

CDP investor research series

- Focus on **environmental metrics for key sectors**: Transport, Utilities, Materials/Chemicals, Metals & Mining, Consumer Goods, & Oil & Gas, Cement, Steel.
- Identifies material **environmental and regulatory issues** within each sector and the potential impact on companies' financials
- Combines metrics to create a '**super league table**' & highlights engagement ideas
- Voted **most innovative research product & best climate change research** in 2015 by [IRRI](#)





CDP Investor Research

Making the grade

Are some miners chasing fool's gold?

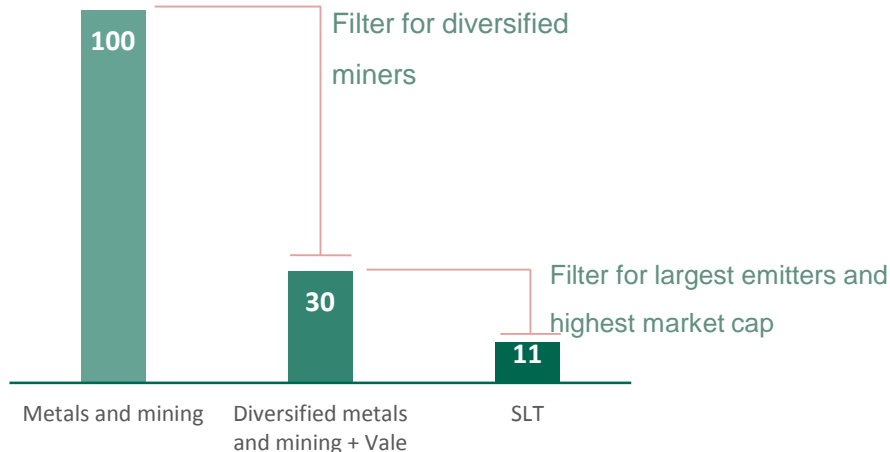
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Scope of research: company selection

CDP respondents

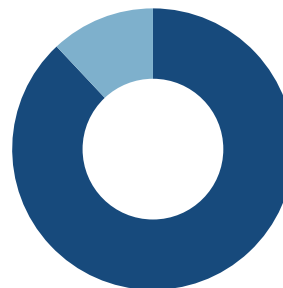


▾ **Largest non-responders: Norilsk Nickel, Grupo Mexico and KGHM Polska Miedź**



85%

of combined scope 1+2 emissions amongst responding diversified miners.



US\$329bn

in market capitalization (88% of total amongst responding diversified miners).

Full scope of research: key areas

- ▼ **Energy efficiency:** against a backdrop of deeper mining and lower ore qualities, which require greater energy to process, and increasingly remote locations of mining operations, with potential grid and transport constraints, leaders in energy efficiency will gain a competitive advantage and potentially enhanced earnings.
- ▼ **Coal exposure:** coal faces tightening regulation and increasing competition from cleaner alternatives with implications for its economics. We examine the companies' exposure to both thermal and coking coal.
- ▼ **Carbon cost exposure:** we assess the emissions-related carbon cost exposure of mining companies in our study and the potential impact on earnings under current and future carbon price scenarios.

Full scope of research: key areas

- ▼ **Carbon regulation readiness:** using InfluenceMap's proprietary analysis, we assess each company's actions in supporting or opposing climate legislation. We believe that supportive firms are most likely to benefit from progressive climate agreements.
- ▼ **Water resilience:** we assess the companies' exposure to water risk and how aware they are of these risks. We undertake facility-level analysis to assess which companies are at a greater risk of future production issues due to water stress.

Super-League Table

- Ranking companies based on emissions-related metrics which in aggregate could have a material impact on company performance.
- Proxy for business readiness in an industry where environmental regulations are becoming more stringent.
- From a climate risk perspective companies towards the bottom of the table are possibly higher risk investments than those towards the top.

SLT rank	Comp	Overall SLT Score	Energy efficiency grade	Water resilience grade	Coal exposure grade	Carbon cost exposure grade	Carbon regulation readiness grade	CDP performance band (2015) (ii)
1		3.98	B	A	C	A	A	B
2		4.26	A	B	D	B	C	B
3		4.71	C	C	A	B	C	B
4		5.66	B	C	C	C	D	B
5		5.76	C	B	D	D	B	B
6		5.79	D	E	A	B	A	D
7		5.93	A	C	E	D	D	B
8		6.33	D	D	A	B	C	C
9		6.49	D	E	A	C	B	C
10		6.74	E	D	A	B	B	C
11		8.95	E	D	E	E	E	C
Weights for each area			40%	20%	15%	10%	10%	5%

Water resilience

Water and the mining sector

- ▼ The mining sector is amongst the most water intensive sectors.
- ▼ Water is used across a broad range of activities and is a fundamental resource to the continuity of operations.
- ▼ Water spending in the mining industry almost tripled over 2009-2013, outstripping growth in mining output for major commodities over the same period.
- ▼ Water regulation and prices are tightening in some of these areas, as recognised by the companies themselves.
- ▼ Water stress can lead to forced production interruptions or significant capital expenditures on new water supply infrastructure.

Licence to operate not granted



Barrick Gold suspends construction on its Pascua-Lama mine project after investing US\$8.5 billion due to concerns about local groundwater pollution and stringent permitting conditions.

Forced production interruption

Anglo American lost 30,000 tonnes of copper production at their Los Bronces mine in Chile due to drought, equating to 4% of the company-wide 2014 copper output, and circa US\$170m in lost revenue.



Capital expenditure on new water supply infrastructure



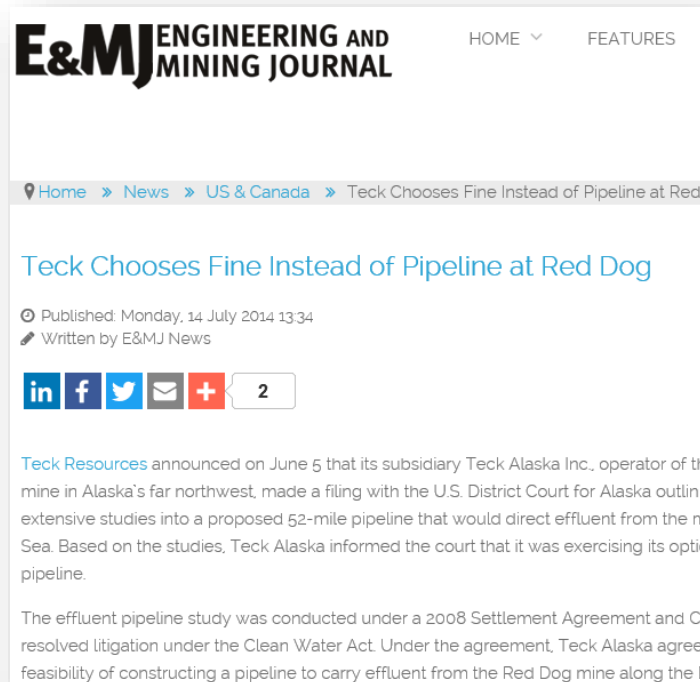
Image: Fluor

BHP Billiton and Rio Tinto jointly investing US\$3bn in desalination infrastructure to supply their Escondida copper mine in Chile

= 13% of their respective total 2014 capital expenditure

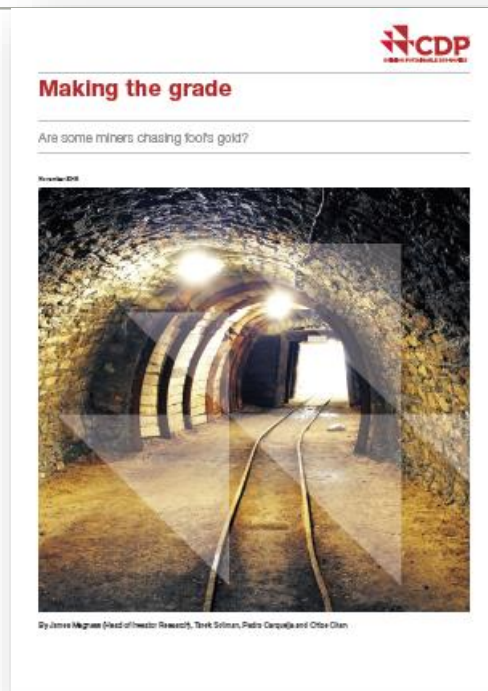
Regulatory fines

In 2014, amongst the largest water regulatory fines for the mining industry were Anglo American (US\$10m) in Chile and Teck (US\$8m) in Alaska.



Tailing dams

- Recent tragic Samarco mining disaster has highlighted issues relating to tailings dams.
- This topic is outside the scope of our research, which focuses on climate change-related metrics.
- However the report includes some separate research (attached as an appendix) that assesses the companies' exposure to tailings dams incidents.



Metric 1): Water stress exposure

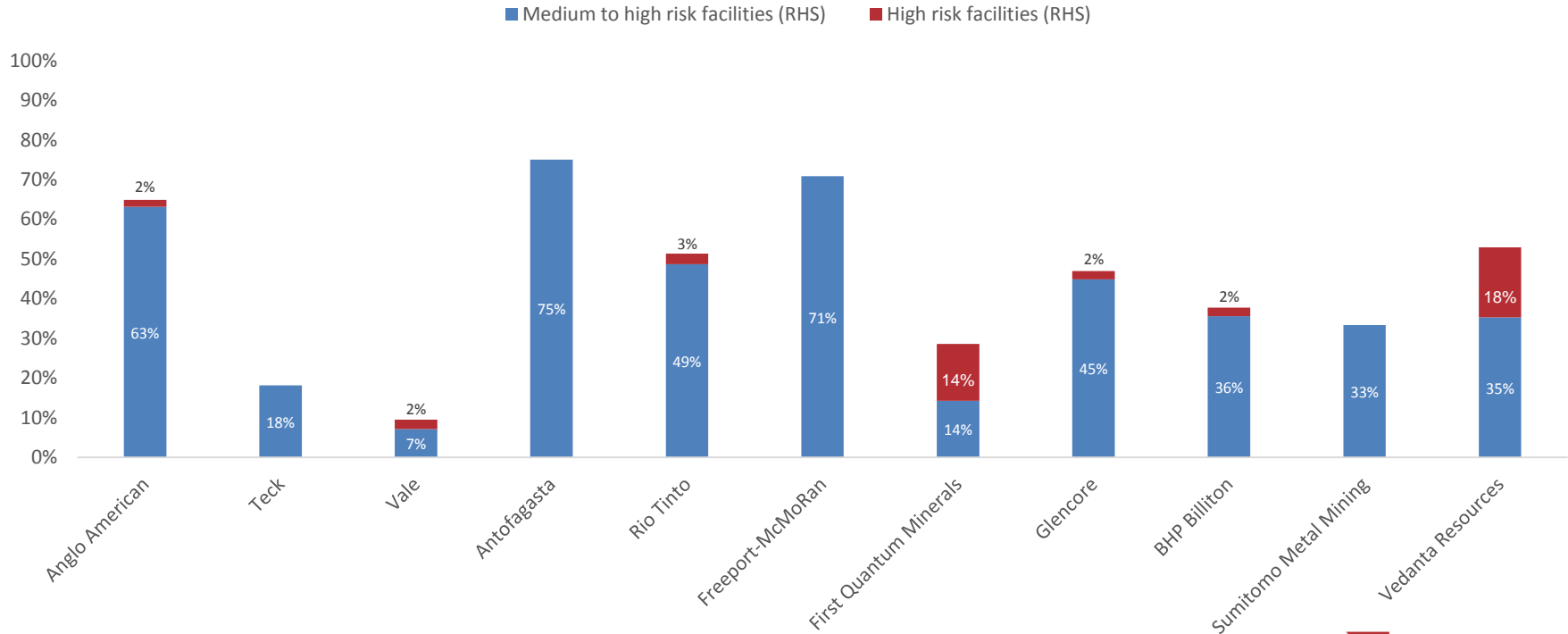
Assessed on a mine-by-mine basis using the Aqueduct global water risk mapping tool developed by the World Resources Institute (WRI)

- ▼ Evaluates localised water stress using industry-specific indicators (water quantity, water quality and regulatory & reputational risks).
- ▼ Cross-referenced to CDP questionnaire responses to assess how well this is recognised by responding companies.

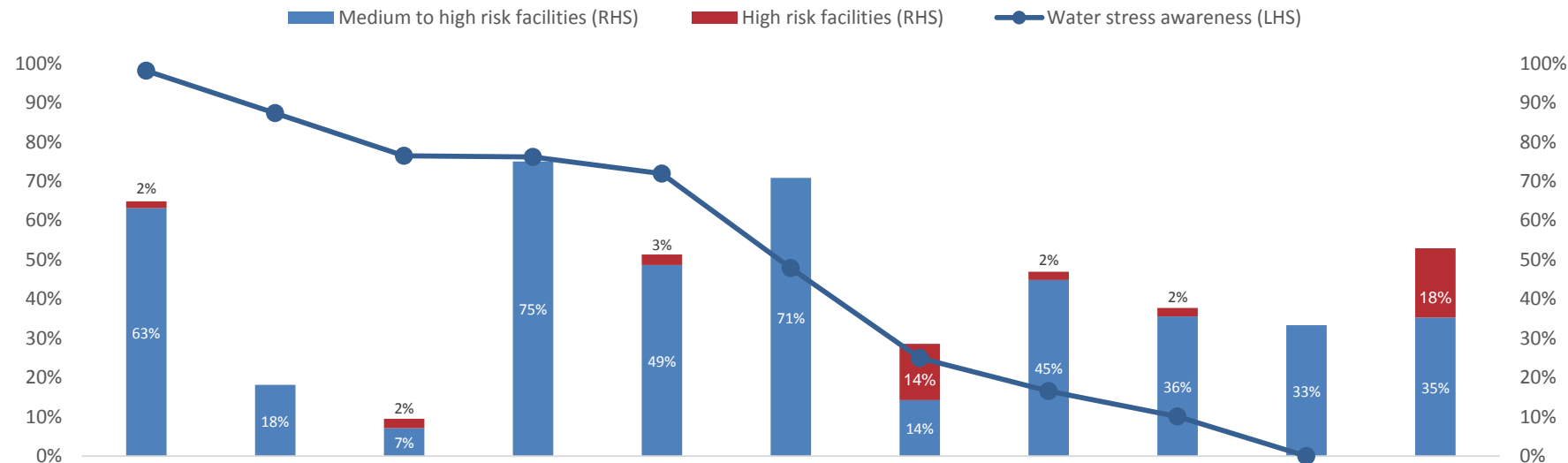
50%

Almost 50% of facilities for the companies in our study are located in areas with medium or higher water stress

Water stress risk (% of facilities)

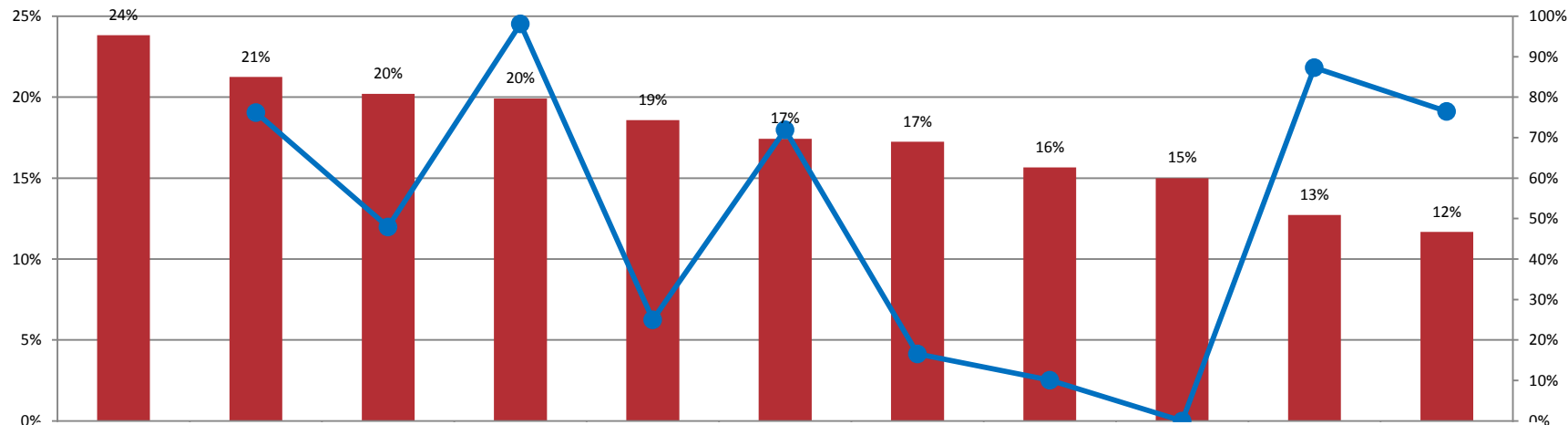


Water stress awareness index and water stress risk



Company results are available to investor signatories

Components of metric 1) water stress risk index (LHS) and water stress awareness index (RHS)



Company results are available to investor signatories

Fit -

Sun -

Water stress risk index

Water stress awareness index

Metric 2): Water governance and strategy

Scorecard approach to evaluate companies' responses to CDP's 2015 water questionnaire, this looks for evidence that the company has:

- ▼ Established comprehensive water risk assessment procedures, engaging with other stakeholders on the river basin level;
- ▼ Have a track record of water regulatory compliance;
- ▼ Recognise opportunities from water efficiencies, develop targets and strategies.

Metric 2: Governance and strategy

- ▼ BHP Billiton is top ranked on this metric. It is comprehensive in its stakeholder engagement and evaluates water risks on a 10 year timeframe. Its also recognizes water opportunities which represent cost savings and has the joint strongest water policy framework.
- ▼ Only 3 companies have a water risk assessment at the river basin level.
- ▼ Five companies report that they evaluate water risks over a 10 year period, and how they could impact the organization's growth strategy.
- ▼ Only one company reports an absolute water consumption reduction target (relative to business-as-usual levels).

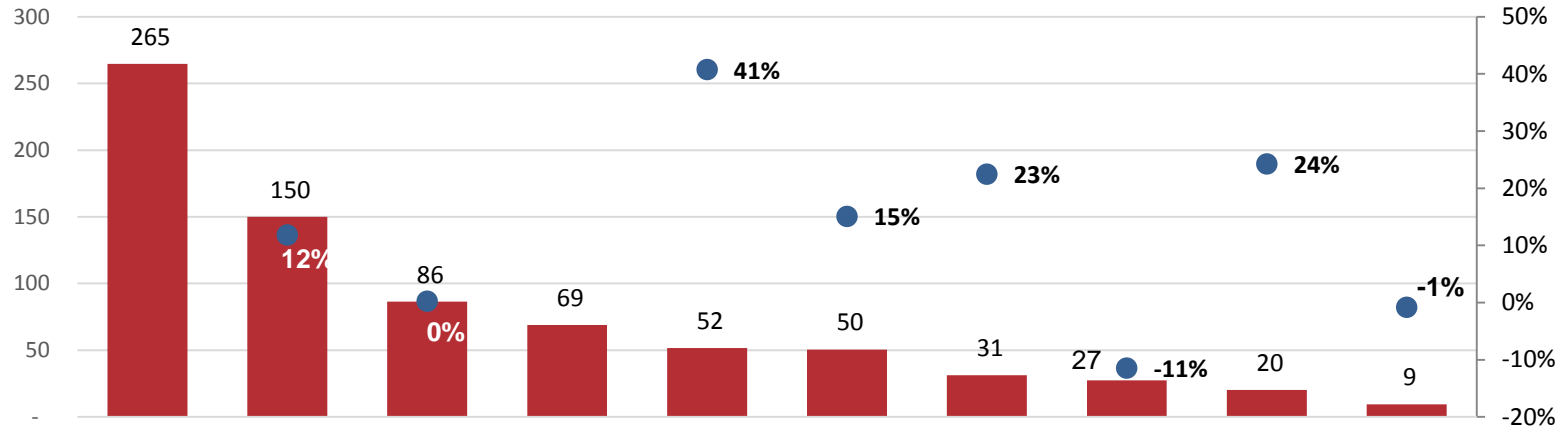
Metric 3): Water performance (withdrawal)

Looks at companies' water withdrawal intensity using value-added as a normalisation factor.

- ▼ Water withdrawal intensity in 2014;
- ▼ How this has changed between 2010 and 2014.

This metric is lightly weighted (10%), to recognise the limitation in judging a company on an aggregate basis.

Metric 3: Water performance



Company results are available to investor signatories

■ Water intensity 2014 (megaliters per US\$m) ● Implied annual growth rate 2010-2014 (%)

Note: We were unable to calculate implied annual growth rates for Teck, First Quantum Minerals and Glencore. In addition, there was insufficient data to calculate Glencore's water intensity in 2014.

Water resilience: Results

Company	Water Stress Exposure	Water governance and strategy	Water Performance	Overall weighted rank	Water resilience rank	Water resilience grade
Company results are available to investor signatories	1	5	6	2.92	1	A
	4	1	2	3.98	2	B
	2	10	10	4.65	3	B
	5	3	8	5.11	4	C
	6	6	1	5.23	5	C
	3	9	3	5.53	6	C
	8	2	9	5.99	7	D
	7	7	11	6.46	8	D
	9	4	4	6.56	9	D
	10	8	7	7.38	10	E
	11	n/a	4	9.70	11	E
Weighting	60%	30%	10%			
Adjusted weightings for Vedanta Resources	78%	n/a	22%			

Water resilience: Results

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n/a : Vedanta Resources was not target by CDP's 2015 water questionnaire

Limitations

- ▼ The lack of granular data on water quality, recycling and withdrawals limits our ability to fully assess which companies are improving their water impact, and identify those that are at risk of having their assets stranded.
- ▼ Assessing the water stress exposure of different mining operations using a single indicator (i.e. WRI), may have limitations. For example, water risk can vary significantly across both the type of commodity and the nature of the process.
- ▼ Water accounting practices differ across companies.

Engagement themes

Overall engagement themes: Water resilience (1/2)

Link to earnings

- Water stress can lead to forced production interruptions or significant capital expenditures on new water supply infrastructure.

Key engagement themes

- Improve awareness of potential risks of water stress at mining facilities and disclose what actions are being taken to avoid disruption to operations.
- Improve granularity of water data reporting at facility level and using a consistent reporting framework.
- Report all water-related incidents (e.g. penalties, fines).

W3.2a Please provide the number of facilities¹ per river basin exposed to water risks that could generate a substantive change in your business, operations, revenue or expenditure and the proportion this represents of total operations company-wide (CDP 2015 question W3.2a, amended)

Country	River basin	Number of facilities exposed to water risk	Proportion of total operations company-wide (%)	Comment

W5. Facility level water accounting

W5.1 Water withdrawals: for the reporting year, please complete the table below with water accounting data for all facilities included in your answer to W3.2a (CDP 2015 question W5.1, amended)

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawn at this facility compare to the last reporting year?	Please explain

W7.1a Please describe the penalties, fines and/or enforcement orders for breaches of abstraction licenses, discharge consents or other water and wastewater related regulations and your plans for resolving them

Facility name	Incident	Incident description	Frequency of occurrence in reporting year	Financial impact	Currency	Incident resolution

Linking emissions-related metrics to earnings

Key area in SLT	Link to company earnings	Metric	Key area weighting in overall SLT	Metric weighting within each key area
Energy efficiency	Improvements in energy efficiency can lead to cost savings and thus enhanced earnings. This is especially pertinent against a backdrop of deeper mining and lower ore qualities and increasingly remote locations of mining operations.	i) Reduction in emissions intensity 2008-2014.	40%	24%
		ii) Emissions intensity 2012-2014.		6%
		iii) Quality of emissions targets.		25%
		iv) Performance against targets.		25%
		v) Emissions data transparency.		20%
Water resilience	Water stress issues at mining locations pose significant risks to commodity production continuity in high stress areas or require significant expenditure to rectify.	i) Water stress exposure.	20%	60%
		ii) Water governance and strategy.		30%
		iii) Water performance.		10%
Coal exposure	Coal faces increasing regulatory and market pressure in its downstream use which will negatively impact the economics of its upstream production.	i) Share of revenue from coal.	15%	40%
		ii) Percent thermal coal production.		30%
		iii) Emission intensity of coal activities.		20%
		iv) Life of reserves.		10%
Carbon cost exposure	Financial exposure to meeting carbon emission cost, both present and potential future.	i) Current carbon cost exposure.	10%	40%
		ii) Potential future carbon cost exposure.		40%
		iii) Internal carbon price.		20%
Carbon regulation readiness	Companies that are supportive of regulation which facilitate a low-carbon transition are more likely to be better placed to benefit from it.	i) InfluenceMap score.	10%	100%
CDP performance band	A good annual CDP score is a proxy for a generally well-run company. Well-run companies are better placed to succeed in a changing marketplace.	i) CDP annual performance score.	5%	100%

Tack!

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