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Overview of the energy – water – food nexus

International Conference on Fresh Water Governance for Sustainable Development

Drakensberg, South Africa

November 5th – 7th, 2012

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Water scarcity risk

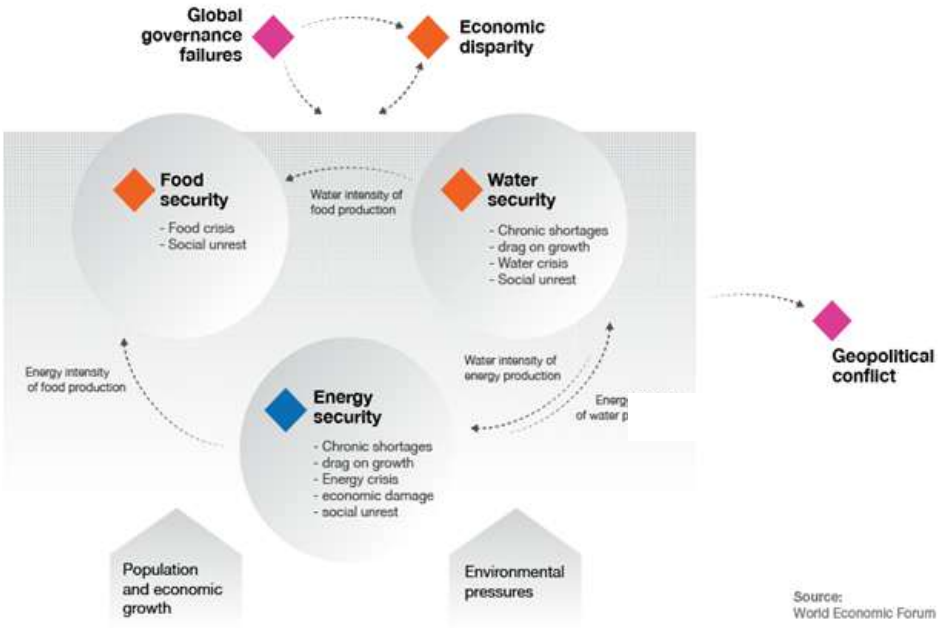
No water, no energy, no food

"Drought reduces water available for energy production, temporarily shuts down plants" eenews, 9/11/12

"Drought may cost $20 billion in crop insurance" CNN Money, 8/3/12

"Severe Drought Seen as Driving Cost of Food Up" Associated Press, 7/25/12

Energy, water and food nexus

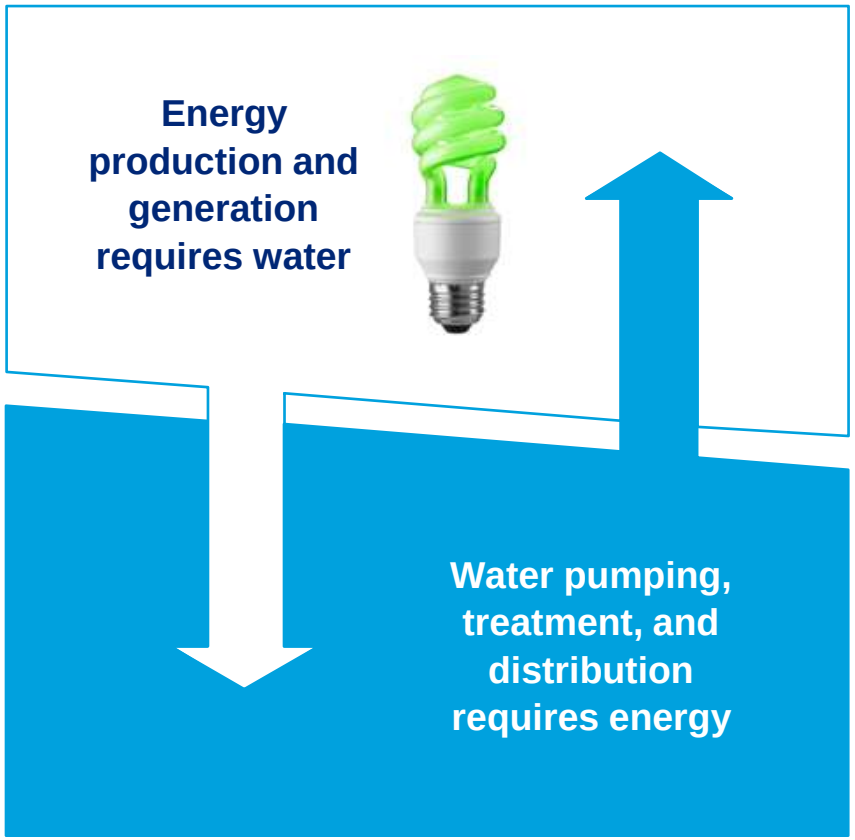


Food - The agriculture sector will need to increase production by 70 to 100 percent to meet demand in the next 20 years.

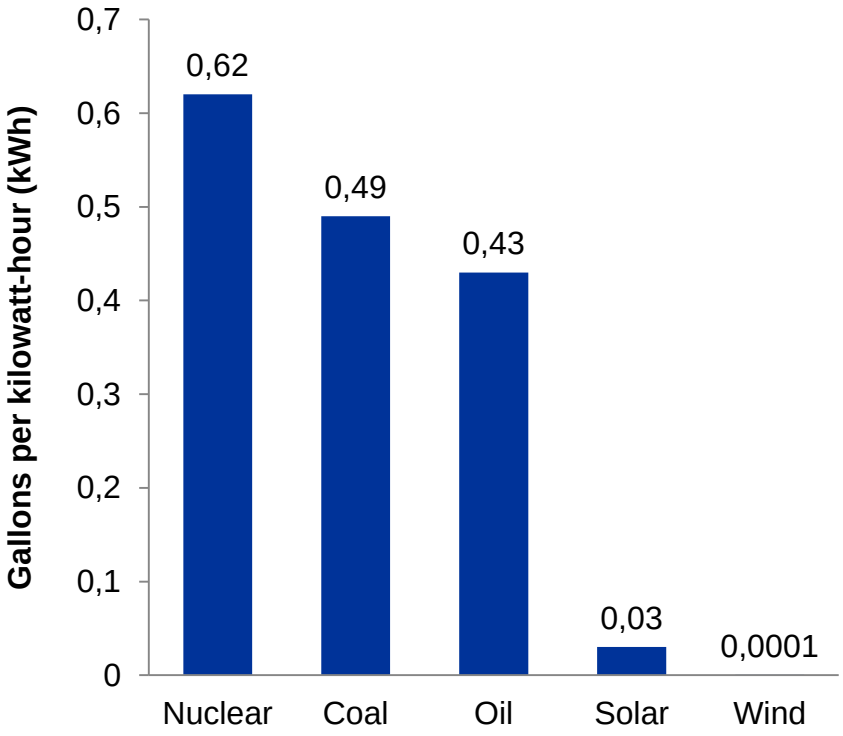
Energy – There is a projected 40 percent increase in energy demand by 2030. in the US energy sector. This projected increase equals an increase in freshwater needs of 165 %.

Water needs for power electricity

The Energy and Water Nexus



Water Requirements for Electricity Generation

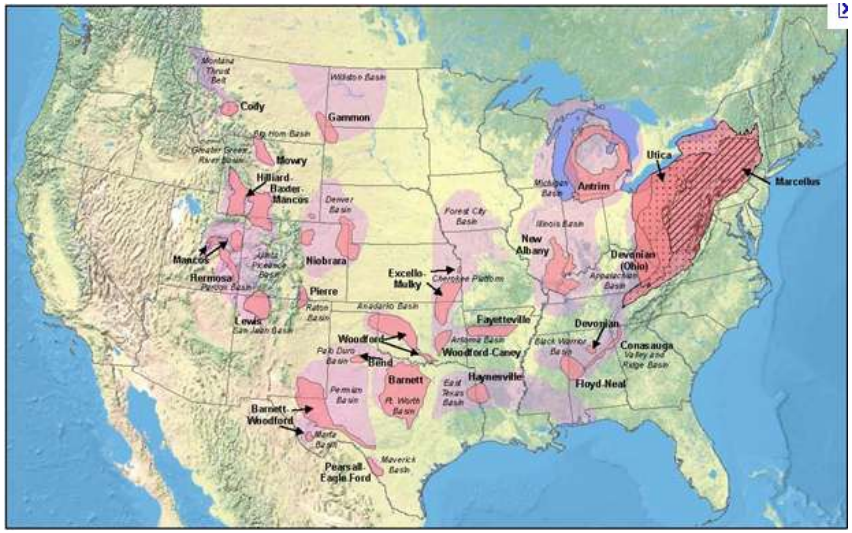


Source: Paul Gipe, "Wind Energy Comes of Age"
http://www.eeweek.org/water_and_energy_wise/connection .

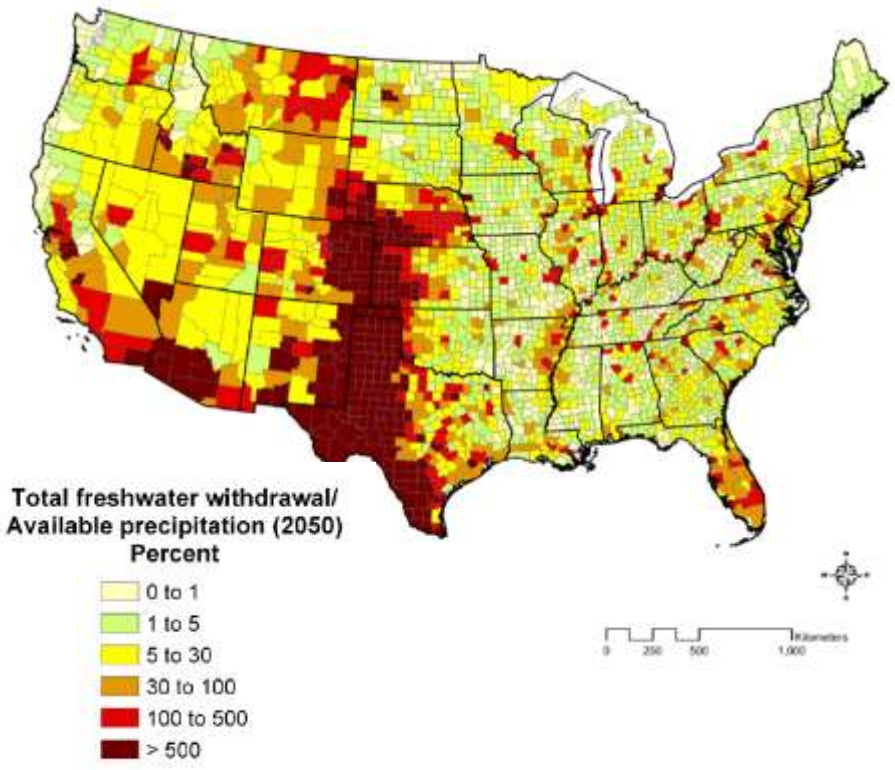
Energy and water consumption are inextricably linked.

US water scarcity and shale gas

Shale Gas



Gap between existing supply and projected demand in 2050[1]



1 – **"Climate Change, Water, and Risk: Current Water Demands Are Not Sustainable," Natural Resources Defense Council, 2010.**

Insights on water, energy and food – CDP WD

- **The Carbon Disclosure Project (CDP) Water Disclosure was launched in 2010.**
- **The CDP WD represents 470 institutional investors with assets of US$ 50 trillion**

"The companies that succeed will be those that consider water with the strategic importance it deserves and take steps to transform their business now"[3]

- CDP Water Disclosure

"The vast majority of companies and investors remain unaware of both current and future water risks and are therefore failing to protect company value"[4]

- EIRIS Investment Research

"The challenges associated with water scarcity are becoming an emerging risk of strategic importance to businesses and their financial backers around the world"[6]

- UN Environment Programme

"Water may turn out to be the biggest commodity story of the 21st century"[7]

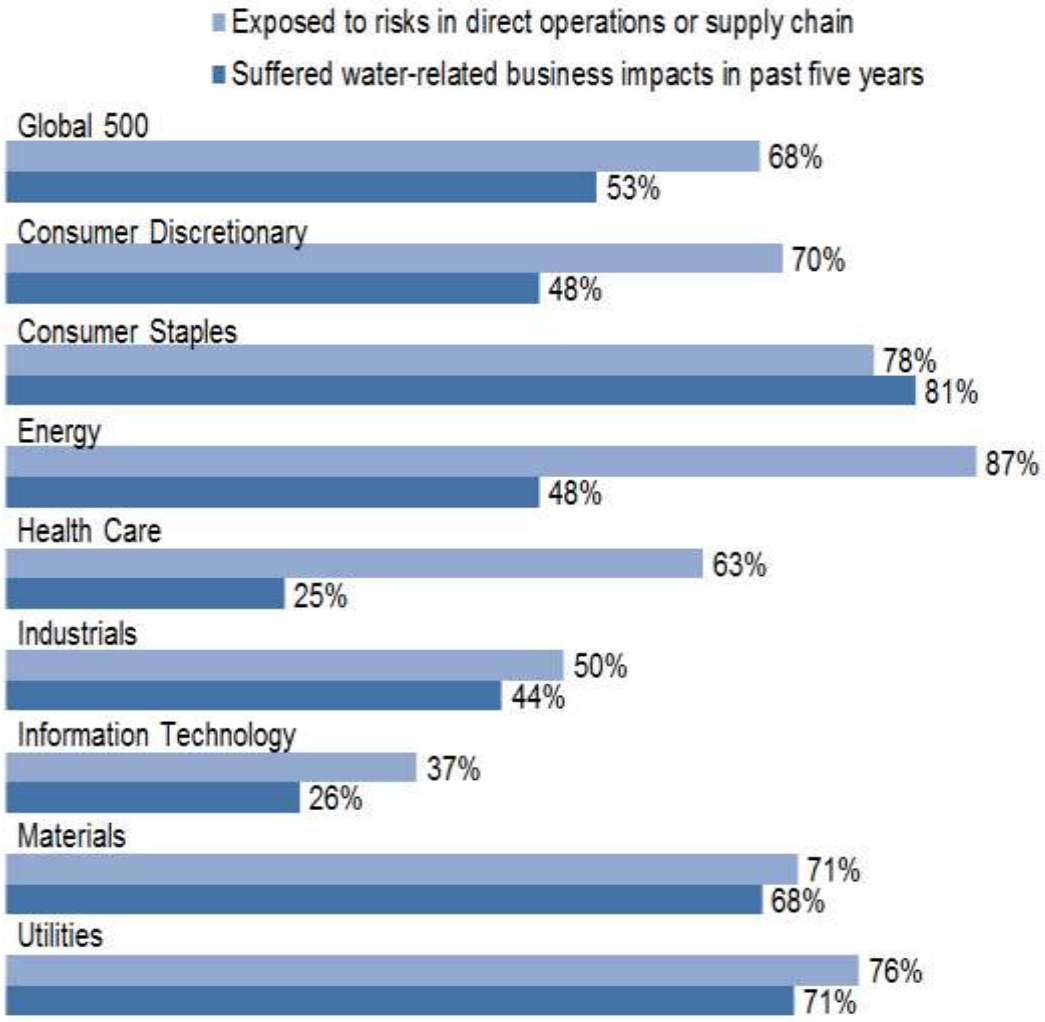
- Morgan Stanley

www.cdproject.net

Global 500 Findings

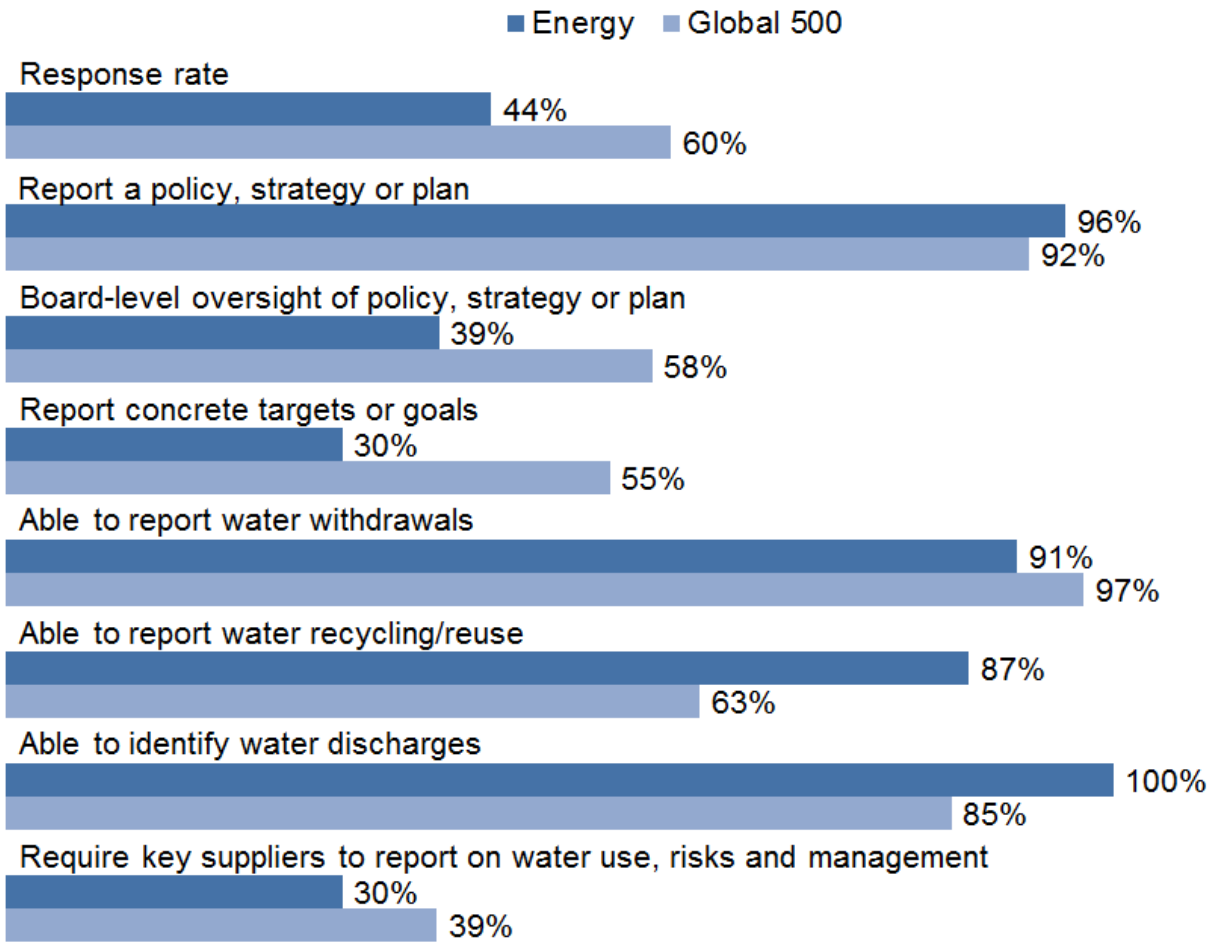
Water risk is a prominent and rising issue among 2012 respondents

- **53%** of respondents have **experienced** water-related detrimental impacts in the past 5 years; up from **38%** in 2011.
  - Financial costs as high as **$US200 million**.
- More respondents **(68%)** report **exposure** to water-related risks, up from **59%** in 2011.



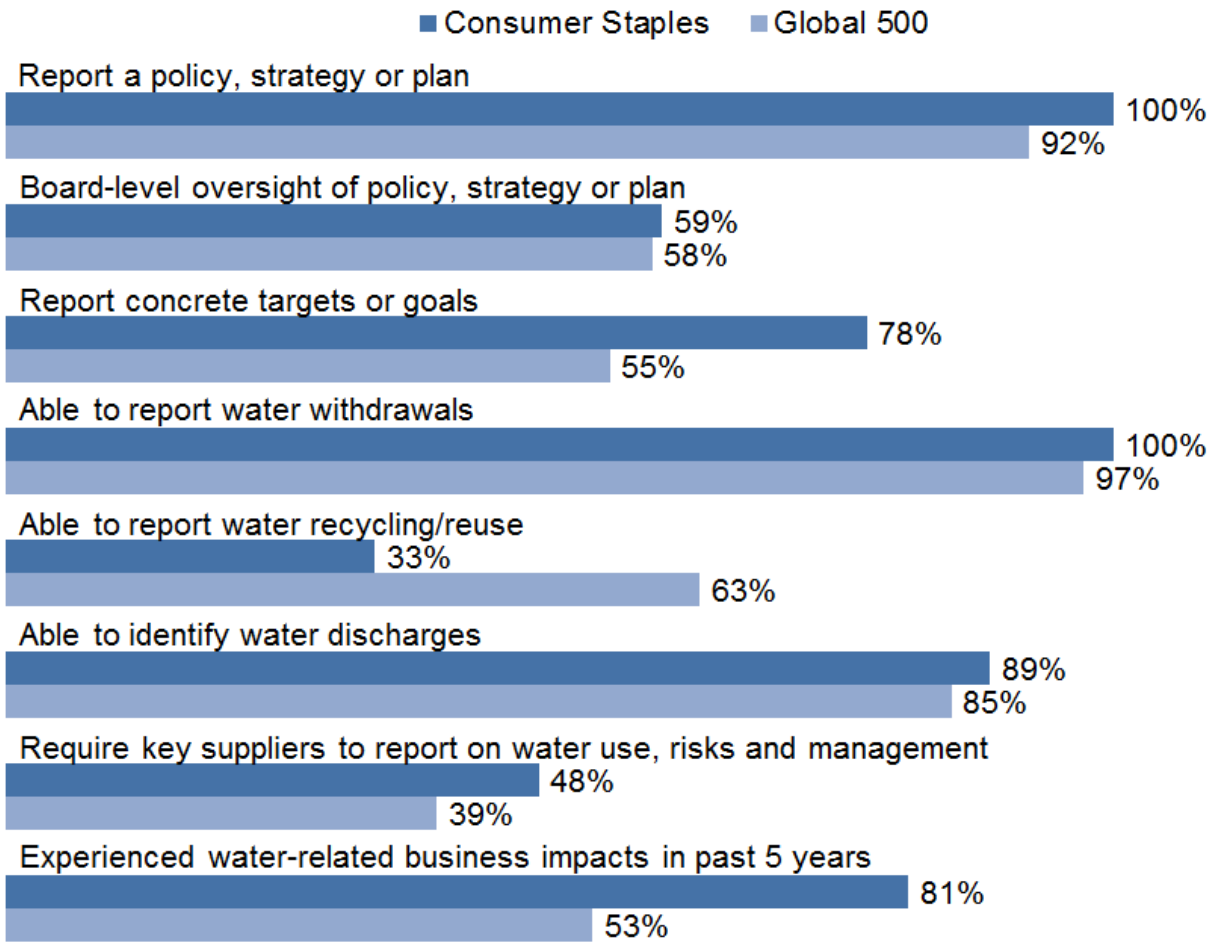
Global 500 - Sector Highlights

Energy sector respondents has the lowest response rate despite high exposure to risk; few respondents report board-level oversight of their water policies and even fewer set concrete targets or goals.



Global 500 - Sector Highlights

Consumer Staples sector respondents experiencing detrimental impacts in the past five years has doubled since 2011 and is significantly higher than the Global 500 average.



Water Stewardship

The dimensions of business risks from water

	Supply Chain	Operations	Product Use
Physical	▪ Temporary non-availability of water disrupts supply chain ▪ Water scarcity drives up input prices (~2%-20%)	▪ Temporary non-availability of water disrupts operations ▪ Increased capital expenditure on water treatment, extraction or alternative technologies raises costs	▪ Non-availability or scarcity of water required for using product or service limits growth
Regulatory	▪ Intensifying competition for scarce water constrains growth ▪ Suspension or withdrawal of supplier's water license or discharge permits disrupts supply chain	▪ Intensifying competition for scarce water constrains growth ▪ Reallocation to more urgent needs during drought disrupts operations ▪ Suspension or withdrawal of supplier's water license or discharge permit disrupts operations	▪ Non-issuance of water license or restrictions on use of particular products or services due to water intensity raises costs or checks growth
Reputational	▪ Competition with household water demand constrains suppliers' growth ▪ Responsibility "by association" for suppliers' water pollution damages brand or reputation, hinders growth	▪ Increased capital expenditure on wastewater treatment to meet or exceed standards ▪ Competition with household demands, or pollution incidents, damages brand or reputation, hinders growth	▪ Public outcry regarding water intensity of product damages brand, reputation, hinders growth

Financial Impact

- Lost revenue from disruption of water supply
- Higher costs from:
  - Supply chain disruption
  - Changes in production processes
  - Capital expenditure to secure, save, recycle, or treat water
  - Regulatory compliance
  - Increasing price of consuming or discharging water
- Delayed or suppressed growth, potentially impacting share price
- Potential higher cost of capital for businesses that rely heavily on fresh water resources

Source: "Watching Water," JP Morgan Chase Global Equity Research, April 2008.

Water management to stewardship

Water Management

Focused on immediate, direct and indirect business costs of scarcity and efficient use of the resource

Water Stewardship

Focused on long-term availability of clean water for stakeholders in impacted watersheds

Internal Operations	Value Chain Business Partners	Watershed Stakeholders
• Consistent, high-quality supply can no longer be assumed given increasing drought and flooding • Managing water as an input must extend beyond the unit cost of water to include business continuity, brand value, and regulatory considerations	• Complex supply chains cross watersheds and contain hidden water-related business risks • Hidden risks in the supply chain magnify exposure to water risk • Effectively managing water-related business risk through the value chain is paving the way for innovation and new business opportunities	• Effective long-term water stewardship occurs on the scale of the local watershed in partnership with local communities and NGOs • Disclosure of water-related efforts allows companies to gain trust, build relationships, and mitigate tensions • Watershed-level stewardship has strategic value for global business

Companies are at different levels of maturity with respect to addressing water scarcity; stewardship is the most inclusive and long-term approach.

Benefits of water stewardship

Business Continuity

- A comprehensive view of corporate water use can have significant financial impact (e.g., reduced potential for supply disruptions, capital costs to secure, process, and discharge water, and compliance issues)
- These benefits can be leveraged in the supply chain and in direct operations

Innovation

- Historically, water management practices have focused on securing water supplies, and managing waste discharges
- Identifying reuse and recycling opportunities can reduce costs and diversify supply, mitigating risk in direct operations

Brand Value

- Sound water stewardship can align corporate and environmental goals
- Avoiding negative consumer perceptions can lead to increased revenues

License to Operate

- Water is a local issue and misuse of water resources can lead to regulatory or consumer conflict
- Considering operational and local community needs can maintain this license in the supply chain and direct operations, and support business continuity and brand value

Risk Mitigated

	Business Continuity	Innovation	Brand Value	License to Operate
Operational	✓	✓		✓
Regulatory		✓	✓	✓
Reputational	✓		✓	✓

Responding to water-related risks can mitigate risk and identify opportunities across a company's value chain

Elements of water stewardship

A step forward in one category improves water stewardship performance.

DISCLOSE
- Disclose water-related information to stakeholders
- Publish water-related analysis in financial reports
- Audit/assure water-related data
- Be transparent in reporting

GOVERN
- Oversee water policy, strategy, or management plan at board level
- Develop concrete water-related goals
- Innovate and invest in water technology
- Manage brand and reputation
- Establish water management accountability through public policy and lobbying efforts

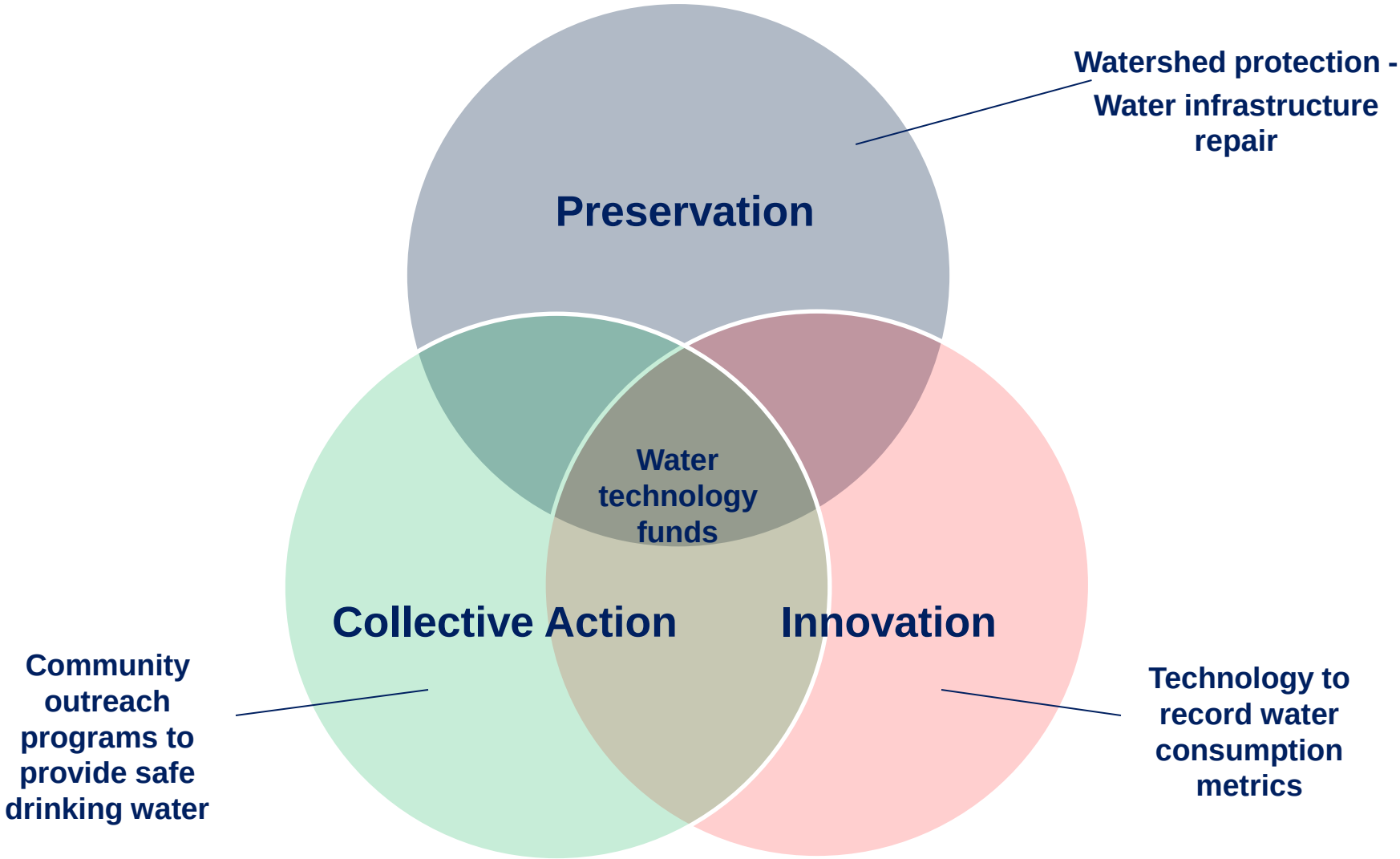
COLLABORATE
- Identify stakeholder concerns (employees, suppliers, local communities, governments and regulators, NGOs, other water users (industry or company-level), customers, investors)
- Engage internal and external stakeholders on water-related issues

FOOTPRINT
- Direct operations: Measure water withdrawals, recycling/reuse, wastewater discharges (quantity and quality)
- Indirect operations: Measure supplier water use and discharges (quantity and quality)
- Measure water footprint of products

ASSESS RISKS & OPPORTUNITIES
- Assess physical/operational, regulatory, and reputational water-related risks (direct and indirect operations)
- Prioritize risks and develop a mitigation plan
- Evaluate and implement water-related opportunities (direct and indirect operations)

[1] A water footprint is defined as the total volume of freshwater used to produce goods and services across both direct and indirect operations. It is a geographically explicit indicator, showing not only water volumes consumed and/or polluted per unit of time, but also locations.

Stewardship – collective action and innovation



Water Risk and Water Stewardship Strategy

Innovation – technology and collective action

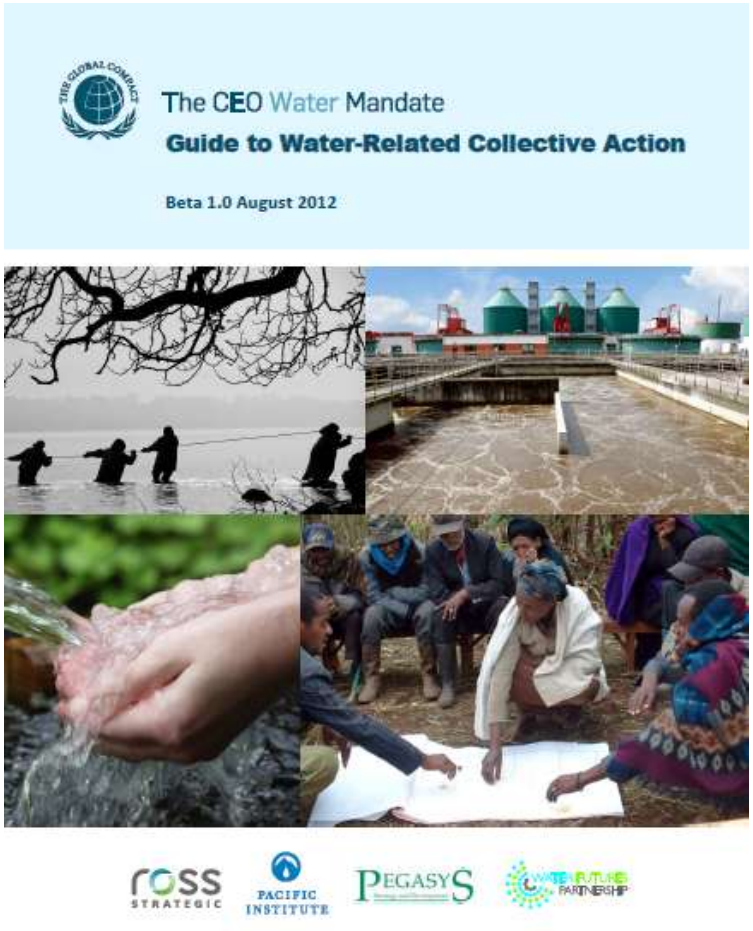
Global 500 Findings – collective action

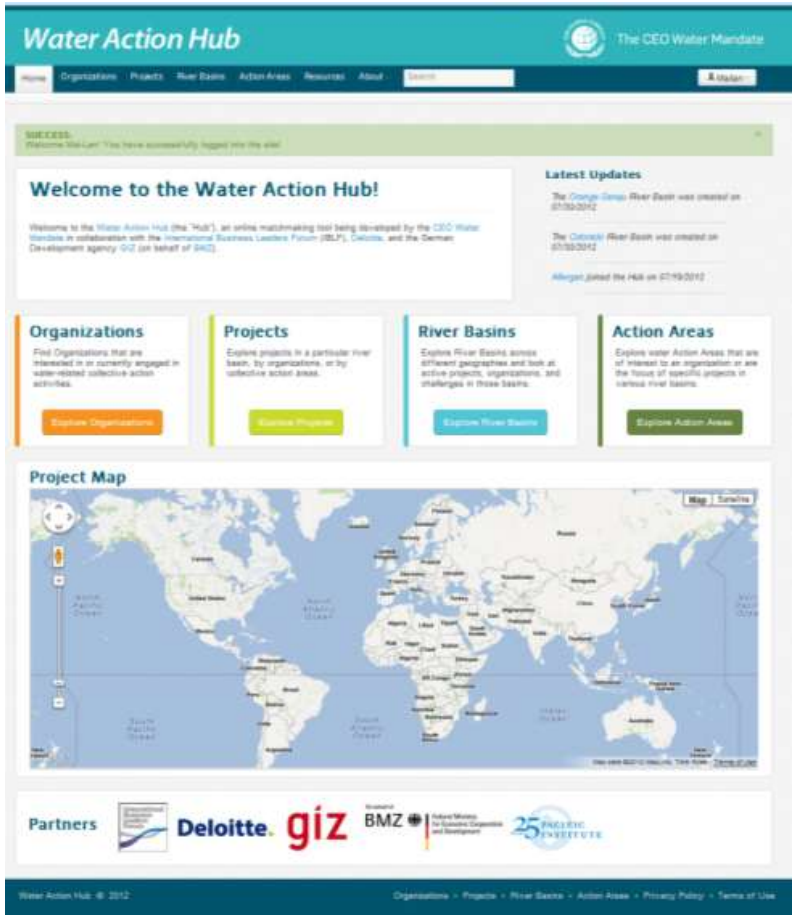
Collective action as an approach to addressing risks and opportunities

- **74%** of respondents report goals and actions related to collective action initiatives.
  - Community engagement **(56%)**
  - Supply chain and watershed management **(43%)**
  - Collective action **(38%)**
  - Public policy **(24%)**
- Benefits: increased business continuity, license to operate and brand value
- Opportunities: gain fresh ideas, increase momentum for change and pool resources

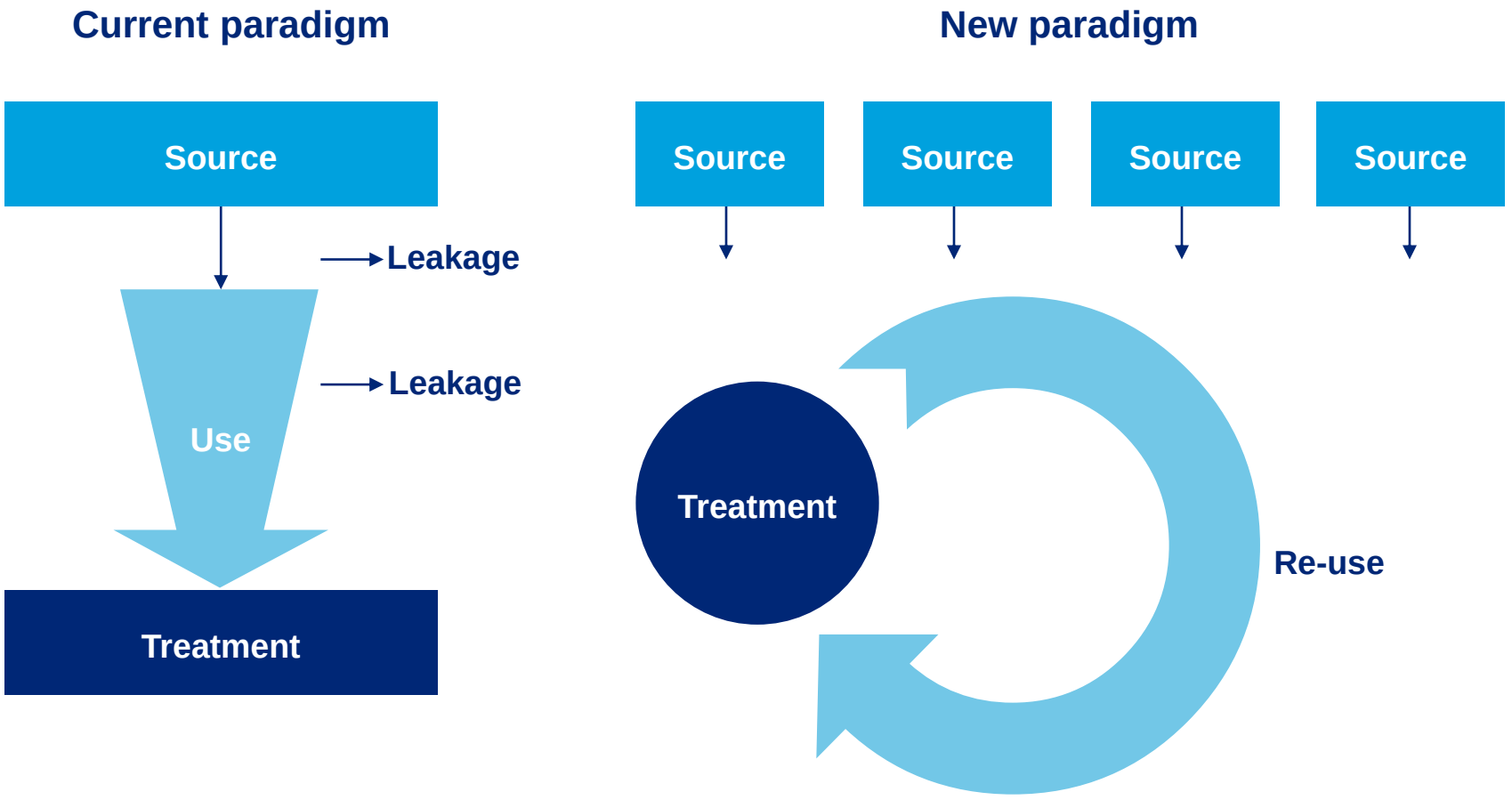
Collective Action Image Courtesy of Mike Auraz, Executive Strategy Director at Undercurrentz

Collective action – Water Action Hub





Paradigm shift driving technology innovation



Adapted from Lux Research Water Intelligence 2008

Managing the energy water nexus

Water Stewardship – Top Three Actions

Track water use against energy use—how much water is associated with direct energy use (onsite), purchased energy and in your supply chain

Develop an understanding of your water footprint and water risk within the watershed

Engage stakeholders within the watershed to develop a collective water and energy conservation and management plan

Energy and Power – Top Three Actions

"Watershed-scale thinking" -view energy development (oil and gas, biofuels, etc.) and power generation within the context of the local watershed

Consider renewables (low water footprint) for watersheds experiencing water stress or scarcity

Engage stakeholders within the watershed to develop a collective water and energy conservation and management plan

Thank You!

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