



Presentation from
**2016 World Water
Week in Stockholm**

www.worldwaterweek.org

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Trickle down 'wateronomics'

Cate Lamb, Global Director of Programs, CDP

August 29, 2016

Principle aims of CDP's water program

- ▼ To make meaningful reporting on water standard practice for companies globally, promoting competent and robust governance of water issues.
- ▼ To provide investors with access to corporate water data to facilitate informed decision making that drives the efficient allocation of capital.
- ▼ To promote better corporate water management through capacity building, multi-sector collaborations and the sharing of best practice.

Who we target - 2016

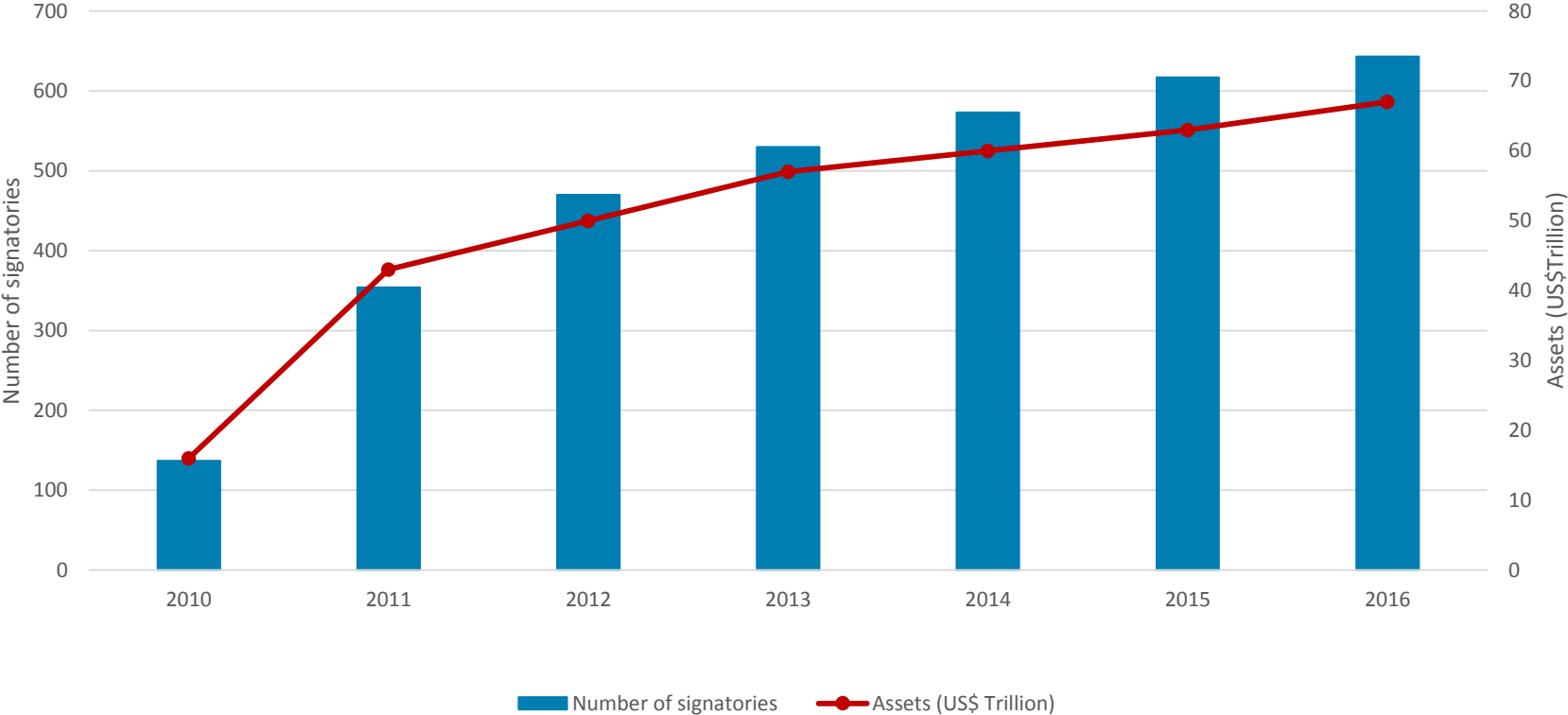
- ▼ 2,300 heavily water dependent companies requested
- ▼ 1,041 were MSCI ACWI constituents, accounting for 50% of total global market cap
- ▼ 1,411 companies disclosed

Targeted industry sectors include:

- apparel
- chemicals
- food & beverage
- metals & mining
- oil & gas
- pharmaceuticals
- power generation
- semiconductors

Investors have woken up to water risk

CDP Signatories & Assets: 2010 - 2016



Today's agenda

- ▼ Opening, Cate Lamb, CDP
- ▼ View from the top - Asset owner expectations of industrial water users
 - *Isabelle Juillard Thompsen, Senior Analyst, NBIM*
- ▼ Panel discussion - how is the market responding to these expectations?
 - *Sasja Beslik, Head of Sustainable Finance, Nordea Wealth Management*
 - *Yiannis Bartzilas, ESG Analyst, Bloomberg LP*
 - *Monika Freyman, Ceres*
- ▼ Audience impressions
- ▼ Concluding remarks, Cate Lamb, CDP

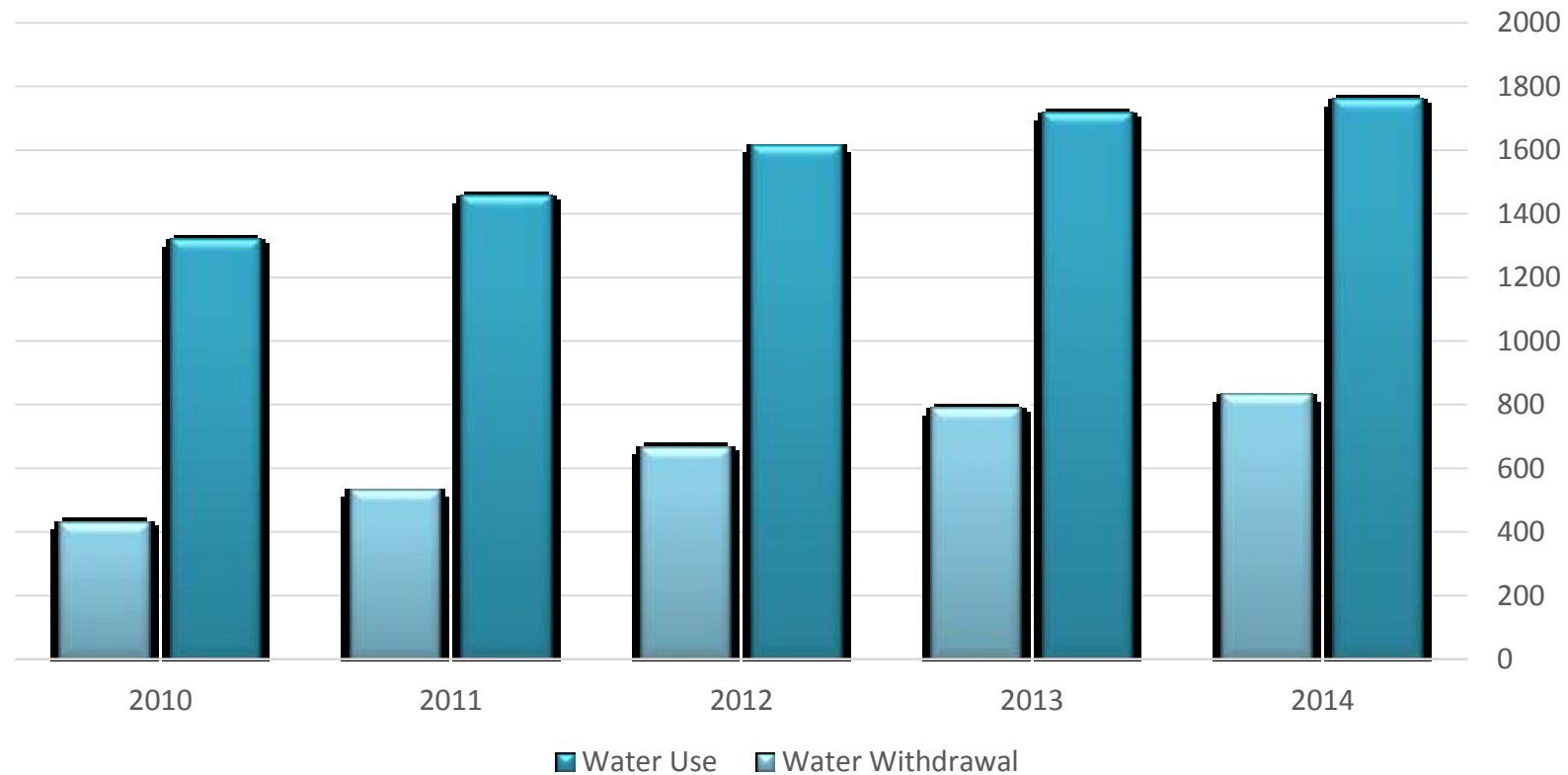
Water data on bloomberg

Yiannis bartzilas
august// 29// 2016

Bloomberg

Water Disclosure

Nr of companies disclosing water data



Corporate water data on bloomberg terminal

In Millions of EUR except Per Share	FY 2015	FY 2014	FY 2013	FY 2012	FY 2011	FY 2010	FY 2009	FY 2008	FY 2007	FY 2006
12 Months Ending	12/31/2015	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010	12/31/2009	12/31/2008	12/31/2007	12/31/2006
Total Water Use	6,070,000...	6,033,000...	5,724,000...	6,111,000...	5,783,000...	5,419,000...	2,730,000...	2,688,000...	2,652,000...	2,645,000...
Total Water Withdrawal	1,685,000...	1,877,000...	1,781,000...	2,122,000...	2,218,000...	2,182,000...	2,032,000...	2,126,000...	2,157,000...	2,132,000...
Surface Water Withdrawal	1,564,000...	1,772,000...	1,671,000...	1,891,000...	2,012,000...	2,008,000...	1,873,000...	1,951,000...	2,029,000...	1,957,000...
Groundwater Withdrawals	76,000.00	82,000.00	87,000.00	95,000.00	94,000.00	87,000.00	79,000.00	82,000.00	79,000.00	59,000.00
Salt Water Withdrawals	23,000.00	-	-	-	-	0.09	-	-	-	-
Municipal Water Use	22,000.00	23,000.00	23,000.00	23,000.00	24,000.00	30,000.00	25,000.00	25,000.00	26,000.00	19,000.00
Reclaimed Water Use	1,000.00	-	-	-	-	-	-	-	-	-
Total Water Recycled	4,324,000...	4,156,000...	3,943,000...	3,989,000...	3,565,000...	3,237,000...	698,000.00	562,000.00	495,000.00	513,000.00
% Water Recycled	71.24	68.89	52.54	66.50	62.60	60.40	26.00	20.91	18.67	19.40
Water/Unit of Prod (in Liters)	-	-	-	-	-	-	-	-	-	-
Process Water Use	318,000.00	303,000.00	253,000.00	362,000.00	357,000.00	308,000.00	304,000.00	334,000.00	339,000.00	381,000.00
Cooling Water Inflow	5,752,000...	5,769,000...	5,471,000...	5,940,000...	5,426,000...	5,111,000...	2,426,000...	2,370,000...	2,322,000...	2,275,000...
Cooling Water Outflow	1,414,000...	1,644,000...	1,583,000...	1,706,000...	1,849,000...	1,871,000...	1,737,000...	1,808,000...	1,827,000...	1,762,000...
Water Discharged	207,000.00	194,000.00	192,000.00	174,000.00	193,000.00	197,000.00	185,000.00	182,000.00	202,000.00	176,000.00
Treated waste water discharged	-	-	-	-	-	-	-	-	-	-
Discharges to Water	0.03	0.02	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.04
Chemical Oxygen Demand of Di...	17.30	18.70	19.70	21.60	24.30	26.10	18.60	20.60	31.20	32.80
Biological Oxygen Demand of Di...	-	-	-	-	-	-	-	-	-	-
Nitrogen Discharges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Phosphorus Discharges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Waste	2,020.00	2,070.00	2,470.00	2,210.00	1,970.00	1,860.00	1,690.00	1,770.00	1,930.00	1,500.00
Hazardous Waste	900.00	940.00	1,310.00	-	-	-	-	-	-	471.00
Drilling Waste	-	-	-	-	-	-	-	-	-	-
Mining Overburden	-	-	-	-	-	-	-	-	-	-

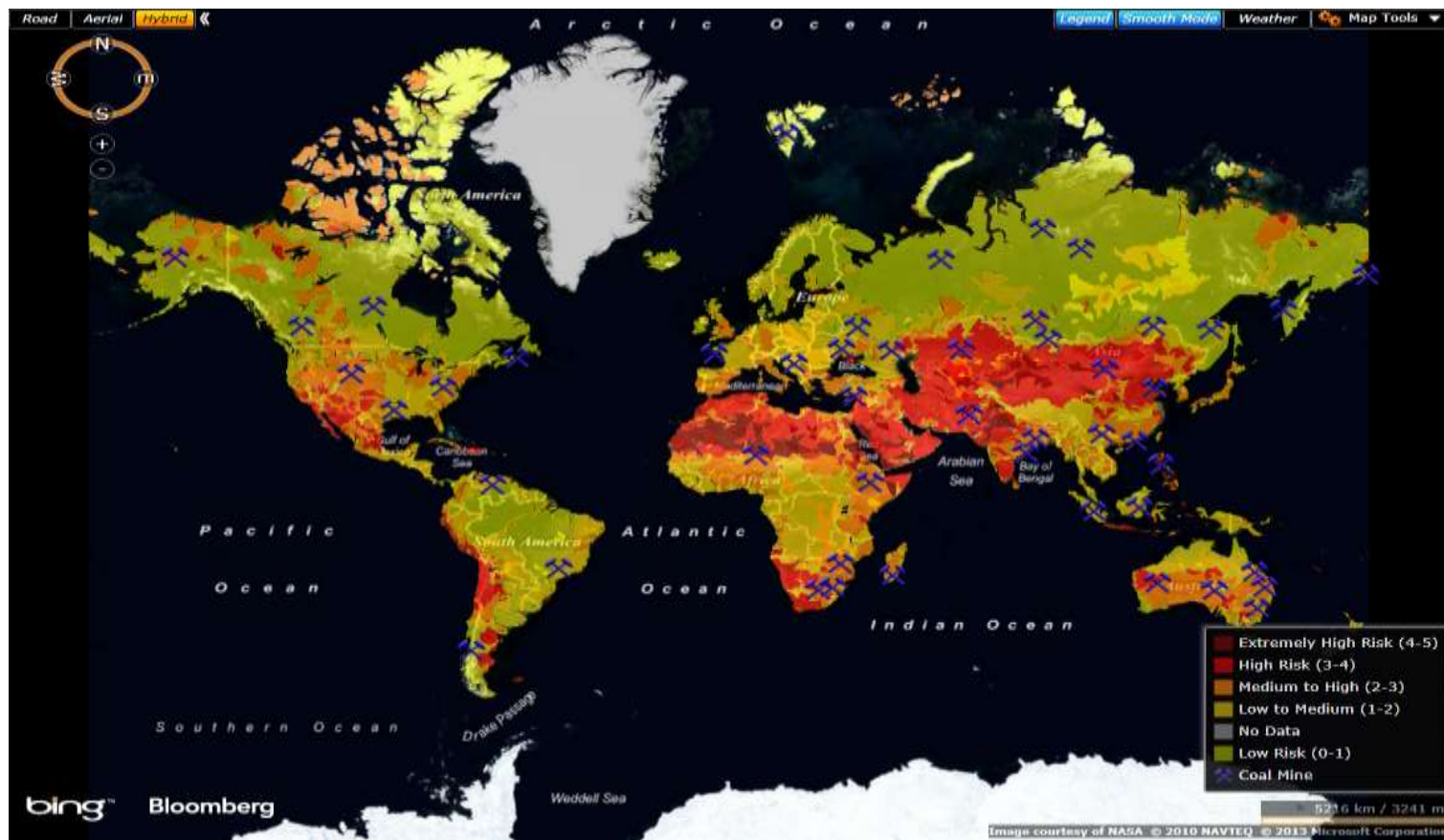
Research topic on Bloomberg intelligence

The screenshot displays the Bloomberg Intelligence interface. At the top, navigation tabs include '90) Search BI', '91) Actions-', '93) Settings', and 'Bloomberg Intelligence'. Below this is the 'Environmental, Social & Governance Dashboard (BI BESGG)' with a 'Global' filter. A left-hand navigation menu lists various categories such as 'Analysis', 'Industries', 'Data Library', and 'Monitor'. The main content area shows three primers:

- Gold ESG Primer** (Page 1 of 8): Article 102) 'Gold Mining Safety, Community Relations, **Water Top ESG Issues**' dated 05/04/16. The text discusses worker safety, community relations, water management, energy use, and carbon emissions as key ESG issues for the gold mining industry.
- Base Metals ESG Primer** (Page 1 of 11): Article 103) 'Metals and Mining ESG Risks Driven by **Energy, Water and Safety**' dated 04/21/16. The text highlights energy use, water management, carbon emissions, community relations, and worker safety as key ESG issues for the metals and mining industry.
- Building Materials ESG Primer** (Page 1 of 11): Article 104) 'Building Materials ESG Risk Driven by Energy Use, Carbon, **Water**' dated 03/31/16. The text identifies energy use, carbon, water management, waste disposal, and worker safety as key ESG issues for the building-materials sector.

Each primer includes a brief summary and a small chart or table. The 'Water Top ESG Issues' article features a bar chart, while the 'Building Materials' article includes a line chart showing trends over time.

WRI Aqueduct water risk



WATER RISK VALUATION IN MINING

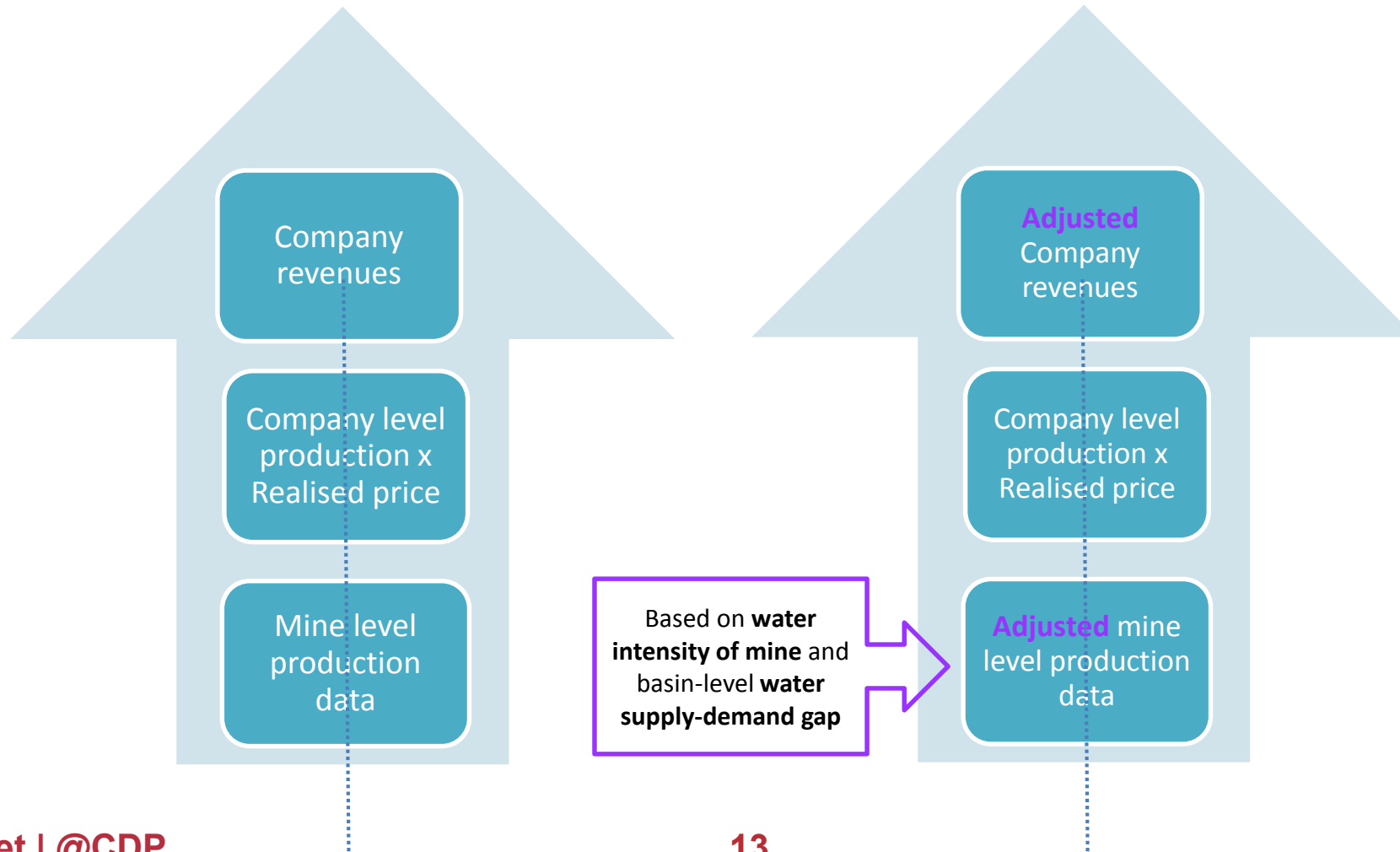
Yiannis bartzilas
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Bloomberg

Modelling bau vs. water stranding

BUSINESS AS USUAL (NO STRANDING)

WATER STRANDING SCENARIO

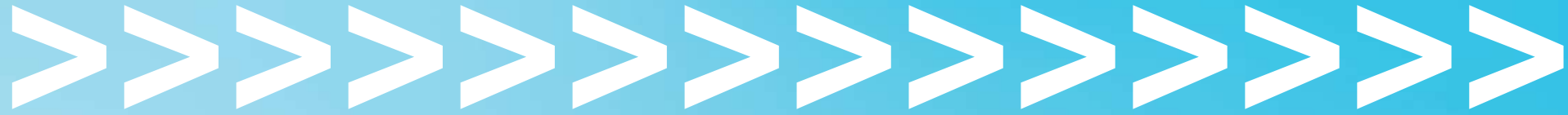


Companies analysed in the model

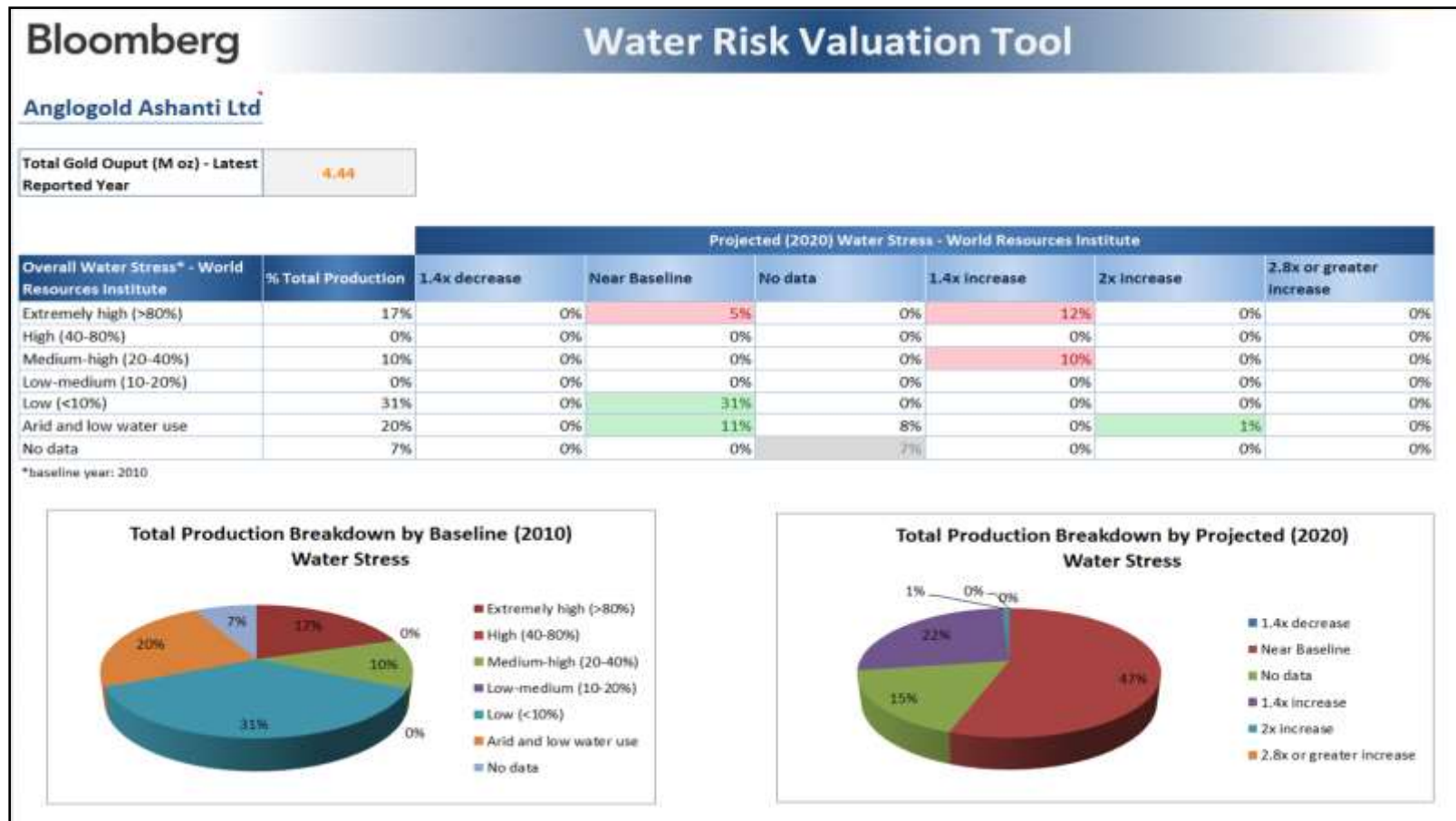
Company	Bloomberg Ticker
Acacia Mining Plc	ACA LN
Agnico Eagle Mines Ltd	AEM CN
Alamos Gold Inc	AGI CN
Anglogold Ashanti Ltd	ANG SJ
Argonaut Gold Inc	AR CN
Aurico Gold Inc	AUQ CN
Barrick Gold Corp	ABX CN
Centamin Plc	CEY LN
Eldorado Gold Corp	ELD CN
Gold Fields Ltd	GFI SJ
Goldcorp Inc	G CN
Kingsgate Consolidated Ltd	KCN AU
Kinross Gold Corp	K CN
Lake Shore Gold Corp	LSG CN
Newcrest Mining Ltd	NCM AU
Oceanagold Corp	OGC CN
Polyus Gold Ojsc	PLZL RM
Resolute Mining Ltd	RSG AU
Wesdome Gold Mines Ltd	WDO CN
Yamana Gold Inc	YRI CN
Antofagasta Plc	ANTO LN
Capstone Mining Corp	CS CN
Oz Minerals Ltd	OZL AU

- Together account for **50% of production of publicly listed gold producers** tracked by Bloomberg Intelligence (100+ companies)
- Largest impacts on production and revenues → **smaller & less diversified** companies
- **Capital expenditure** appears to be a viable route to value preservation in most cases

MODEL OVERVIEW



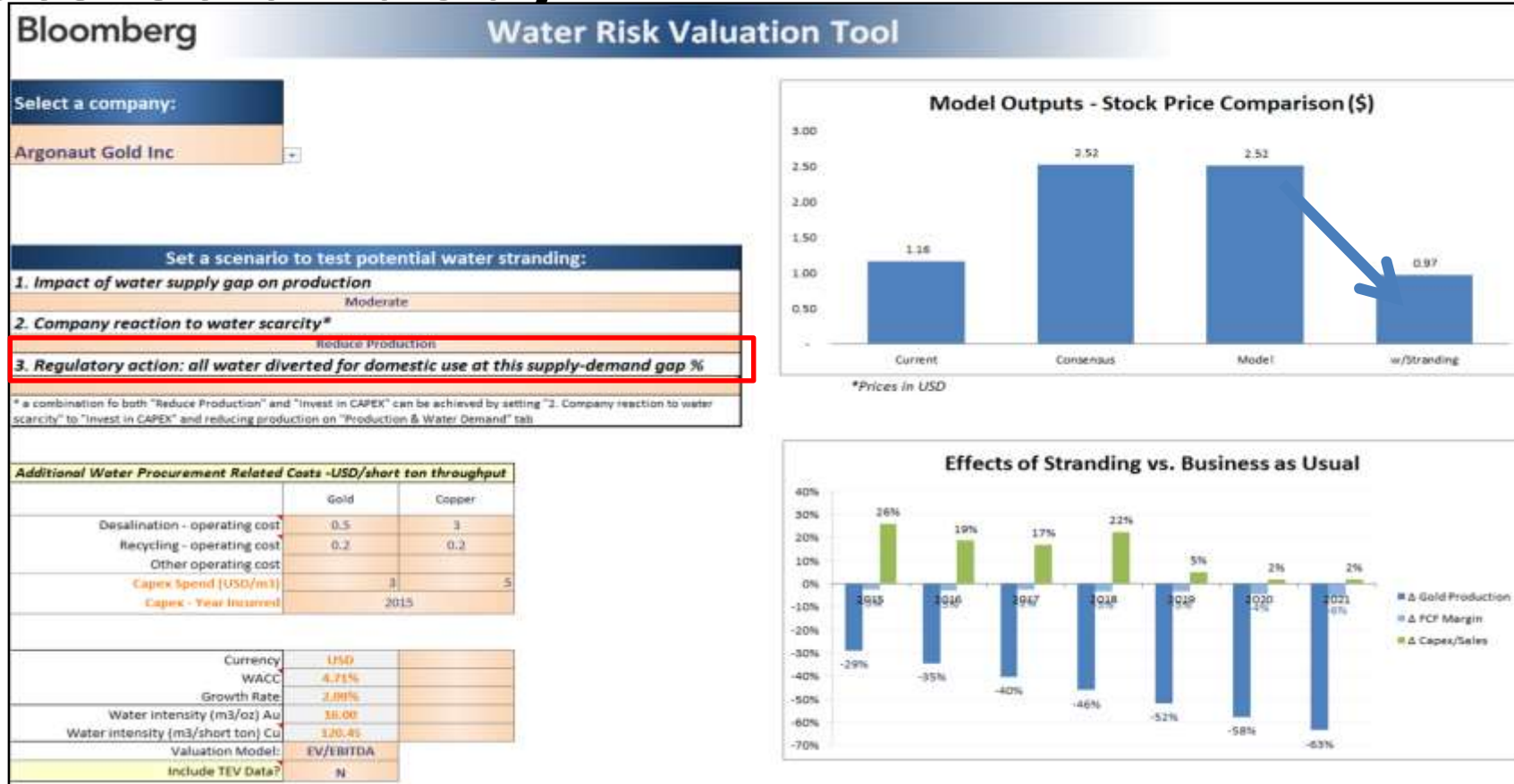
Aggregated Company level water risk



Pinpoint exposure by asset

List of AngloGold Ashanti Ltd Mine Sites						
Mine Name	Mine Ticker	Country	World Resources Institute - 2010 Water Stress Category	World Resources Institute - Projected Water Stress Category - 2020	Attributable Mine Output Moz	Mine Output % of Total Company Output
Morro da Gloria Gold Mine	0694760D Equity	Brazil	Low (<10%)	Near Baseline	-	
Raposos Gold Mine	0694792D Equity	Brazil	Low (<10%)	Near Baseline	-	
Mina Grande Gold Mine	0694774D Equity	Brazil	Low (<10%)	Near Baseline	-	
Kukuluma Gold Deposit	0694777D Equity	Tanzania	Low (<10%)	Near Baseline	-	
Cuiaba Gold Mine	0694798D Equity	Brazil	Low (<10%)	Near Baseline	-	
Velha Gold Mine	0694801D Equity	Brazil	Low (<10%)	Near Baseline	-	
Veduga Gold Deposit	0694788D Equity	Russia	Low (<10%)	Near Baseline	-	
Corrego do Sitio Tailings Gold Min	0694756D Equity	Brazil	Low (<10%)	Near Baseline	-	
LMS Gold deposit	0694799D Equity	United States	Low (<10%)	Near Baseline	-	
Rescatada Gold Deposit	0694770D Equity	Peru	Low (<10%)	Near Baseline	-	
Cerro Vanguardia Gold Mine	0694757D Equity	Argentina	Arid and low water use	Near Baseline	0.25	6%
AngloGold Ashanti Mi	0694781D Equity	Brazil	Low (<10%)	Near Baseline	0.40	9%
Cresson Gold Mine	0694796D Equity	United States	Extremely high (>80%)	Near Baseline	0.21	5%
Sunrise Dam Gold Min	0694782D Equity	Australia	Arid and low water use	Near Baseline	0.26	6%
Geita Gold Mine	0694802D Equity	Tanzania	Low (<10%)	Near Baseline	0.48	11%
La Colosa Gold Depos	0694783D Equity	South Africa	Low (<10%)	Near Baseline	-	
Gramalote Gold Deposit	0694772D Equity	Peru	Low (<10%)	Near Baseline	-	
Tropicana Gold Deposit	0694773D Equity	Australia	Arid and low water use	No data	0.36	8%
Crixas (Serra Grande) Gold Mine	0694779D Equity	Brazil	Low (<10%)	Near Baseline	0.07	2%
Sao Bento Gold Mine	0739304D Equity	Brazil	Low (<10%)	Near Baseline	-	
Teberebie Gold Mine	0694784D Equity	Ghana	Low (<10%)	Near Baseline	-	
Obuasi Gold Mine	0694797D Equity	Ghana	Low (<10%)	Near Baseline	0.24	6%
Teberebie Gold Mine	0694786D Equity	Ghana	Low (<10%)	Near Baseline	-	

Company reaction: reduce production (assets stranded)



Company reaction: invest in capex

Bloomberg Water Risk Valuation Tool

Select a company:

Argonaut Gold Inc

Set a scenario to test potential water stranding:

- Impact of water supply gap on production
Moderate
- Company reaction to water scarcity***
Invest in CAPEX
- Regulatory action: all water diverted for domestic use at this supply-demand gap %

* a combination for both "Reduce Production" and "Invest in CAPEX" can be achieved by setting "2. Company reaction to water scarcity" to "Invest in CAPEX" and reducing production on "Production & Water Demand" tab

Additional Water Procurement Related Costs -USD/short ton throughput		
	Gold	Copper
Desalination - operating cost	0.5	3
Recycling - operating cost	0.2	0.2
Other operating cost		
Capex Spend (USD/m ³)	3	5
Capex - Year Incurred	2015	

Currency	USD
WACC	4.71%
Growth Rate	2.09%
Water intensity (m ³ /oz) Au	18.00
Water intensity (m ³ /short ton) Cu	320.45
Valuation Model:	EV/EBITDA
Include TEV Data?	N

Model Outputs - Stock Price Comparison (\$)

Category	Price (\$)
Current	1.18
Consensus	2.52
Model	2.53
w/Stranding	2.31

*Prices in USD

Effects of Stranding vs. Business as Usual

Year	Δ Gold Production (%)	Δ FCF Margin (%)	Δ Capex/Sales (%)
2015	26%	0%	-4%
2016	19%	0%	-2%
2017	17%	0%	-1%
2018	23%	0%	0%
2019	5%	0%	0%
2020	2%	0%	0%
2021	2%	0%	0%

Include shadow price of water

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Set a scenario to test potential water stranding:

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Moderate

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Capex - Year Incurred	2015	

Currency	USD	
WACC	4.71%	
Growth Rate	2.09%	
Water Intensity (m3/oz) Au	16.09	
Water Intensity (m3/short ton) Cu	120.45	
Valuation Model	DCF	
Include TEV Data?	Y	

Model Outputs - Stock Price Comparison (\$)

Scenario	Price (\$)
Current	1.16
Consensus	2.52
Model	2.52
w/Stranding	2.21

*Prices in USD

Effects of Stranding vs. Business as Usual

Year	Δ Gold Production (%)	Δ FCF Margin (%)	Δ Capex/Sales (%)
2015	-4%	26%	0%
2016	-5%	19%	0%
2017	-2%	17%	0%
2018	-2%	23%	0%
2019	-2%	5%	0%
2020	-2%	2%	0%
2021	-2%	2%	0%

Customize inputs: Cost of water solutions

Bloomberg
Water Risk Valuation Tool

Select a company:

Argonaut Gold Inc

Set a scenario to test potential water stranding:

1. Impact of water supply gap on production: Moderate

2. Company reaction to water scarcity*: Invest in CAPEX

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2015	-4%	0%	26%
2016	-3%	0%	19%
2017	-2%	0%	17%
2018	-2%	0%	23%
2019	-2%	0%	5%
2020	-2%	0%	2%
2021	-2%	0%	2%

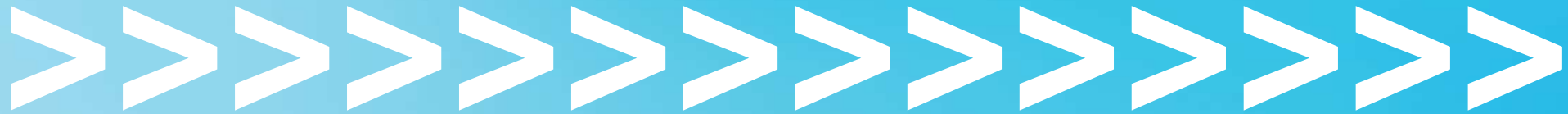
Methodology: key points

“Water risk” = physical availability of water

Assumptions

- Water scarcity does NOT impact the global/realized **metals prices**
- Forecasting
 - Financial metrics in BAU scenario – **broker estimates**
 - Production figures at individual mine sites – **historical growth rates**
 - Future scarcity sets in a **linear** fashion 2010-20

THANK YOU

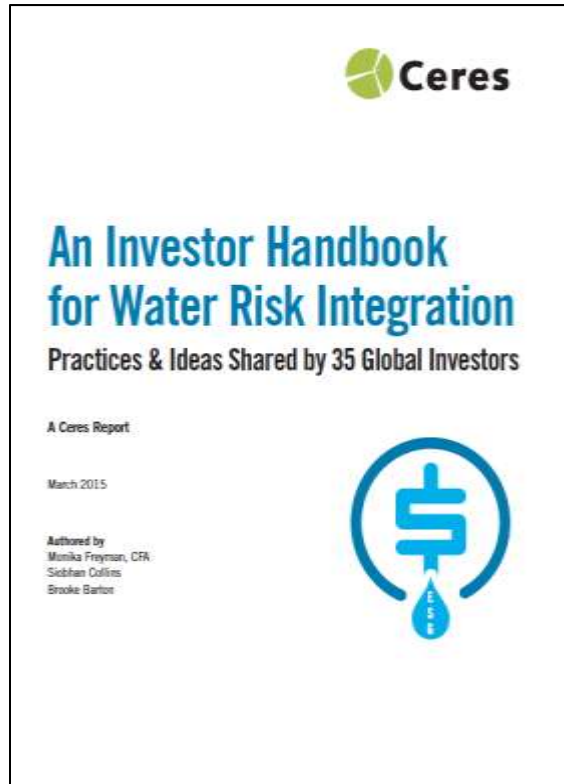


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<http://www.bloomberg.com/bcause/new-tool-integrates-water-risk-considerations-in-equity-valuation-process>

Survey of 36 Global Investment Firms - Water Research Practices



Investors Increasingly “Get” that Water Risks are Real and Growing

- Only half of survey asked 3+ water questions
- 35 of 36 wanted to deepen their water risk analysis practices
- Since survey we now work with ~80 investment firms that want to become more water aware
- Three challenges were almost always universally mentioned: Lack of decision-useful data and.....

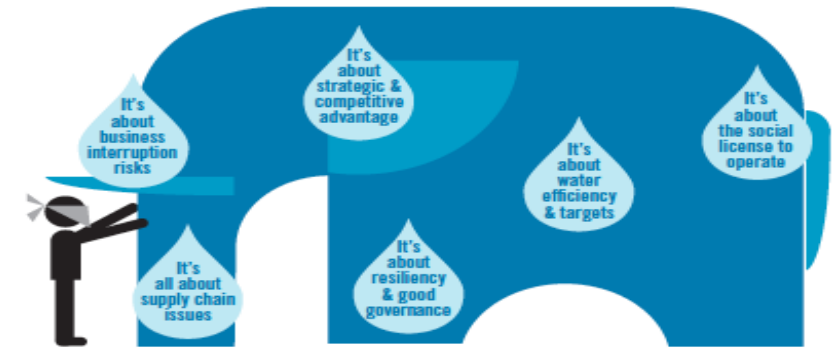


BBC News Oct. 2014



Challenge 2 and 3 Lack of Framework and Mandate

As fund managers we are not getting strong market signals to integrate water. Global water scarcity must first be a priority with the gatekeepers of Requests for Proposals [the asset owners]. Exacerbating the problem is that consultants are disengaged on ESG and water. We are ready, but the market is not functioning.”



“GE recently released new water targets and our analysts are now struggling with how to interpret these targets. They are frustrated by a lack of context. Are GE's targets the right ones? Are they ambitious enough, should they be reaching higher?”

“Investor environmental and water risk analysis is too often driven by issues in the media. A better approach would be to systematically assess industry and corporate risks and impacts on water resources.”

Opportunity: Framework = Investor Water Toolkit

Investor Water Hub:

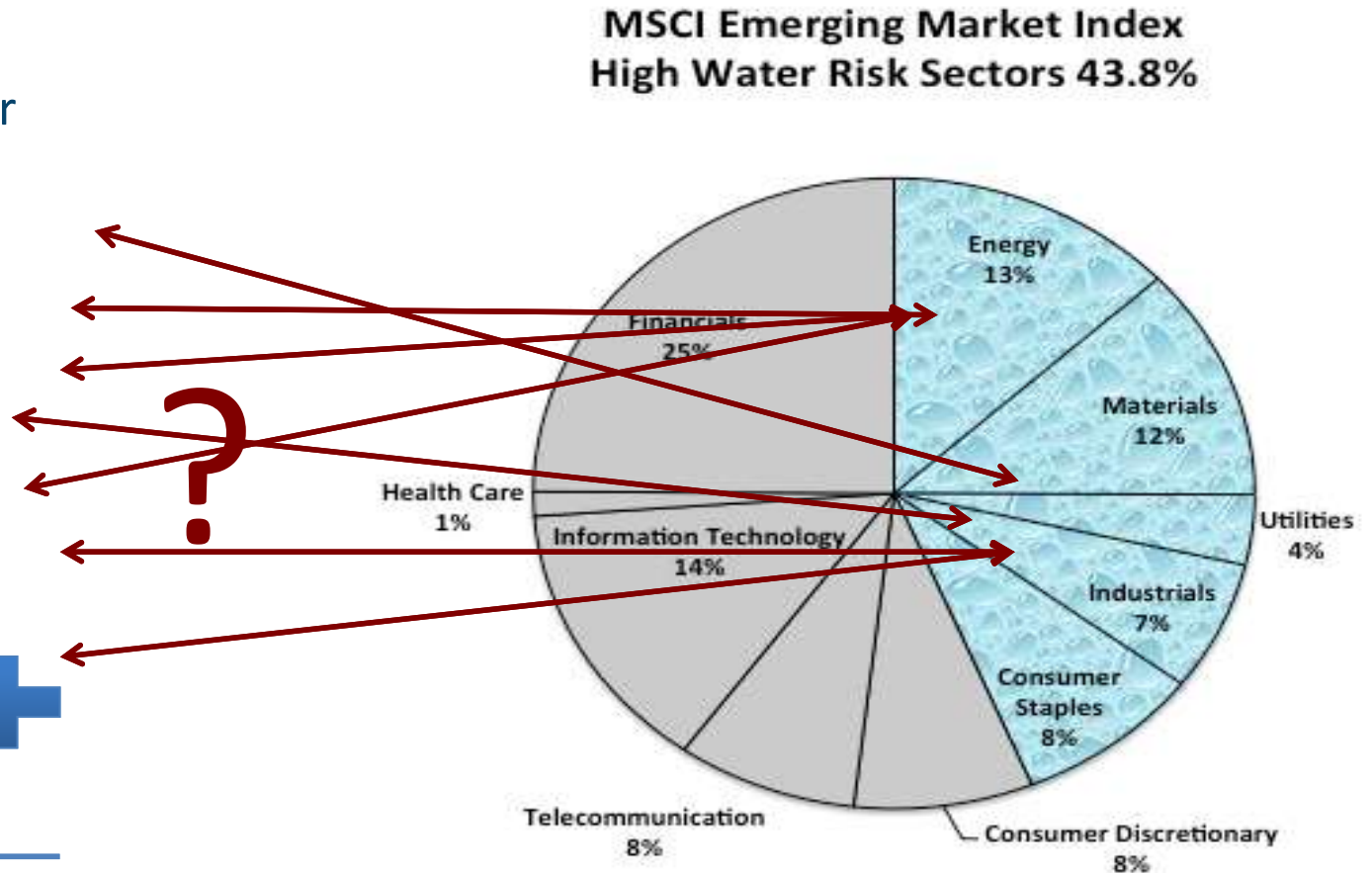
~50+ active members Investor Institutions
working on creating an Investor Water Toolkit:

- 1) Step by step guide on water risk analysis
- 2) Ultimately ask better questions
- 3) Catalyze water and market stakeholders to provide more decision-making support
- 4) Starting point for water community and others to fill needs mapped



Lack of Mandate due in part to Lack of Evidence and Guidance

- Population growth and competition for water
- Climate variability
- Degradation of water quality
- Under-investment in water infrastructure
- Loss of social license to operate
- Workers lack water and sanitation
- Poor water stewardship by regulators



*Are these risks material relative to all other risks?
And if so...Which risks?*

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= Opportunity

Three Opportunities for Water Community

I) HELP BUILD MANDATE: MAP INDUSTRY AND GEOGRAPHIC WATER RISKS AND IMPACTS

- IPCC Type Report on Water – Impacts and Risks to water resources from major industries and critical regions in typical investment universe
- Empirical studies linking financial performance to water risks

II) HELP EVOLVE DATASETS

- Use and test data currently being collected
- Data to match company disclosure – place based physical and regulatory stewardship water risks

III) ASSIST STANDARD SETTING AND REGULATORY DECISION-MAKERS

- Growing Green Bond Market
- Mandatory Reporting - Stock Exchanges & Financial Regulators

Concluding remarks



Systemic change lies ahead

▼ Reporting on climate and water risk is becoming standard and mandatory practice for investors and in turn for the businesses in which they invest:

- UN PRI Reporting Framework
- EU NFR Directive; SEC; Stock Exchange listing requirements
- Article 173 in France
- Task Force on Climate-Related Financial Disclosure

Bridging the data gap

▼ We are pursuing a range of options:

- Improve the disclosure experience for companies
- Promote and support investor engagement to increase response rate from listed equities
- Scrape water data from some CSR reports
- Model asset level water stress exposure for key sectors – O&G, Electric Utilities and Coal
- Improve the dissemination of data back to data users
- Refine the questionnaire and develop sector specific metrics to meet evolving data needs
- Actively advocate for meaningful, mandatory water-related non-financial reporting

Coming to a cinema near you!

- ▼ We're facing a new norm - A stable supply of good quality water is no longer guaranteed in many regions.
- ▼ The pressure is growing on the financial community to demonstrate the actions they are taking to adapt to this new norm.
- ▼ The case for corporate water disclosure has never been more clear and compelling.

Thank you

Lamb, Global Director of Programs, CDP
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