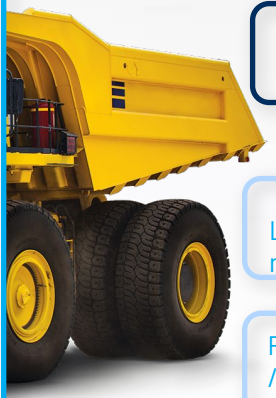
Southern Cone Industry Team

The sustainable mine

The world needs Mining

Mining



Coal

Metal

Iron Ore

Nickel

Copper

Bauxite

Nonmetals

Lithium

Phosphate / Potash

Precious

Gold

Steel Scrap

Nonferrous Scrap

Steel Mills

Primary Smelting And Refining of Nonferrous

Copper / Aluminum Nickel

Steel

Nonferrous

Metals

Cold-rolled Steel Sheet, Strip, and Bars, Steel Pipe and Tubes

Rolling, Drawing, and Extruding of Nonferrous

Lithium Carbonate

Battery producers

Fertilizers

World Capex $23 T (BHP)

Markets

Transport

Construction

Appliances

Containers

Energy

Machines

Gadgets

Recycling Centers

Energy Storage

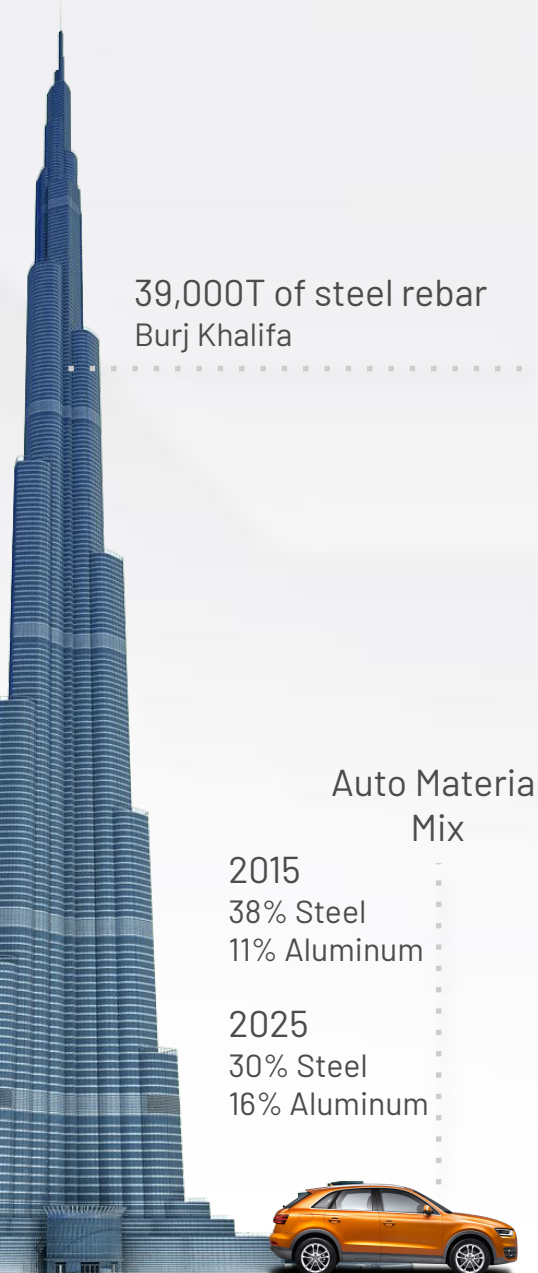
Transport

Food

Jewelry/ Investment

The world needs **Metals**

39,000T of steel rebar
Burj Khalifa



Auto Material Mix

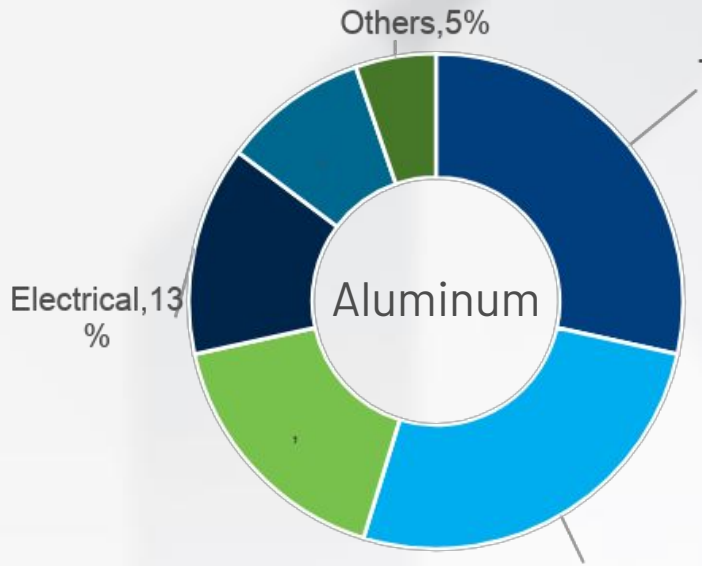
2015
38% Steel
11% Aluminum

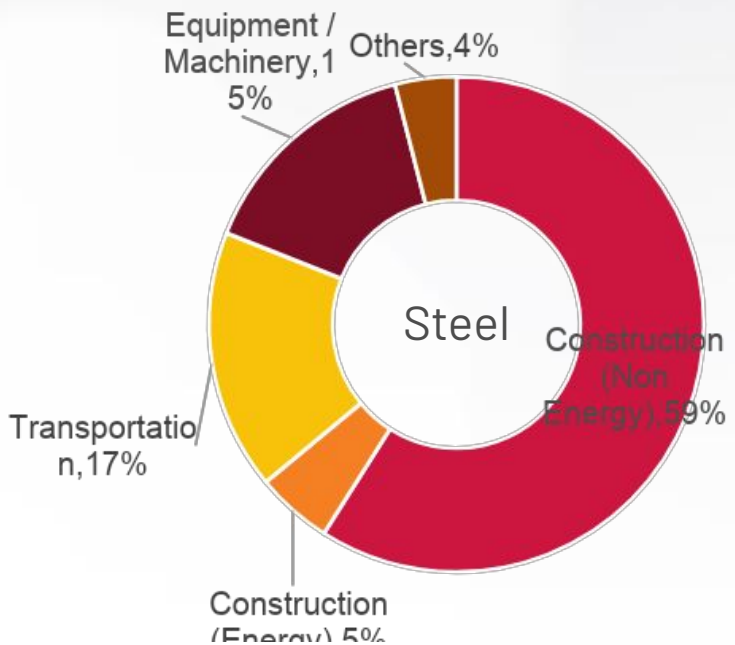
2025
30% Steel
16% Aluminum

One 3MW turbine
335 Tons Steel
4.7 Tons copper
3 Tons aluminum

17% packaging material are metals
(36% cardboard)

How Steel and Aluminum are used





2025 AMM estimates / Aluminum Leader / Ducker Worldwide / North America Package Market

The need of more resources raises the importance of sustainable mining

Access to resources

- 30%

copper ore grades decline over the last two decades

Water Consumption

1 m3/ton

water consumption copper concentrator

Energy Consumption

Up to 6 %

of the world's electricity is consumed by mining

Waste

Recycling aluminum saves

90%

of the energy it takes to make new aluminum

Sources: International Copper Study Group (ICSG), Cochilco

The extractive sector,

if well managed, can play a positive role in promoting broad-based development and structural transformation of economies.

SDG1 Poverty eradication

Mining generates significant revenue streams through taxes, royalties and dividends for governments to invest in socioeconomic development.

SDG 6 Clean water and sanitation & SDG 15 Life on land

Mining requires access to land and water, which gives rise to significant and wide-ranging landscape impacts that must be managed responsibly.

SDG 7 Affordable and clean energy & SDG 13 Climate action

Mining activities are also energy- and emissions-intensive in terms of the production and downstream uses of mining products.

SDG 8 Decent work and economic growth

Mining can alter the lives of local communities, offering opportunities for jobs and training, while contributing to economic and social inequities if not appropriately managed.

SDG 9 Industry, innovation, and infrastructure

Mining can help drive economic development and diversification through direct and indirect economic benefits, the development of new technologies and by spurring the construction of new infrastructure for transport, communications, water and energy.

SDG 16 Peace, justice, and strong institutions

Mining can contribute to peaceful societies by avoiding and remedying company-community conflict, respecting human rights (including those of indigenous peoples) and by supporting the representative decision-making of citizens and communities in extractives development.

UN environment programme

International Resource Panel

Mineral Resource Governance in the 21st Century: Gearing Extractive Industries towards Sustainable Development

Download the report at www.resourcepanel.org/reports/mineral-resource-governance-21st-century

La sustentabilidad para la Industria Minera (Codelco)

NUESTROS COMPROMISOS DE SUSTENTABILIDAD A 2030

Menor huella de carbono:
disminuiremos en 70% nuestras emisiones de gases de efecto invernadero.

Habilitaremos una matriz energética 100% limpia. Innovaremos para reemplazar todos los equipos de producción y logística de las minas subterráneas por otros eléctricos, y participaremos activamente en la búsqueda de fuentes de nuevas energías limpias con foco en el hidrógeno verde.

13.3

Menor huella hídrica:
reduciremos en 60% el consumo unitario de aguas continentales.

Disminuiremos el make-up (utilización de recursos frescos en las operaciones) de uso de agua continental por eficiencia en los procesos; incorporaremos una planta desalinizadora para el Distrito Norte y, a través de soluciones innovadoras, reutilizaremos el agua de nuestros tranques.

6.4

Economía circular:
reciclaremos 65% de nuestros residuos industriales no peligrosos.

Reciclaremos 100% de los neumáticos mineros y aumentaremos el reciclaje de los principales residuos industriales sólidos no peligrosos de nuestras operaciones y proyectos, como aceros, maderas, materiales de embalaje, basura orgánica y chatarras.

12.5

Nuevo estándar en depósitos de relaves:
100% de depósitos con medidas de sustentabilidad de clase mundial

Monitorearemos en línea, con innovadores sistemas, la estabilidad física y química de los depósitos de relaves y aplicaremos sistemas de control de infiltraciones.

12.4

Desarrollo del territorio con valor social:
aumentaremos en 60% los bienes y servicios suministrados por proveedores locales, junto con aumentar la mano de obra local.

Adicionalmente, implementaremos una nueva estrategia de integración con el territorio, enfocándonos en generar valor social mediante el impulso a la mano de obra local, el fortalecimiento de la educación minera y el incremento de la sustentabilidad territorial.

11.a

Para abordar estos elementos, estamos desarrollando casos de negocio con sus respectivas hojas de ruta a 2030, identificando iniciativas específicas, recursos y responsables al interior de la organización.

Este desafío nos exige una transformación cultural interna que nos permita innovar y realizar cambios profundos y necesarios en la forma de operar y desarrollar los futuros proyectos. Cada año, en nuestros reportes de sustentabilidad, iremos dando cuenta de los avances en el logro de estas ambiciosas metas.

La sustentabilidad para la Industria Minera

Personas	Desempeño Económico	Desarrollo Social	Medioambiente	Transparencia y Gobierno Corporativo
• Cero fatalidades • Modelo de Seguridad y Salud • Relaciones laborales • Administración de talentos • Diversidad e Inclusión	• Mirada de largo plazo • Activos de Calidad y larga duración • Valor por sobre el volumen • Asignación disciplinada del capital • Retorno a accionistas	• Desde mitigación de impactos a desarrollo compartido • Modelo de relacionamiento con las comunidades locales	• Modelos de Gestión Ambiental • Uso de Energías renovables • Uso de Agua de Mar • Objetivo de emisión de gases de efecto invernadero	• Gestión de riesgos • Apetito de riesgo • Comité de Ética • Valores Corporativos

Fuente: AMSA 2019

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Our Sustainability Strategy

Sustainable **Customers**

- Enable our customers to achieve their own sustainability goals, making a positive impact on the world.
- Everything we do for our customers is about increasing efficiency, reducing energy usage, improving worker safety, and ensuring regulatory compliance.

Sustainable **Company**

- Create innovative, sustainable products and solutions, and foster a culture that empowers employees to operate safely, sustainably, and responsibly.
- Our commitment to ethics and integrity is a competitive advantage and a way to differentiate ourselves to our customers, partners, shareholders, and employees.

Sustainable **Communities**

- Support the communities in which we live and work, leaving a legacy that extends beyond our own organization.
- Our mission is to provide our community partners with access to resources that enhance productivity and sustainability.

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Sustainable

Customers

Energy

Contemporary industrial energy management software solutions that put energy data in context to production data, to **reduce energy use** across the value chain

Water

Smart water solutions **leverage modern software and analytics** to improve operations **visibility**, system reliability, and worker productivity while supporting security needs and meeting regulatory obligations.

Waste

Enabling the **circular economy** for managing your automation assets.

Focus on developing solutions to automate developing industry specific processes.

enabling

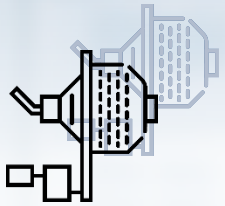
Sustainable mining

Production
Energy
Water
Emissions

Mining Operations Management

Aggregate, contextualize and display information from various systems

Integrated Operation Center



Digital Twin

Represent a physical entity or system across its lifecycle using data, analytics, simulations and emulations

Virtual Assistance

Combine AR collaboration tools with real-time video to connect field technicians with experts

IT/OT CYBERSECURE CONVERGENCE

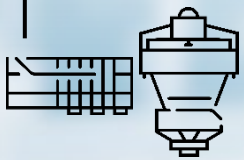
Mines

Extended Reality

Enhance situational awareness and safety of field workers with mobility, VR and AR technology

Artificial Intelligence

Optimize processes reducing energy, emissions and water consumption

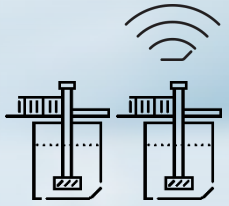


Predictive Analytics

Identify potential quality and downtime events before they occur

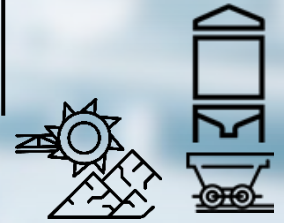
Smart Sensors

Monitor conditions like temperature, vibration, water quality, emission levels and particulate matter



Decision Automation

Use business rules and data to make decisions in a process without the need for human intervention



Environmental

Awareness

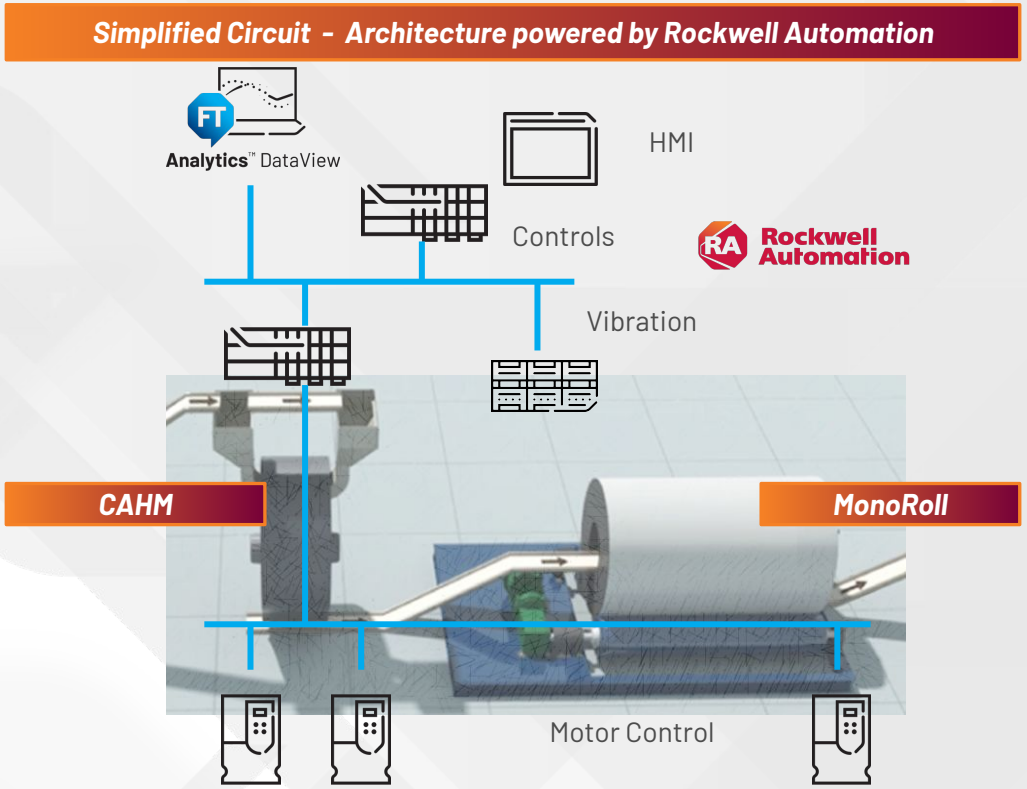
Energy Dashboard Aluminum company
(Data are only illustrative)

THE POWER OF

partnerships

Up to 70% energy reduction

Conjugate Anvil Hammer Mill (CAHM) Platform Technology has the potential to significantly reduce energy consumption by up to 70%. Large scale pilot demos are underway.



AGNICO EAGLE · GLENCORE · Newmont · Teck · KINROSS · VALE

ReThink Mining · cmic · CTTI

"The Mining Industry, along with the generous support of Rockwell Automation and CTTI have developed technologies that have the potential to disrupt the industry by achieving up to 70% energy reduction without the use of conventional grinding media. The ESG impact resulting from these simplified and efficient comminution circuits will be significant"

Gillian Holcroft
Innovation Manager
Canada Mining Innovation Council

Rockwell Automation

The sustainable mine