



MineSpans

By McKinsey, delivered by IHS Markit

360° view of markets, cost, supply and demand in the mining industry



In today's volatile commodity markets, reliable data is critical when making investment decisions. However, most supply, demand, and cost-intelligence tools lack the transparency and accuracy that mining investors and advisors need.

MineSpans, by McKinsey, delivered by IHS Markit, enables financial market customers and investors to uncover valuable insights by delivering a comprehensive view of the mining industry. The data and methodology behind the MineSpans cost curves and mine models are fully transparent, allowing users to stress-test assumptions and make critical decisions with confidence.



What do you get from MineSpans?



Asset analysis

Delve into the economics of individual mines and benchmark them against each other. Dynamic DCF models for all mines.



Cost analysis

Obtain detailed cost analysis for mines by region, company or even individually. Data is collated from bottom-up research and publicly available information.



Commodity markets and trends

Track ongoing interactions between supply, demand and macroeconomic factors that impact commodity prices. Supply and demand balances extend out over a decade.



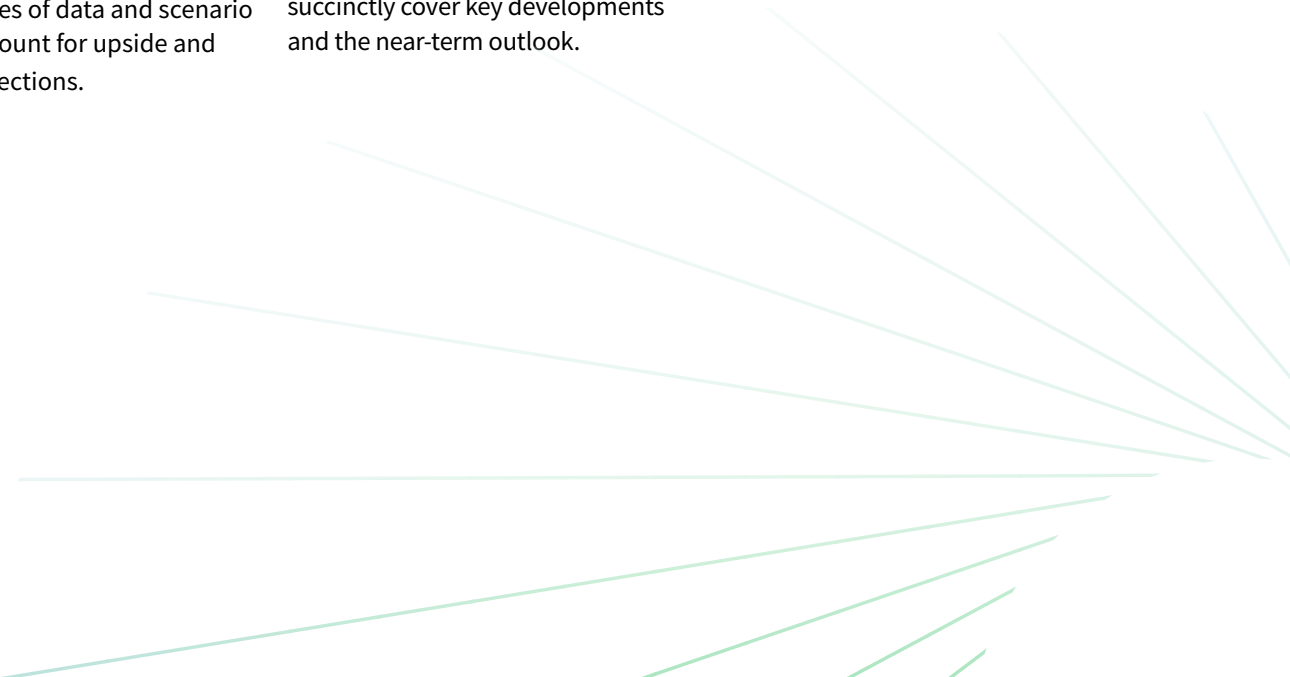
Proprietary tools and financial models

Enhance forecasts for financial returns with tools, based on unique methodology, that allows for multiple sources of data and scenario analysis to account for upside and downside projections.



Industry expertise and reports

Industry experts are available to help clients understand our methodology and talk through key developing themes. Quarterly commodity reports succinctly cover key developments and the near-term outlook.



Who needs MineSpans?

Financial analysts and investors who need to make informed strategic and financial decisions will need the most reliable cost curves and supply and demand models.

MineSpans provides a one-stop solution by offering a holistic view of commodity markets, companies and assets. MineSpans also includes tools that allow scenario analysis based on a variety of outcomes, enhancing strategies for different investment timeframes and risks.

MineSpans users

Use Case

Equity Analyst/ Portfolio Manager

- Understand which assets within a company's portfolio drives earnings
- Examine cost factors driving under/over-performance
- Identify an asset's position on the global cost curve and use the tool to examine cost drivers
- Run sensitivity analysis to see how various cost drivers impact overall competitive position

Commodity Analyst/ Trader

- Understand the volume of new supply coming online in the next few years
- Anticipate market trends and expectations of deficit or surplus
- Use filters to include or exclude assets based on stage of development - MineSpans covers 100% of global supply and includes a demand model

Investment Banker

- Value assets and run a sensitivity analysis using:
 - Individual mine data reports and models which allow accurate financial modelling of production and costs by mining & processing step
 - Fully dynamic models that allow changes in key financial parameters to stress test the NPV
 - The asset screening tool to filter for specific project characteristics and compare similar assets

MineSpans core features

Cost Curves

- Cash cost and full cost analysis
- Bottom-up cost model, by mine, detailed by cost factor and activity
- Mining archetypes & processing flow sheets
- Global Material moved (MM)/run of mine (ROM) volumes/costs
- 4,240+ mines in the database

Market outlook – Supply & demand

- Scenarios for development stage, type of project, country risk, capex
- Grade erosion, life of mine (LOM) methodology

Mine reports and dynamic models

- Detailed mine level supply and cost (MM, ROM, strip ratio, recoveries, grades, FX, oil prices, wages, etc...)

- 1,400+ dynamic discounted cash flow (DCF) mine models
- Value in use (VIU)/product premium methodology

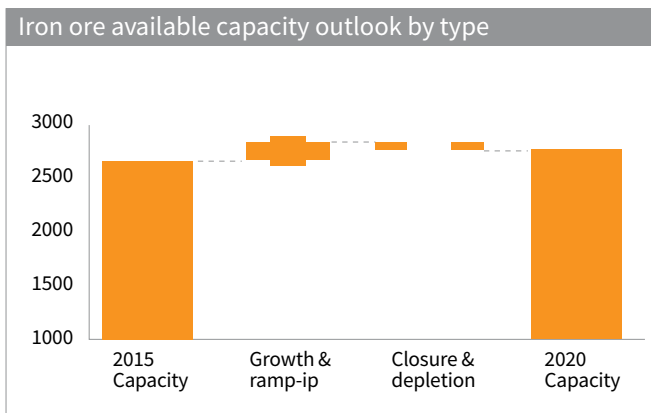
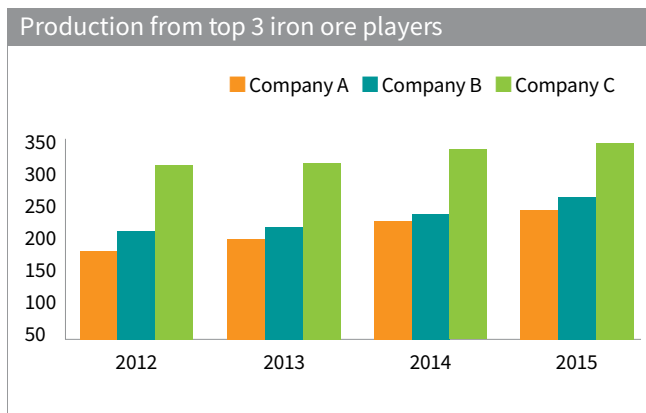
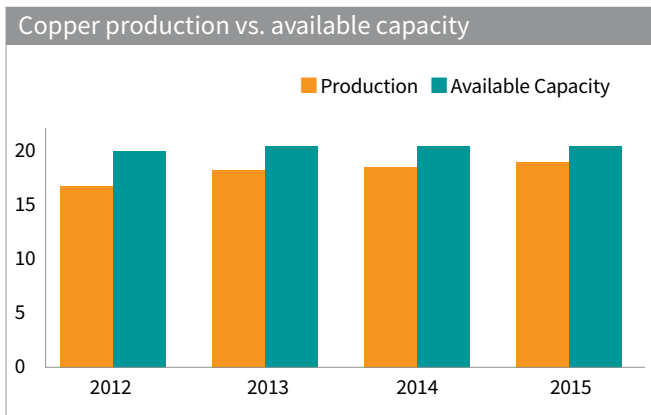
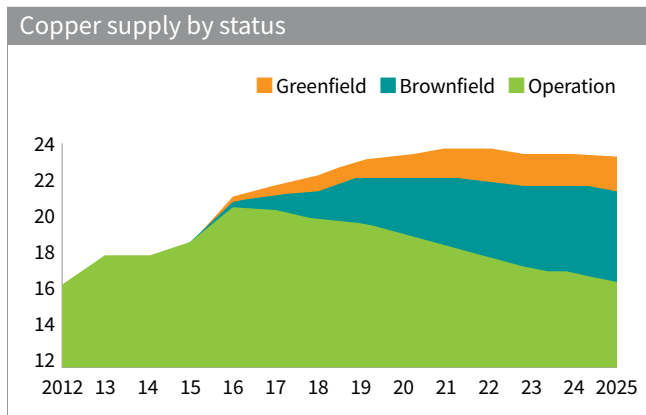
Publications & industry expertise

- Insights provided by experts
- Quarterly commodity outlook report

Additional features

- Outside-in detailed cost analysis
- Sensitivity analysis – The scenario tool allows users to re-run the entire cost curve based on different input assumptions. For example – what does the cost curve look like in aggregate if you run it using \$100 crude?
- Document library (15,000+ docs)
- Asset screening

000s tone, recoverable (Cu) or wet (IO), base case



All charts above are for illustrative purposes only

Referenced to: MineSpans by McKinsey

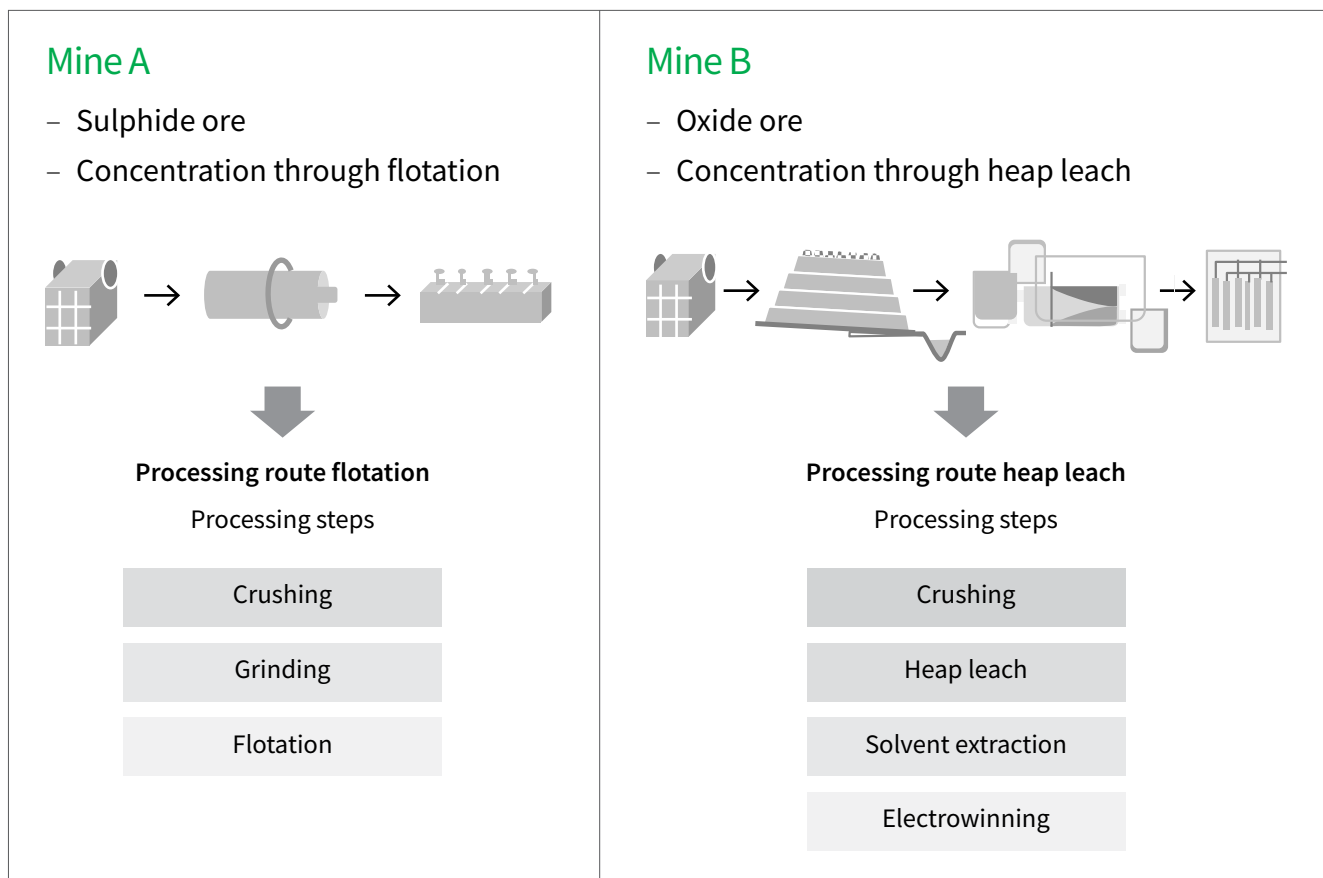
Methodology

MineSpans models each asset bottom-up, based on the mining method, processing flow sheet and key technical parameters.

Each plant configuration is modelled by assigning a processing route with processing steps.

The requirements for energy, labor, and consumables are defined at the level of processing steps, and are expressed per metric ton of applicable volume.

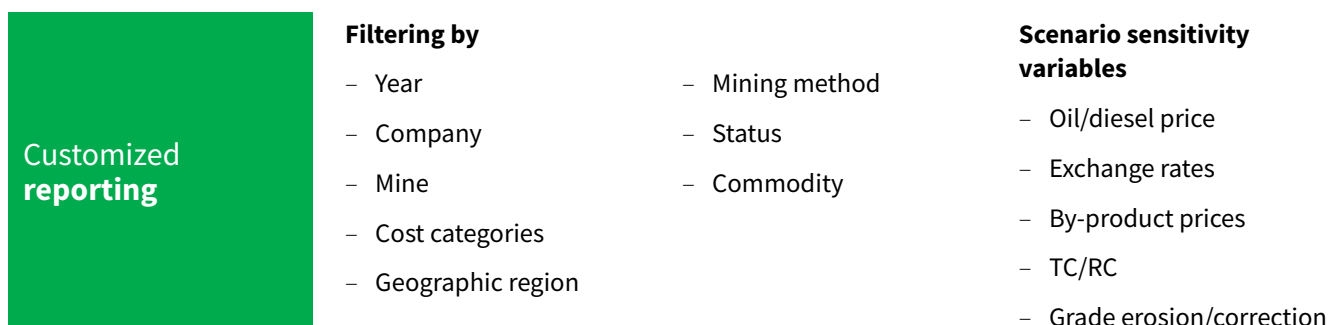
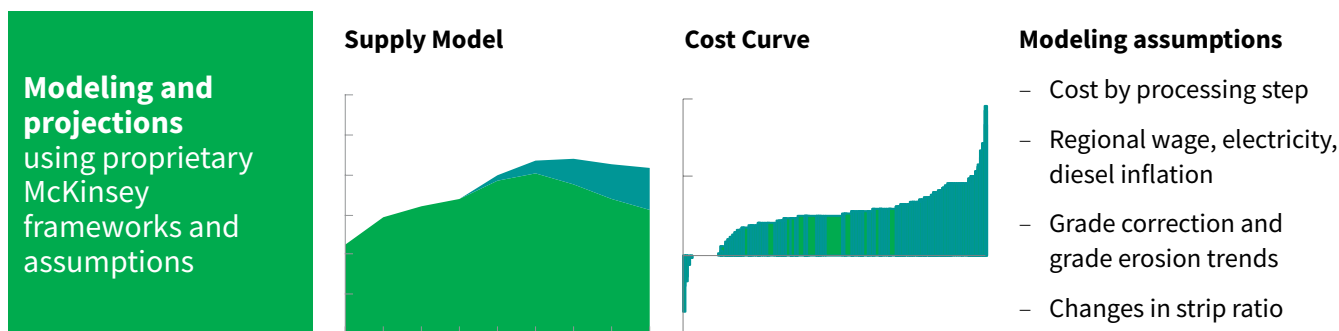
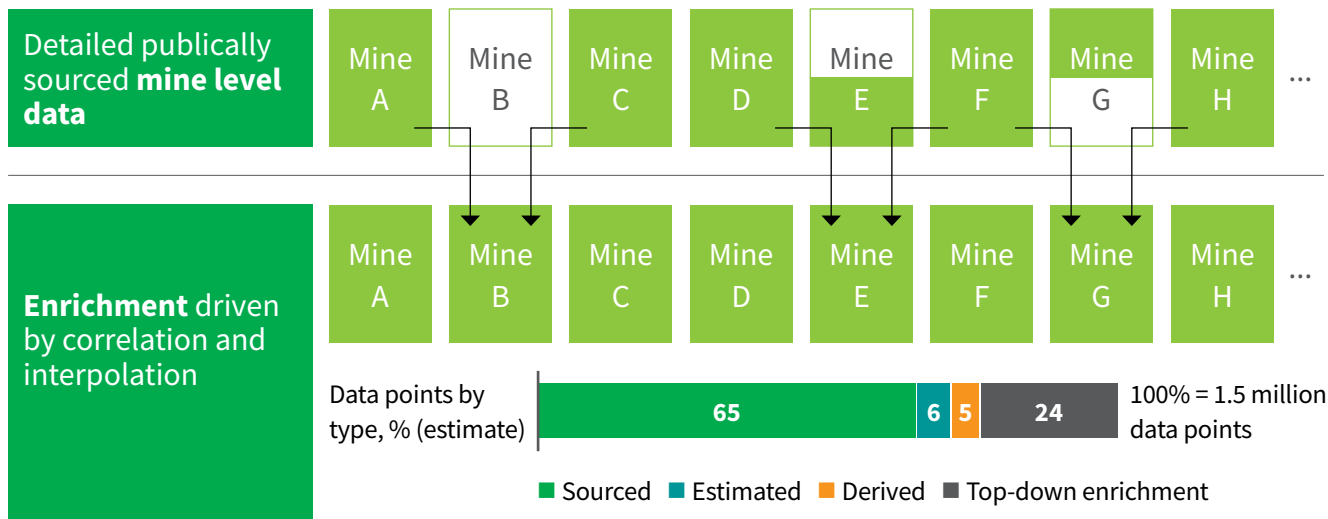
Example of two copper mines



1 100% outside-in based on publicly available and assumptions (MineSpans does not make any use of client confidential data / MNPI)

Referenced to: MineSpans by McKinsey

MineSpans combines public data with McKinsey insights to deliver more accurate cost curves, supply and demand outlooks



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MineSpans dynamic and flexible NAV mine models cover 1400+ assets. Flexible input parameters for scenario modelling and user input include:

- **Macro:** FX-rate, oil price, wages, diesel and power price, commodity prices, payable rates, royalty rates (impact on cost output)
- **Volume:** Strip ratio, ROM, mill head grade, metallurgical recovery, product split (impact on cost output)
- **Cost input:** freight, by-product streaming, TC/RC, exploration, SG&A, sustain Capex, Capex, tax rate, discount rate

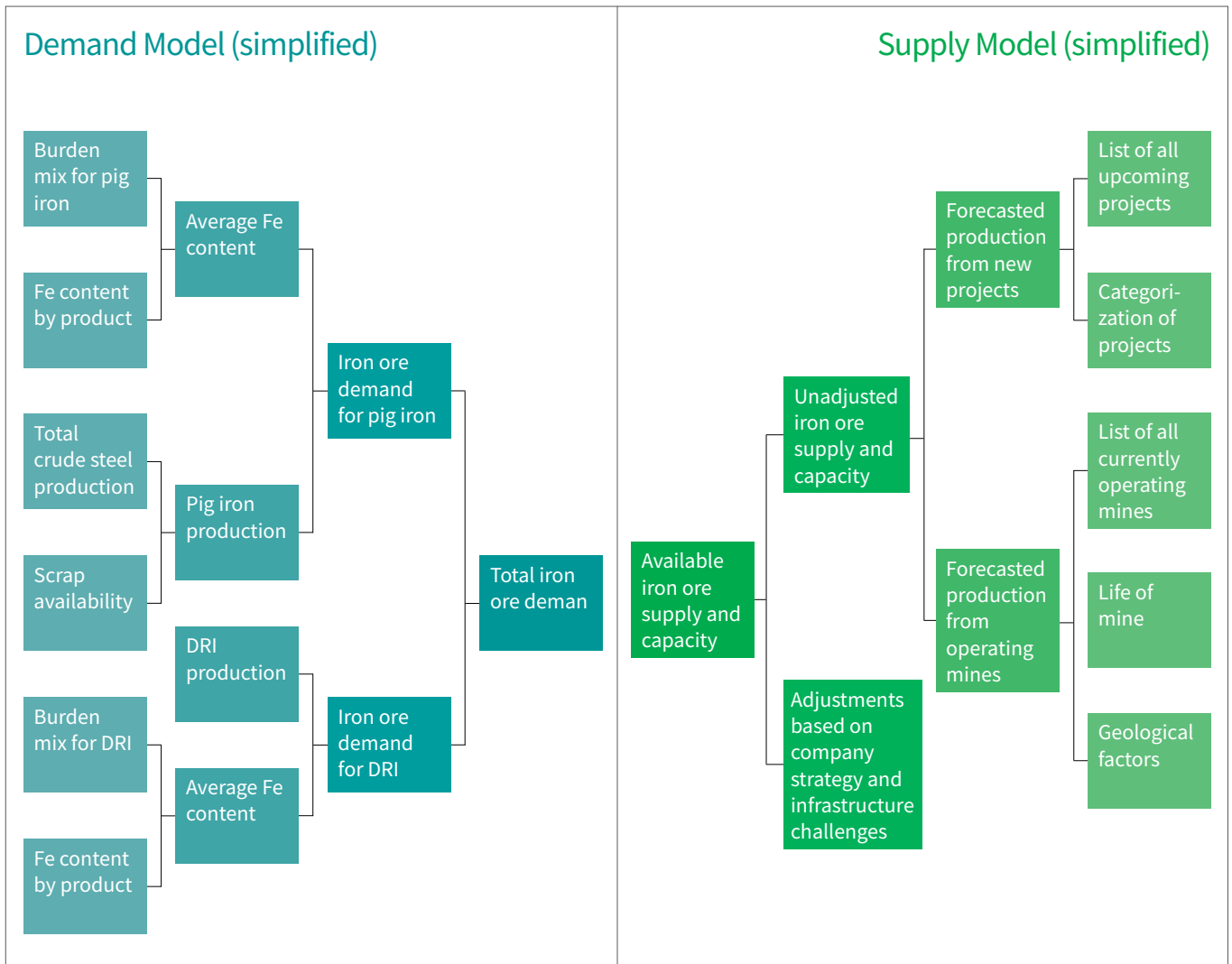
MineSpans provides **full flexibility** to vary underlying drivers and understand implications on the cost curve

Bottom-up modeling approach allows users to run scenarios varying currency exchange rates, oil prices and a number of other variables. Different scenarios for currencies, oil and local inflation can yield up to 20% difference in marginal costs.

Granular approach allows for comparison of reserve grades and mill-head grades, and potential impact on metal production

Ability to assess **profitability** of mines in an environment of changing VIU premia: MineSpans cost curves provide insight on market evolution

MineSpans models are built from bottom-up

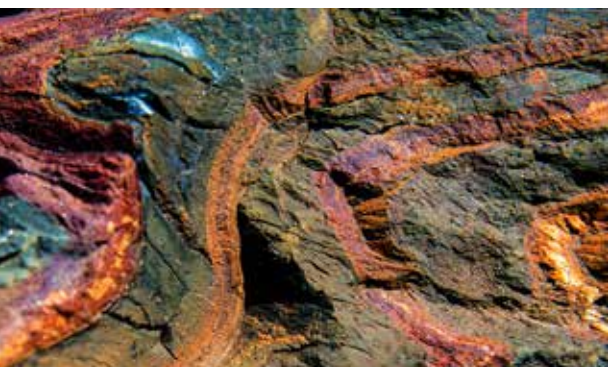


Referenced to: MineSpans by McKinsey, McKinsey Basic Materials Institute

MineSpans data and commodity coverage: 4,240+ mines

Copper	Iron ore	Gold	Potash	Lithium
<ul style="list-style-type: none"> • 390 primary mines • 171 secondary mines • 143 projects (base case) • 119 other projects • Supply/Cost curve cover 100% of global output • China coverage: 50% by mine (60 mines), 50% on a provincial level 	<ul style="list-style-type: none"> • 278 primary mines • 21 secondary mines • 7 projects (base case) • 369 other projects • Supply/Cost curve cover 100% of global output • China coverage: 40% by mine (41 mines) and 60% on a provincial level 	<ul style="list-style-type: none"> • 273 primary mines • 87 projects • 407 secondary mines and projects • Supply/Cost curve cover 63% of global output (67 Mn ounces) • Top 50 gold producers (ex-China) covered • Total of 187 producers 	<ul style="list-style-type: none"> • 72 primary mines • 1 secondary mines • 10 projects (base case) • 82 other projects • Supply/Cost curve cover 100% of global output • China coverage: 97% by mine (15 mines) and 3% on a provincial level 	<ul style="list-style-type: none"> • 25 primary mines • 2 secondary mines • 15 projects (base case) • 90 other projects • Supply/Cost curve cover 100% of global output
Zinc	Metallurgical coal	Uranium	Cobalt	By-products
<ul style="list-style-type: none"> • 172 primary mines • 127 secondary mines • 33 projects (base case) • 78 other projects • Supply/Cost curve cover 100% of global output • China coverage: 25% by mine, 75% on a provincial level 	<ul style="list-style-type: none"> • 180 primary mines • 20 projects (full case) • Supply/Cost curve cover 100% of global output • Focus on the seaborne market • China perspective included • Available as of Q2 2019 	<ul style="list-style-type: none"> • 71 primary mines • 6 secondary mines • 6 projects (base case) • Supply/cost curve cover 100% of global output • Available as of Q2 2019 	<ul style="list-style-type: none"> • 70+ operational mines • 40+ potential projects • 50+ other early stage projects • Supply coverage close to 100% • Bottom-up coverage in the DRC 	<ul style="list-style-type: none"> • Nickel: 100% of supply • Lead: 70% of supply • Molybdenum: 80% of supply • Platinum: 85% of supply • Silver: 80% of supply • Phosphate rock: 60% of supply

Referenced to: MineSpans by McKinsey



Why is MineSpans the preferred solutions for investment bankers, analysts and investors?



Transparency and accuracy in methodology

Trust in the output and analyses with the ability to crosscheck 100% of documents sourced.



Independent view of the market

Be assured in analysis derived independently and updated quarterly, making it the most frequently updated mining intelligence source.



Reliable bottoms-up cost model

Understand sensitivities and cost drivers via the use of combined publicly sourced data with robust bottoms-up cost model, mining archetypes and processing flow sheets that are directly comparable against all assets.



Flexible tools

Scenario analysis to capture opportunities and identify risks with models that allow multiple data source input and factors to analyze including inputs of cost sensitivity, fiscal terms, FX and commodity price changes.



Experts provide knowledgeable insight

Have confidence as Minespans is managed by a team of experts with deep commodity experience, with expertise in mining operations and finance.



About IHS Markit

IHS Markit (Nasdaq: INFO) is a world leader in critical information, analytics and solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 80 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

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