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MARKET INSIGHT

Water Solutions for Global Mining:
Competition, Costs & Demand Outlook, 2014–2019

July 2014

About This Market Insight

Market Insight Details

- This Market Insight highlights the following:
  - An in-depth analysis of planned global hard-rock mining activity by mine, mining company, mineral, and US$ investment.
  - A five-year forecast (2014–2019) of the global hard-rock mining sector's water demand by region and mineral type.
  - A five-year forecast (2014–2019) of the global hard-rock mining sector's water & wastewater treatment investment.
  - Profiles of key water technology equipment and service providers active in the global water for mining sector, including mining revenue rankings of construction & design firms.
  - Profiles of leading mining companies and rankings of revenues per m^3 water.
  - Mining company water withdrawals, recycled water use (m^3), costs and efficiency ratios.
- This Market Insight analyzes water solutions for copper, gold, nickel, and iron ore, which represent more than 88% of planned hard-rock mining investments worldwide.
- This Market Insight draws on Bluefield Research's Advanced Water Treatment & Desalination Insight Service and its ongoing deliverables.

Geographical Coverage

- North America
- Latin America
- Asia-Pacific
- Africa
- Europe
- Middle East – North Africa

Company Segments Analyzed

- Chemical Companies
- EPC Firms
- Filtration Companies
- Mining Companies
- Pump & Valve Companies
- Specialized Mining Equipment Companies

Water Treatment & Solutions Providers

- Abengoa
- Acciona
- AECI
- Ashland Inc.
- Aveng Group
- BASF Mining
- CYTEC
- Clariant AG
- Doosan
- Evoqua
- Flowserve Corp.
- FLSmidth & Co
- GE
- IDE Technologies
- KSB Group
- Kurita Water
- Metso
- Nalco (Ecolab)
- Outotec
- Osmoflo
- Pall Corp.
- Pentair Ltd.
- RWL Group
- Seven Seas
- SNF FloMin Inc.
- Suez Environnement
- Veolia Water
- The Weir Group
- Xylem Inc.

Construction & Design

- Bechtel
- Black & Veatch
- Bouygues
- Cengiz Construction
- CH2MHill
- China Geo-Engineering
- China Metallurgical
- China Railway Group
- Chiyoda Corp.
- Fluor
- Grupo ACS
- Hatch
- Hoctief AG
- Jacobs International
- KBR
- Kiewit
- Layne Christensen
- Louis Berger
- Mott Macdonald
- MWH
- PCL Construction
- Salfacorp
- SNC Lavalin
- Sinohydro Group
- Skanska AB
- SKM
- Stantec
- Toyo Thai Corp.
- URS
- Worley Parsons
- Others

Mining Companies

- Alcoa
- AngloAmerican
- Barrick
- BHP Billiton
- Citic Pacific
- Codelco
- First Quantum
- Fortescue
- Freeport McMoRan
- Glencore
- Gold Corp
- Newmont
- Norilsk Nickel
- Nova Gold Res
- Rio Tinto
- Rusal
- Teck
- Vale
- Others

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Water Solutions for Global Mining: Competition, Costs & Demand Outlook, 2014–2019 is part of Bluefield's Advanced Water Treatment & Desalination Insight Service.

Advanced Water Treatment & Desalination Insight Service provides clients with a steady stream of in-depth analyses of evolving water treatment markets, company strategies, demand shifts, and the underlying drivers for greenfield opportunities..

Learn more at www.bluefieldresearch.com.

Sample Analysis: Key Markets & Drivers (Section 2, Slide 7)

The demand for water solutions is largely bifurcated between securing water supplies (e.g. desalination, groundwater) and mandated treatment of effluents (e.g acid mine drainage), thereby creating a mix of opportunities for water technology and system suppliers.

Key Drivers for Water Technology & Management Solutions

	Chile	Australia	Peru	South Africa	Canada	Brazil	United States	Indonesia
Mining Policies	◕	●	◑	◑	●	◑	●	◕
Scarcity of Water Supply	●	◕	◕	◑	◔	◔	◑	◔
Mine Dewatering Risk	◔	◕	◔	◕	◑	◕	◑	◑
Acid Mine Drainage	◔	◑	◔	●	◑	◑	◕	◕
Primary Mining Products (Hard Rock)	• Copper	• Copper • Gold • Iron • Nickel	• Copper • Gold	• Gold • Iron	• Copper • Gold • Nickel	• Iron • Nickel	• Copper • Gold • Iron	• Gold • Nickel
Mining % GDP	19%	10%	12%	9%	4%	4%	2%	2%

● High Impact ◕ Strong Impact ◑ Medium Impact ◔ Limited Impact

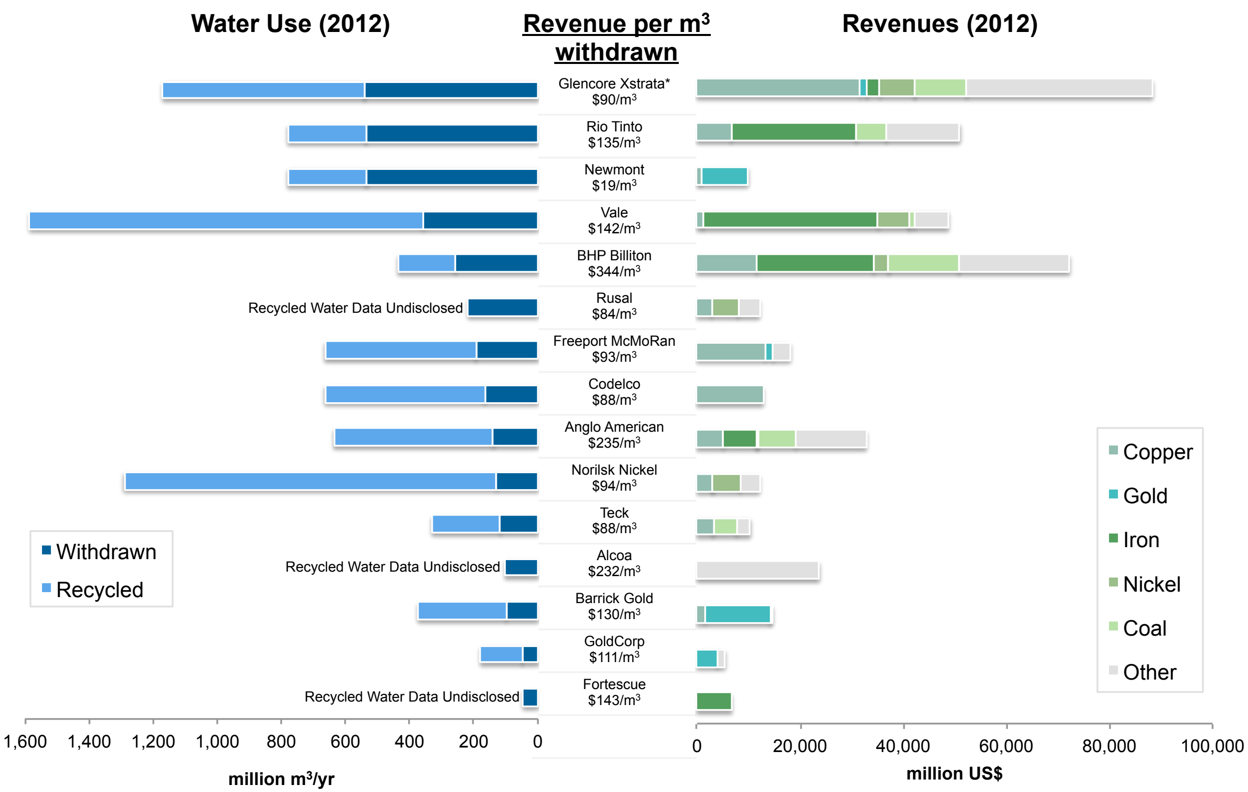
Source: Bluefield Research

Analysis

- More mature economies– Australia, Canada, and the US– have established environmental mandates on mining activities that are slowly being adopted in emerging markets.
- Chile's US$16.4 million fine on and temprary shutdown of Barrick Gold's operations and Peru's move to evaluate environmental impacts through SENACE signals stronger regulatory enforcement in the region.
- Broader mining oversight– via public pressure– has been a recent effect of water scarcity and competition for supply. As a result, seawater desalination supply is on the rise in key markets including Chile, Namibia, and Australia.
- More than 6,000 closed mines in South Africa have sparked debate over acid mine drainage and its impact on existing water source. An analysis of 40 copper mines in the US indicated an average treatment cost of US$1.28/m^3, highlighting the potential cost. South Africa's DWR has estimated US$1 billion in costs.
- The impact of the mining sector on GDP alters the discussion at a political level, focusing attention on the mining sector and potentially slowing sweeping changes to policies and regulations on the sector.

Sample Analysis: Water Use by Mining Companies (Section 3, Slide 20)

Bluefield's analysis of 15 leading mining companies highlights the growing impact of water management on their ongoing operations



Analysis

- These leading mining companies report a combined 25.3 million m³/d of water usage in 2012, of which 62% was recycled. While this represents a significant share, planned mining capacity additions are expected to add to the demand for increased recycling.
- As a benchmark, mining companies have reported revenues per cubic meter withdrawn as an indicator of water efficiency per dollar. BHP Billiton stands out with US$344/m³ withdrawn.
- The wide disparity between BHP Billiton's US$344/m³ and Newmont's US$19/m³ highlight the impact of mineral focus and availability of water.
  - Brazil-based Vale S.A. water usage is largely a result of its high water usage iron ore mining. Further, much of its activities are in low water-stress regions.
  - In contrast, Newmont Mining and Codelco's recycled water use is 32% and 75%, respectively. The potential mandates of costly desalination for mines in Chile, could force a change to greater reuse for these companies.

*Only Glencore's revenues from its metals and minerals division included. Revenues from the energy and agriculture groups were excluded, falling outside the scope of this report.
Note: The companies analyzed are intended to be reflective of the mining sector.
Source: Mining Companies, CDP, Bluefield Research

Order Form

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Publication Date: July 2014

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Global companies across the value chain are developing strategies to capitalize on greenfield opportunities in water– new build, new business models, and private investment. Bluefield Research supports a growing roster of companies across key technology segments and industry verticals addressing risks and opportunities in the new water landscape.

Companies are turning to Bluefield for in-depth, actionable intelligence into the water sector and the sector's impacts on key industries. The insights draw on primary research from the water, energy, power, mining, agriculture, financial sectors, and their respective supply chains.

Bluefield works with key decision-makers at utilities, project development companies, independent water and power providers, EPC companies, technology suppliers, manufacturers, and investment firms. Bluefield's services gives these companies tools to define and execute strategies.

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