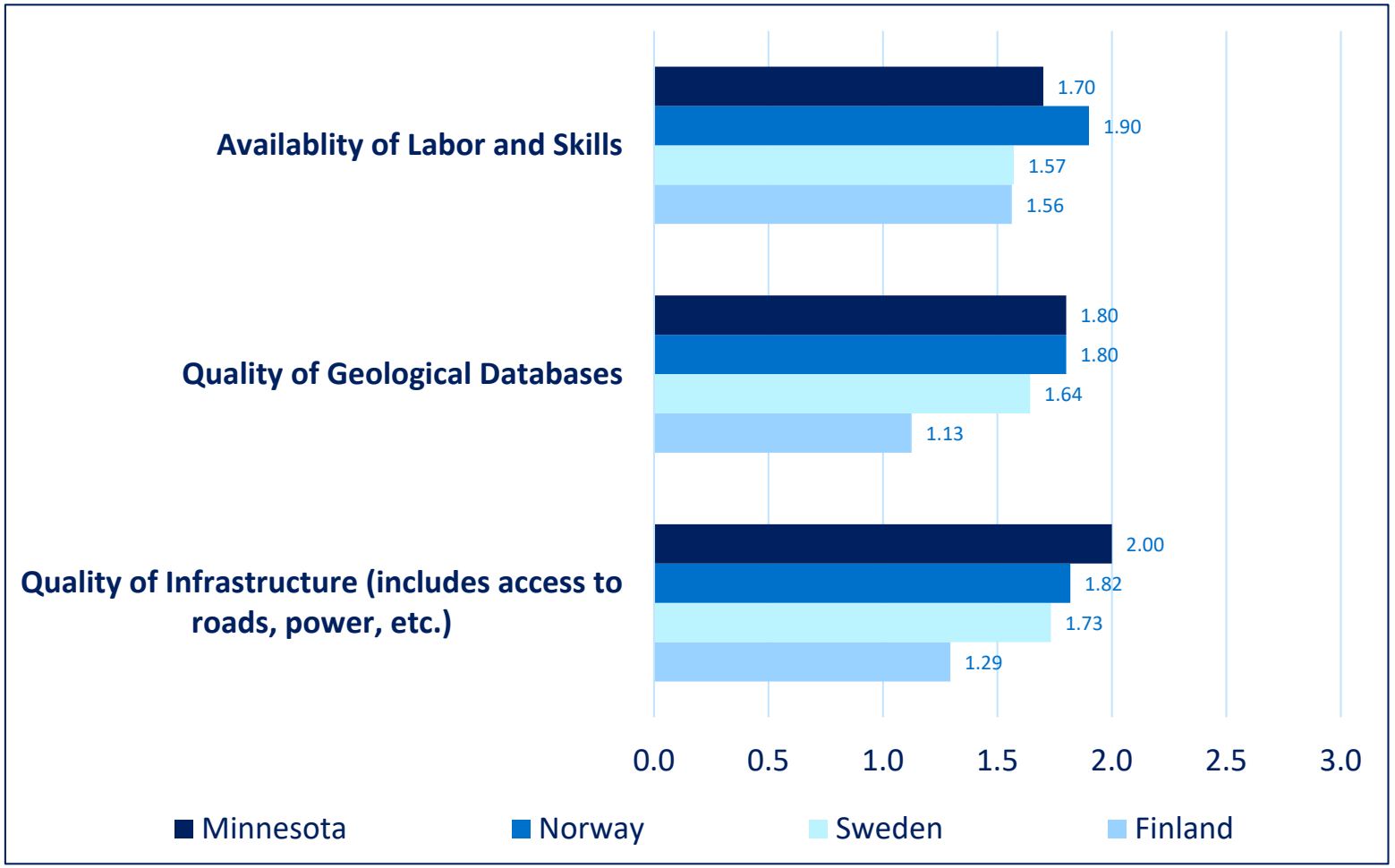
Public Policy Questions – Operational Support



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Minnesota vs Scandinavia?

Mining is Green in Scandinavia.

In-depth: Scandinavia sets sights on mining boom as clean energy transition speeds up

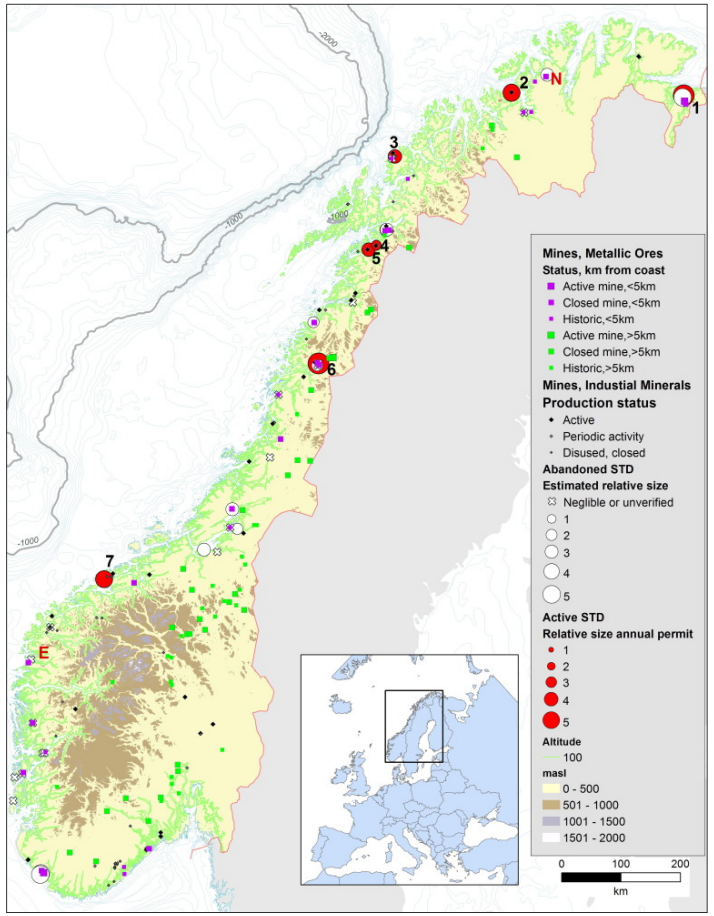
Scandinavia is set to strengthen its position as an EU mining powerhouse as part of the bloc's drive for an autonomous and carbon neutral economy, but industry sees 'red tape' hindering a rapid expansion to meet the expected demand for minerals.

by Christian Ernhede

https://www.endseurope.com/article/1712410/in-depth-scandinavia-sets-sights-mining-boom-clean-energy-transition-speeds

Norway

- Shifting focus from oil & gas production to metallic mineral production
- Permitted new copper mine north of Artic Circle in 2019
- Initiating environmental review process for mining seafloor metal deposits



Ramirez-Llodra et al., 2015

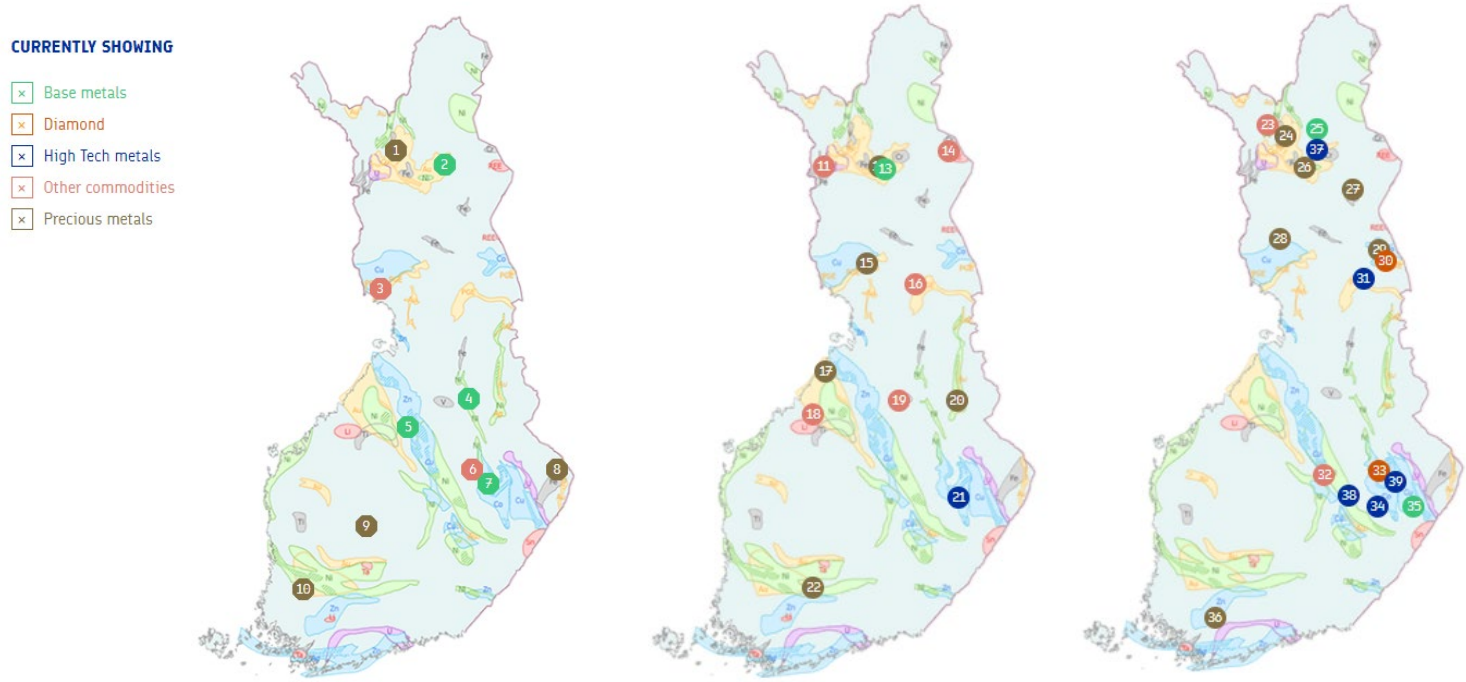
Finland

- Broad Spectrum of Metallic Mining
  - Base metals
  - Diamonds
  - High-tech metals
- Green-lighted a new uranium extraction and refinement facility in 2020.

Active Mines

Current Mine Development Projects

Current Exploration Projects



http://www.miningfinland.com/opportunities

Sweden

- 13 Active Metal Mines
  - Iron ore
  - Copper-Nickel-PGM
  - Gold
- Europe's Leading Mining Nation
  - 91% of iron ore production
  - 9% of copper production
  - 39% of lead, zinc, silver & gold

https://www.miningforgenerations.com/learn-more-about-swedens-mining-industry/

Conclusions

- Minnesota's mining survey scores have a lot of room for improvement
- Scandinavia has strong environmental rules, a robust green mineral economy, and higher mining survey scores
- Minnesota might do better if it acted a little more Scandinavian

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Thanks!