Water data in investment analysis

Impax Asset Management

August 2015

FOR PROFESSIONAL CLIENTS ONLY

Agenda

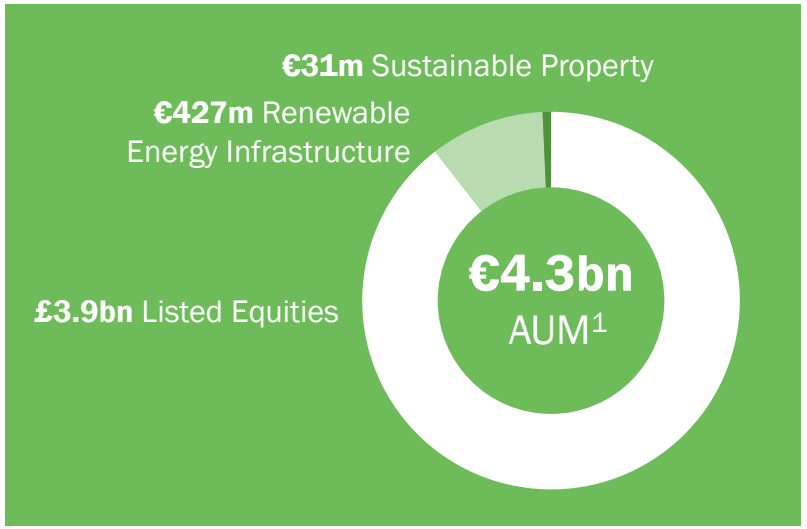
- Impax overview
- Introduction to water risks and analysis
- Fundamental water data
- Sector specific water data
- Geographic and facility specific water data
- Best practice water risk management
- Water data disclosures and engagement
- Conclusions

Impax Asset Management

KEY MESSAGES

- Award winning specialist investment manager since 1998
- Successfully investing in companies active in Resource Efficiency and Environmental Markets
- Recognised thought leaders
- Strong institutional relationships
- Offices in London, Hong Kong, New York, and Portland OR
- Experienced, multidisciplinary investment team with 27 members

ASSETS UNDER MANAGEMENT



THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2014

[1]As of 30 June 2015.

Resource efficiency and environmental markets:

Diverse listed equity opportunities (FTSE classification)

Energy

Energy Efficiency

- Power Network
- Industrials
- Buildings
- Transport
- Consumer

Alternative Energy

- Developers & IPPs
- Solar
- Wind
- Biofuels
- Other

Water

Water Infrastructure & Technologies

- Infrastructure
- Treatment
- Utilities

Pollution Control

- Pollution Control Solutions
- Testing & Gas Sensing
- Public transportation

Food, Agriculture & Forestry

- Sustainable & Efficient Agriculture
- Logistics, Food Safety & Packaging
- Sustainable Forestry & Plantations

Waste/Resource Recovery

Waste Management & Technologies

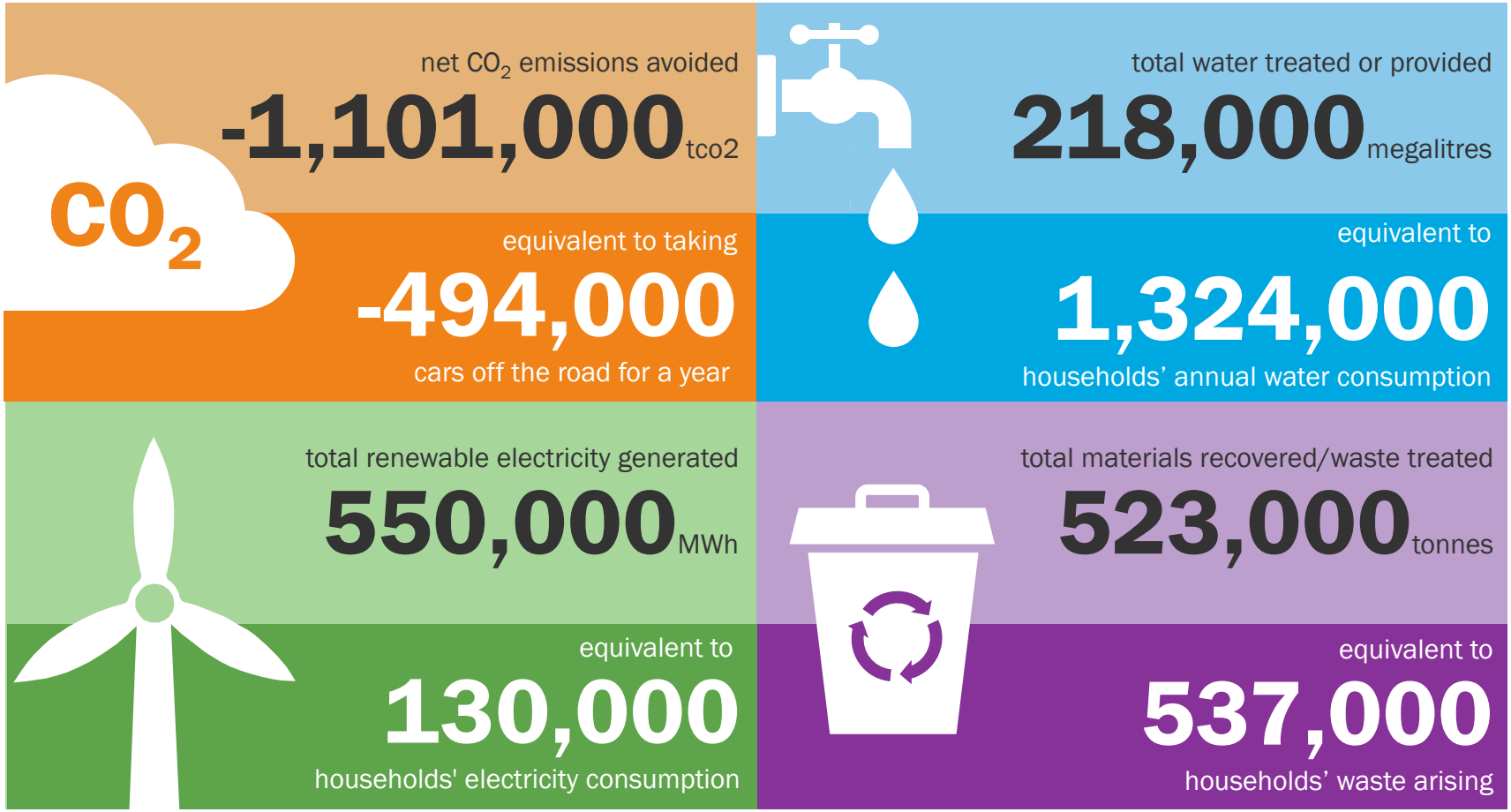
- Tech Equipment
- Recycling & Processing
- Hazardous
- General

Environmental Support Services

- Consultancies
- Carbon & Asset Trading
- Diversified Environmental

Some sub-sectors have an additional 'diversified' category not shown above for the sake of clarity.

Measuring positive environmental impact



The UK Green Investment Bank's calculator was used to translate the impact into everyday equivalents (e.g. cars on the road, household energy use).
Based on most recently reported annual impact data for holdings in the portfolio as of 31/12/2014

Introduction to water risks and analysis

The major resource challenge of our times

- In 16 years the planet may meet only **60% of the global demand** for water[1]
- 1bn people **lack access** to clean water, 2.5bn to sanitation[2]
- Asia: 60% of global population but only 36% of freshwater resources[3]
- Global water infrastructure spending need **2005-2030: $22.6trn[4]**
- 56% of the world's irrigated crop production takes place in regions with **"high" or "extremely high" water stress[5]**
- 52%[6] of the world's population live in water-stressed areas worldwide
- Climate change predicted to lead to **further extreme weather events**
- Water is scarce – and too cheap!

Source: [1]CDP,"Global Water Report 2014", [2]United Nations Development Programme (UNDP), [3]United Nations Environment Programme (UNEP), [4]The Organisation for Economic Co-operation and Development (OECD) studies "Water and Cities – Ensuring Sustainable Futures", [5]Ceres "Feeding Ourselves Thirsty: How the Food Sector is Managing Global Water Risks, [6]Blue & Green tomorrow "52% of global population to live in 'water-stressed areas' by 2050"

Analysing water risks: the key risk drivers

1. FIVE KEY WATER RISK DRIVERS

2. BUSINESS IMPACTS

Rationing & shortages	Abrupt rate hikes for water & wastewater treatment	Water supply and treatment failures	Reputational damage / loss of social licence to operate	Stricter regulations	Decrease in business productivity

3. INCOME STATEMENT & BALANCE SHEET IMPACTS

Source: Adapted from Ceres - Feeding ourselves thirsty, How the food sector is managing global water risks, May 2015

Analysing water risks: investor approach

Fundamental water data

Analysing water risks: the fundamental data

Water volumes, direct & indirect (m^3)

- Water withdrawals (total and by source)
- Water consumption / use
- Wastewater discharge (total and destination)

Water Intensity/Exposure/Footprint

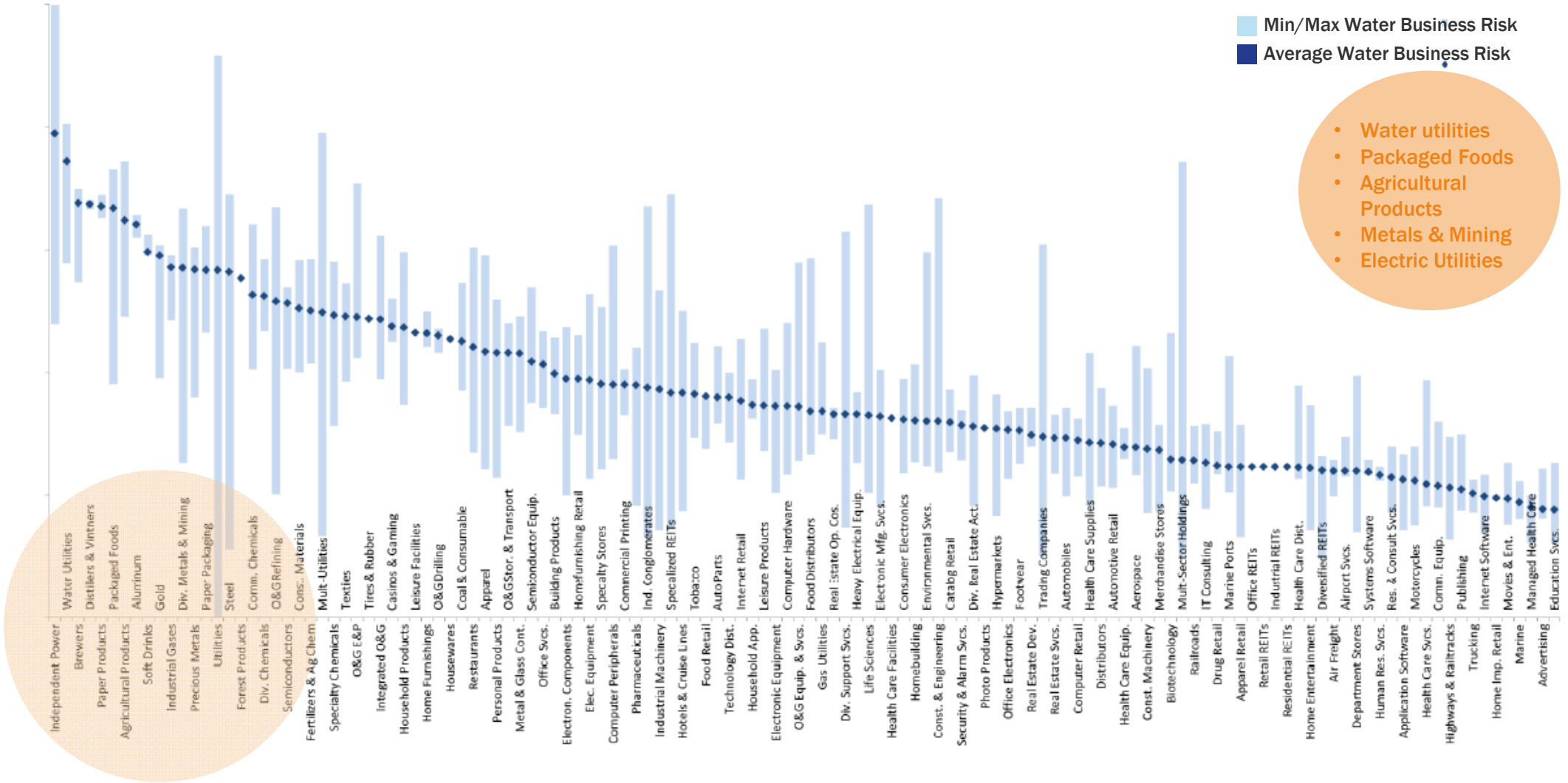
- Water withdrawals / $ sales
- Water withdrawals / units produced

Water Risk Management

- Water policies and processes
- Water recycling (total and % of volume)
- Water reduction targets

Sector specific water data

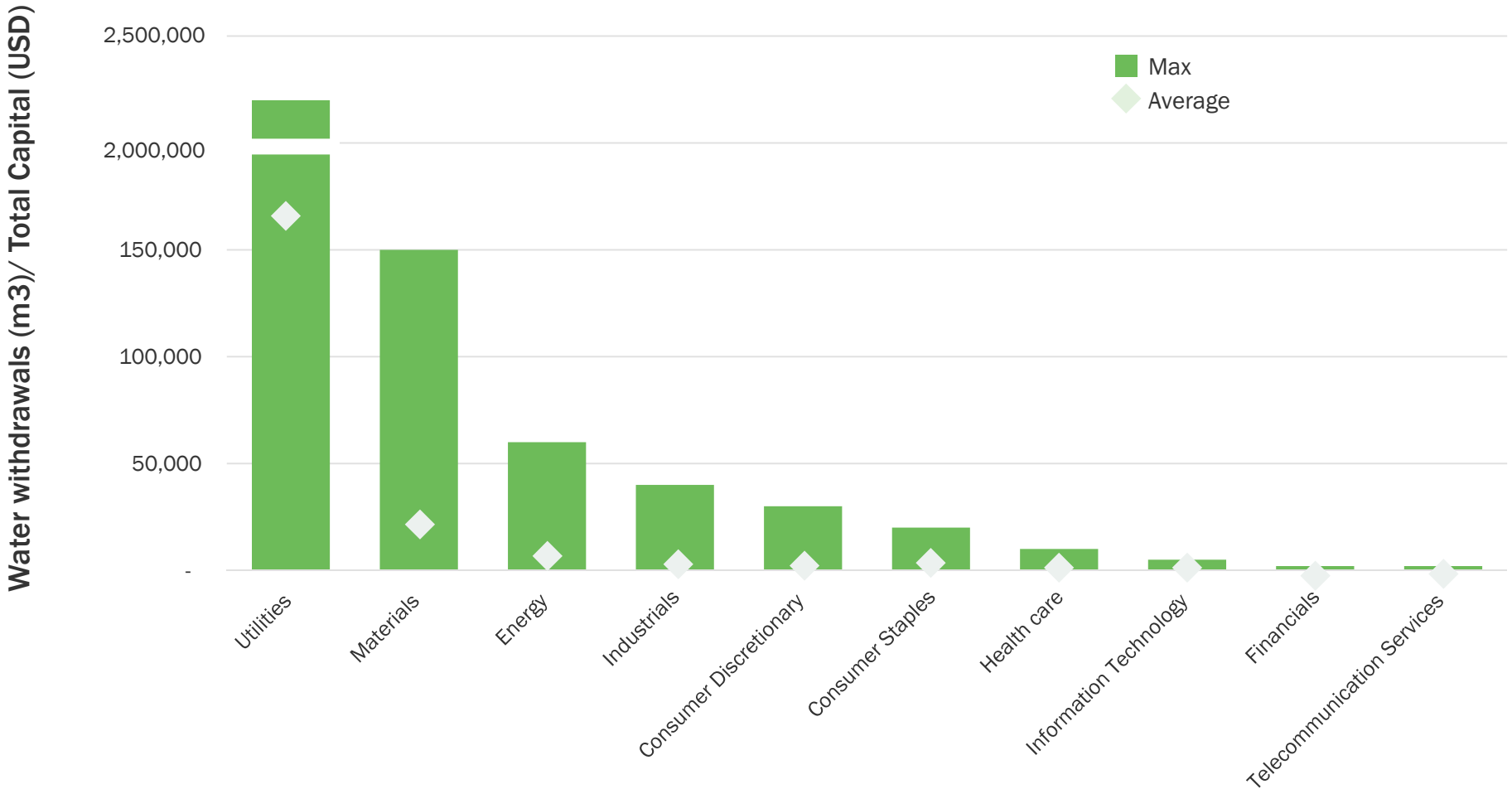
Exposures across sectors “water footprinting” & materiality



Source: MSCI ESG Manager: Water Upstream and Downstream Impacts from a Well Running Dry, Sept 2013

Analysing water risks: high-exposure sectors

Electric Utilities, Water Utilities, Metals & Mining, Food & Agriculture



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Analysing water risks: high-exposure sectors

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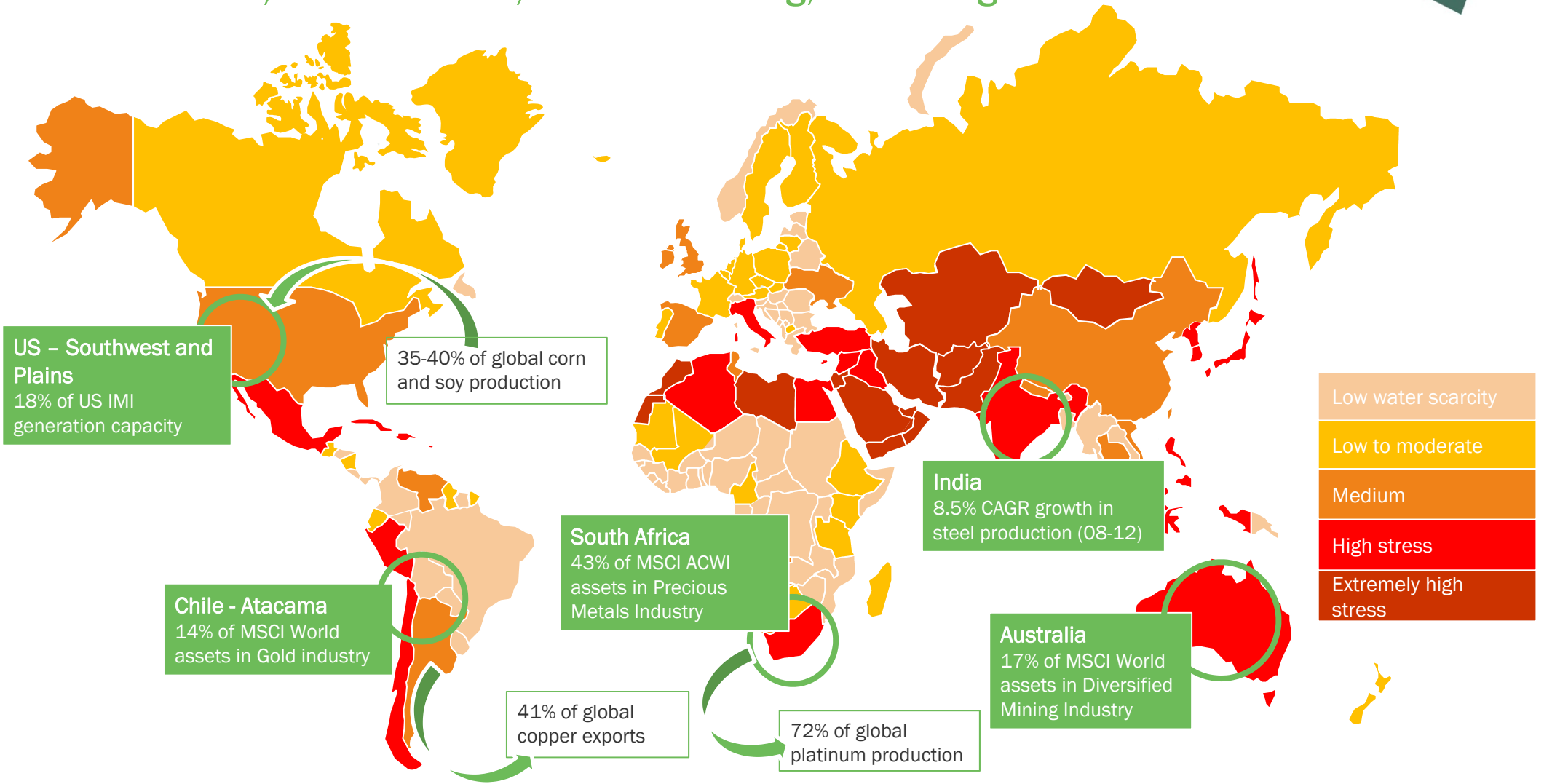


Source: Aqueduct Country and River Basin Rankings, Dec 2013. MSCI ESG Manager: Water Upstream and Downstream Impacts from a Well Running Dry, Sept 2013

Analysing water risks: sector specific water metrics

Electric Utilities, Water Utilities, Metals & Mining, Food & Agriculture

Sector specific water considerations

- Plant shutdown risks, if inadequate water
- Cooling and treatment needs
- Coal, Hydro, Nuclear water intense
- Competing users: agriculture
- Stranded asset risk: $21bn (US)

Sector/facility critical metrics

- Water stress[1]
- Water withdrawal / MWh

Technology changes/opportunities

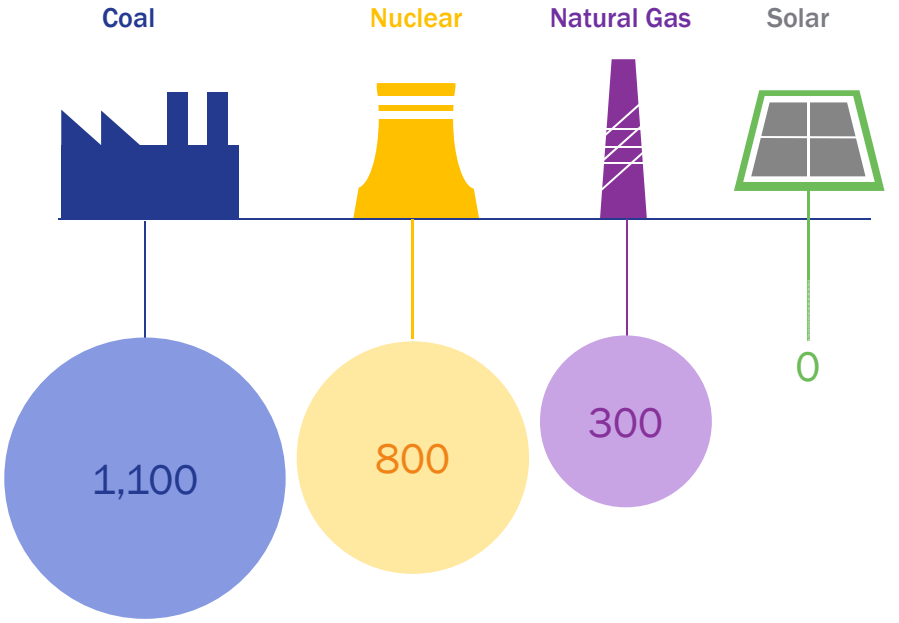
- Cooling technologies (wet, dry, hybrid)
- Closed loop-water systems

Regulatory issues

- Fines, discharge breaches (water temperature)
- Effluent, standards

>50% OF CHINA'S COAL PLANTS ARE SITUATED IN AREAS OF EXTREME WATER STRESS[2]

Water used by power plants (gallons/MWh)[3]



Source: [1]Water stress is the ratio of total water withdrawals to available renewable supply in an area. In high-risk areas, 40 percent or more of the available supply is withdrawn every year. In extremely high-risk areas, that number goes up to 80 percent or higher. A higher percentage means more water users are competing for limited supplies. WRI, Aqueduct, August 2013. [2]World Resources Institute, [3]Climate Reality Project

Analysing water risks: sector specific water metrics

Electric Utilities, Water Utilities, Metals & Mining, Food & Agriculture

Sector specific water considerations
- Major water withdrawals and use
- Highly regulated, policy risk
- Treatment critical for human health
- Competing users: agriculture, hydro

Sector/facility critical metrics
- Water withdrawals and reliability
- Non-return water, leakage %

Technology changes/opportunities
- Water metering
- Desalination
- Medical traces in water (testing)

Regulatory issues
- Water pricing / trading
- Rate cases for capex
- Fines for excessive water leakage (UK)

30%[1] OF TREATED DRINKING WATER IN THE UK IS LOST DUE TO LEAKAGE

Source: [1]World Water, "Water Leakage? Look at the Clouds"

Analysing water risks: sector specific water metrics

Electric Utilities, Water Utilities, Metals & Mining, Food & Agriculture

Sector specific water considerations

- Ore processing and washing
- Relatively few locations, few alternatives
- Major water withdrawals and discharge
- Risk of revoked social licence to operate
- Significant stranded asset risks

Sector/facility critical metrics

- Water stress
- Water recycling %

Technology changes/opportunities

- Desalination
- Chemical treatment for water reuse

Regulatory issues

- Contamination, spill fines
- Effluent, standards (heavy metals)

2/3 OF GLOBAL MINING OPERATIONS ARE IN WATER STRESSED REGIONS[1]

Source: [1]CDP, "Metals and Mining: a sector under water pressure"

Analysing water risks: sector specific water metrics

Electric Utilities, Water Utilities, Metals & Mining, Food & Agriculture

Sector specific water considerations

- Large indirect, supply chain water footprint
- Commodity, raw material risks
- High reputational risks, “B2C”
- Competing users: power generation (USA)

Sector/facility critical metrics

- Water stress, raw material specific
- Indirect water use (supply chain)
- Use of groundwater (beverages)

Technology changes/opportunities

- Efficient irrigation; centre pivot, drip irrigation
- Precision farming, sensors, GPS technology

Regulatory issues

- Water rights and pricing
- Pollution from excess nutrients, pesticides

AGRICULTURE USES C.70% OF ALL ACCESSIBLE FRESHWATER[1]

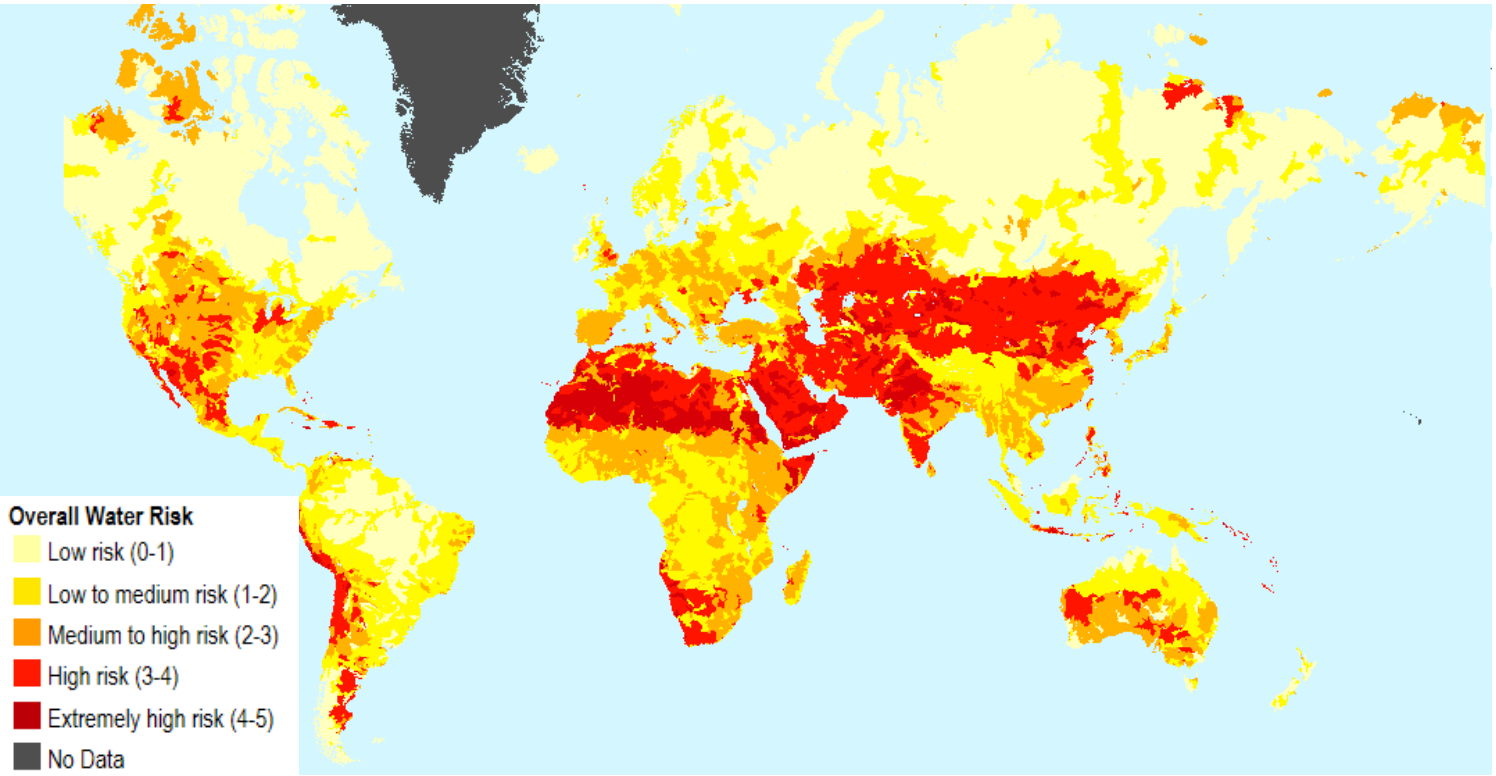
Source: [1]JL IFAD – Investing in rural people, “Water facts and figures”

Geographic and facility specific data

Analysing water risks: geographic and facility specific data

Water is local – requires local or river basin-level water stress analysis

- World Resource Institute (WRI)
- AQUEDUCT Water Risk Atlas
- Interactive tool to analyse physical, seasonal, current and future water risks
- Detailed facility-based data for mining on Bloomberg



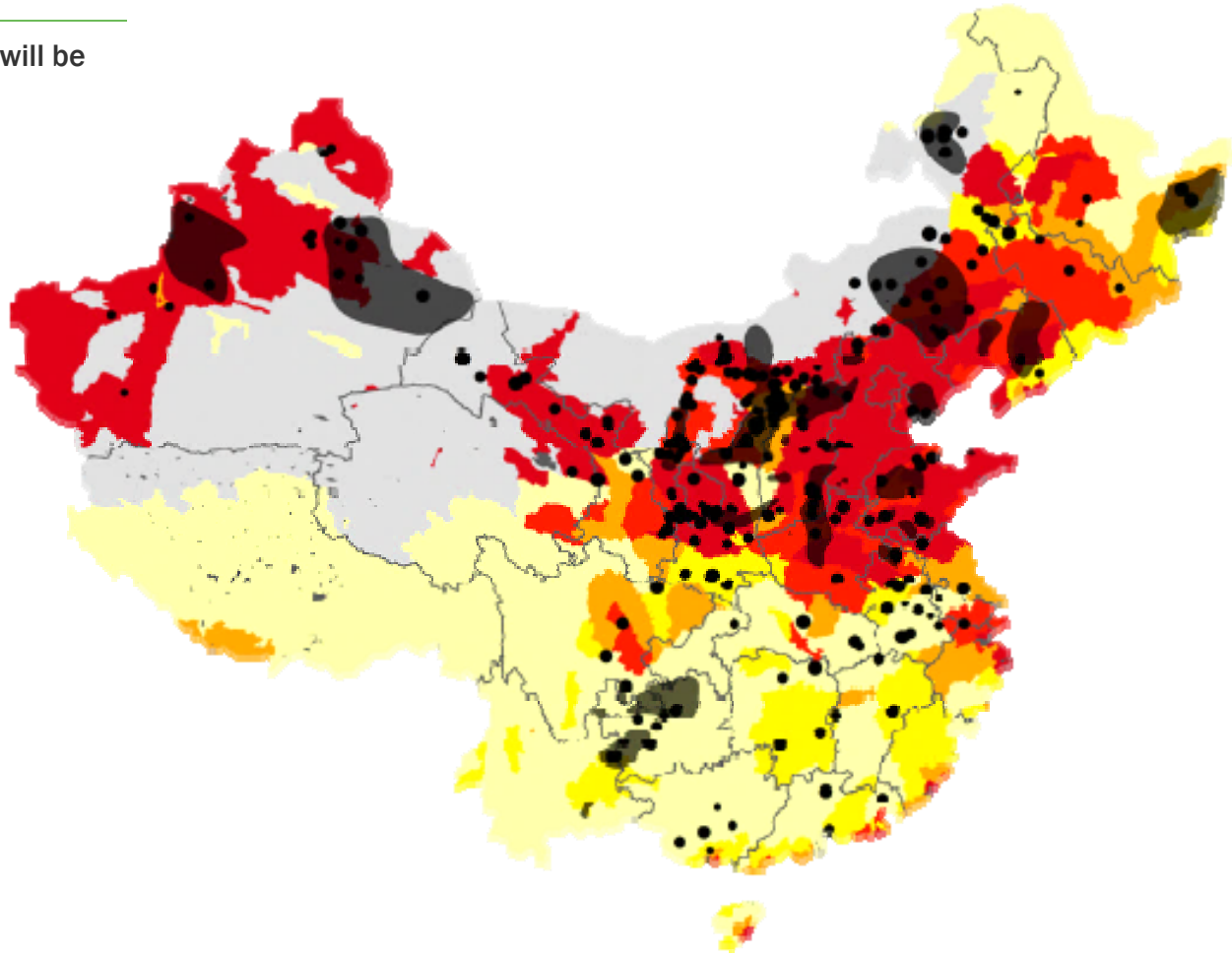
Source: World Resources Institute

Analysing water risks: geographic and facility specific data

Water is local - Overlaying facility data with water scarcity maps

China: Coal plants and water stress[1]

More than 50%[1] of China's coal capacity will be in areas of high or severe water stress

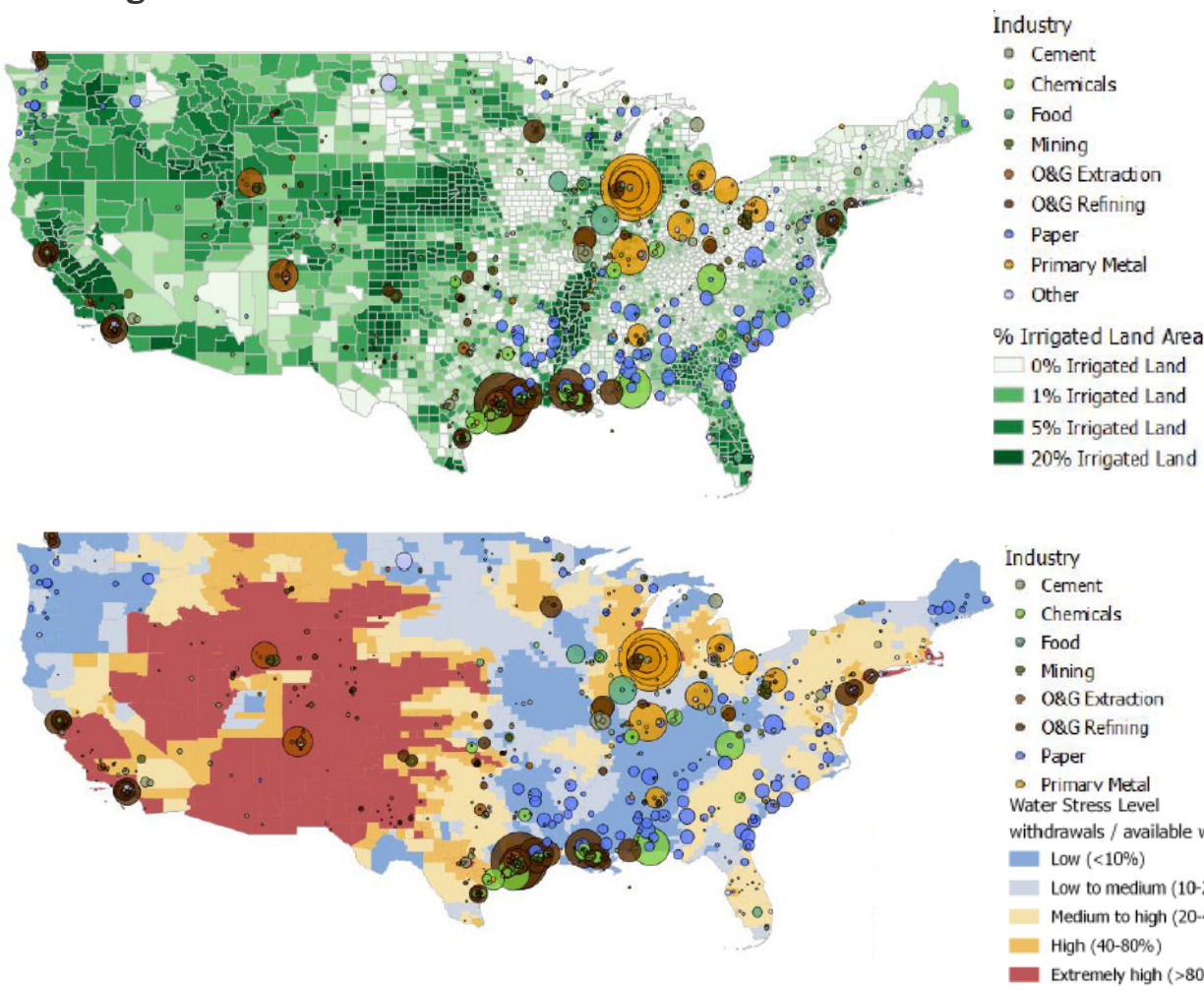


Source: [1]World Resources Institute

Analysing water risks: geographic and facility specific data

Water is local - Overlaying facility data and water scarcity maps

USA: Agro-industrial water conflict



18% of US power generation capacity in the Southwest and Plains where 35-40% of global corn and soy are produced[1]

Source: [1]MSCI ESG Issue Report: Water Corn or Current? The Agro-Industrial Water Conflict, Sept 2014

Best practice water risk management

Best practice for corporate water risk management

In addition to the fundamental, sector and geographic water data, best practice for water risk management is:

- Water part of corporate long-term strategy, board oversight, with local/regional detail
- Management compensation tied to water reduction targets and performance
- Use of “shadow” or internal water pricing by companies to assess present or potential economic water risks accurately
- Product-level life cycle water assessments (LCA)
- Water reduction targets that are differentiated by region, facility or commodity
- Externally verified supply chain audits regarding water performance

Water data disclosures and engagement

Water Risk Management: disclosures and performance

General trends

- Water disclosures trail carbon disclosures (despite being much easier to measure)
- Water risk oversight in supply chains still in its infancy (although 60% of water use is indirect)

Water disclosures illustrated (high water exposure sectors)

- 23%[1] of companies disclosed water withdrawals
- 22%[1] of companies disclosed water intensity figures
- Metals & mining and steel highest water recycling rates 57% and 74%[2]

Water reduction targets

- Less than 15%[2] of power producer, utility and steel companies commit to reduction targets
- More than 80%[2] of brewers and beverage companies commit to reduction targets

Source: [1]CDP Global Water Report 2014, [2]Corporate Water Strategies, William Sarni

Water Risk Management: investor engagement opportunities

General lack of disclosures – engagement focus on high water use sectors

- Utilities (water & energy)
- Metals & mining
- Steel
- Food & Agriculture

Focus areas of water engagement

- Overall water risk exposures and footprint disclosed (measurement, “VaR”)
- Water reduction targets (management and performance)
- Regional / local water risk exposures

Investor engagement opportunities

- General water disclosures – CDP Water Program
- UN PRI “Water Risks in Agricultural Supply Chains” working group

Conclusions

Conclusions

- Water is highly critical for a relatively limited number of sectors; utilities, materials, food & agriculture
- Water becoming a critical issue in many high-growth emerging regions and “BRICs”
- Water stress can lead to major losses or stranded assets up to $260bn[1] for gold, steel, power
- Water analysis is important in the investment process, but multi-faceted and varies significantly across sectors
- Water vs carbon? A public “good” vs a public “bad”, both mispriced, “market failure”, regulatory response
- Significant overlap with high water and high carbon sectors
- Significant water investment opportunities within the critical sectors

Source: [1]FT “Global markets plunge after China sell-off”

Important information

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