MAKE THE IMPOSSIBLE POSSIBLE
Making the Impossible Possible

FROM CLEAN ENERGY TO NATIONAL DEFENSE: ALASKA'S MINERAL PRODUCTION AND POTENTIAL

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Executive Director, AK Metal Mines
September 21, 2023
Resource Development Council
Growing Demand for Responsibly Sourced Minerals

“Over 3 billion tons of minerals and metals will be needed to deploy wind, solar and geothermal power, as well as energy storage, required for achieving a below 2°C future.”
Mineral content of Electric Vehicles vs. Conventional Cars

Data source: International Energy Agency analysis; Graphics: Visual Capitalist, 2023-02-08
Alaska Minerals in Electric Vehicles

- LCD display: Cerium, Yttrium, Gold, Silver, Copper
- Audio system: Gold, Silver, Copper
- Control system: Gold, Silver, Copper
- UV cut glass: Cerium
- Glass & mirror polishing: Cerium
- Fuel additives: Cerium, Lanthanum
- Battery: Cerium, Lanthanum, Cobalt, Graphite, Copper
- Brake system: Graphite, Copper
- Cooling system: Copper
- Energy transformation system: Gold, Silver, Copper
- Motor: Dysprosium, Copper
- Component sensors: Yttrium
- Wiring throughout vehicle: Copper
- Illumination system: Gold, Silver, Copper
- Engine controlling module: Gold, Silver, Copper
- Airbag: Cobalt
- Catalytic converter: Cerium, Lanthanum, Silver
- Door switch module: Gold, Silver, Copper

Source: www.blm.gov/alaska/minerals
Copper is key to climate change solutions

Source: Visual Capitalist

Green energy-related copper demand is expected to increase nearly 600% by 2030.
Is Recycling the Answer?

"...even if we scale up recycling rates for minerals like copper and aluminum by 100%, recycling and reuse would still not be enough to meet the demand for renewable energy technologies and energy storage."
The US Dependency on Mineral Imports

The U.S. is home to an estimated $6.2 trillion in minerals, but we had net imports of $90 billion worth of minerals in 2021 alone.²

**SHARE OF TOP THREE COUNTRIES EXTRACTING/PROCESSING CRITICAL MINERALS**

<table>
<thead>
<tr>
<th>Extraction</th>
<th>Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>China</td>
</tr>
<tr>
<td>Nickel</td>
<td>China</td>
</tr>
<tr>
<td>Cobalt</td>
<td>China</td>
</tr>
<tr>
<td>Rare earths</td>
<td>China</td>
</tr>
<tr>
<td>Lithium</td>
<td>Australia</td>
</tr>
</tbody>
</table>

Source: IEA, *The Role of Critical Minerals in Clean Energy Transitions*

*Countries shown represent an indication of top market producers and consumers in each case.*


President Biden: “We can’t build a future that’s made in America if we ourselves are dependent on China for the materials that power products of today and tomorrow.” 02/22/2022

Senator Sullivan: “Alaska has the critical minerals the world needs now to support all of these new technologies and of course to support our nation’s national defense. 02/07/2023
Alaska has unlimited potential...

...but will we unlock it?
Representative Peltola: “Alaska has a long history of safe and productive mining that benefits our communities. The resources and critical minerals in our state will be essential to our country's renewable energy transition, and I believe that Alaska should lead the way to that transition by continuing our environmentally-sound mining practices.” 03/24/2023
Alaska’s Advantage: Environmental Excellence

• Strict permitting: 40—70 permits to construct
• Close oversight during operation
• Rigorous environmental monitoring
• Closure and reclamation of land
• Financial assurance
• Excellent track record
• Culture of Safety
Local mines support local businesses

$1 billion spent on goods and services from 450+ AK vendors in 2022
Mine workers live in 90+ AK communities
Long-term Community Partnerships
$4.5 million contributed to ~280 AK non-profits in 2022
Benefits to ANCs, Local and State Governments in 2022

Royalty payments to Alaska Native Corporations: $266 million
  • $1.8 Billion in total since 1989

Local government revenue: $55 million
  • Largest property taxpayers in Juneau, Fairbanks, Northwest Arctic Borough

State government revenue: $131 million
  • Alaska Mining License Tax, Corporate Income Tax, Rents & Royalties, other state agencies
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Additional Material – Environment
Natural mineralization made Red Dog Creek toxic to fish. Water discharged from mine improved water quality and the creek now supports Arctic grayling and Dolly Varden.
Fort Knox Restored Nearby Creek

1. Legacy damage on nearby State land

2. One season's growth after recontouring and seeding

3. Award winning restoration project completed
Greens Creek Improved Fish Passage
DNR Commissioner Corri Feige: “The developers leased state land, produced a valuable commodity to serve global markets, employed Alaskans, and paid state taxes and royalties. When they were done, they remediated the effects of their work and returned the land to the state for its next use. The system works.”

October 27, 2020
Additional Material – State Revenue/Taxation
Mining Taxes and Royalties Depend on Land Status
### Mining Industry Payments to the State, 2022

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska Mining License Tax</td>
<td>$53,500,843</td>
</tr>
<tr>
<td>State corporate income tax</td>
<td>$17,837,133</td>
</tr>
<tr>
<td>State Fuel Taxes</td>
<td>$1,367,505</td>
</tr>
<tr>
<td>State mineral rents and royalties</td>
<td>$15,799,115</td>
</tr>
<tr>
<td>State material sales, other payments to DNR</td>
<td>$5,410,402</td>
</tr>
<tr>
<td>Large mine permit coordination program</td>
<td>$1,382,663</td>
</tr>
<tr>
<td>AIDEA facilities user fees</td>
<td>$13,400,000</td>
</tr>
<tr>
<td>AIDEA reimbursements for Ambler Access Road</td>
<td>$7,379,651</td>
</tr>
<tr>
<td>AMHTA (claims, rents, royalties, material sales)</td>
<td>$1,181,309</td>
</tr>
<tr>
<td>ARRC Mining Commodity Movement</td>
<td>$15,000,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$130,875,958</strong></td>
</tr>
</tbody>
</table>

McKinley Research Group (MRG), 2022 Mining Industry Economic Benefits Update, 02/24/2023. Sources: ADOR, ADNR, AIDEA, AMTHA, ARRC, Ambler Metals, and MRG estimates.

Notes: State Fuel Tax is based on a five-year average (2016-2020). ARRC payments are based on 2021 figures.