



Water and Business Growth

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The Squeeze on Water Supply

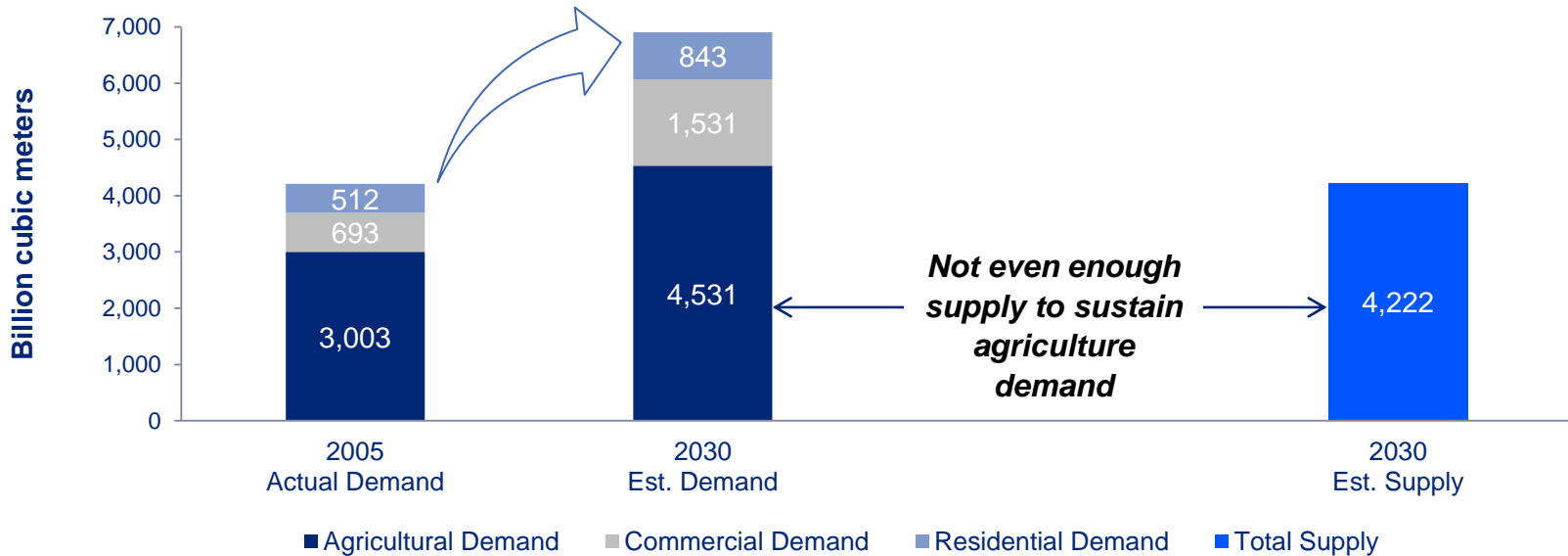


A projected 40 % shortfall in water supply by 2030

Megatrends Impacting Water Demand



Global Supply & Demand of Water 2005 - 2030¹



“Water, energy, and food are our most vital resources... and make up a tightly intertwined network: nearly all forms of energy production require water; energy also is needed to move and treat water; and producing food requires both energy and water.” – Peter Voser, Shell CEO²

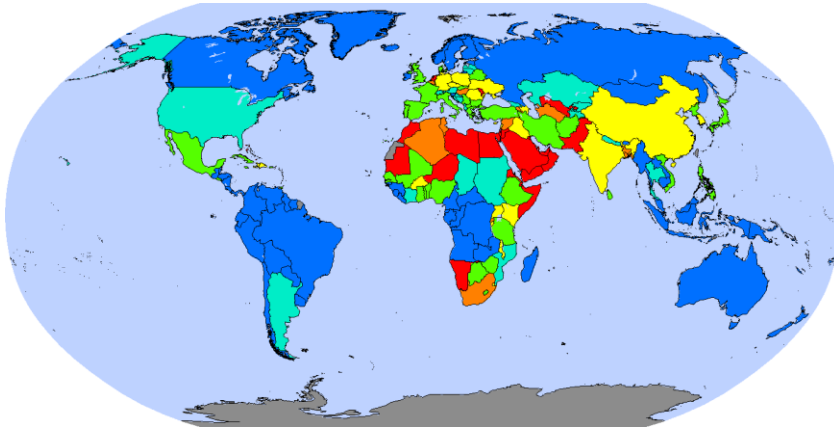
Source: ¹ [“Charting Our Water Future: Economic Frameworks to Inform Decision-Making”](#), World Economic Forum, 2009

² Shell, <http://www.shell.com/global/future-energy/people-planet/water-food.html>

Scarcity is projected to increase – *value chain* risks

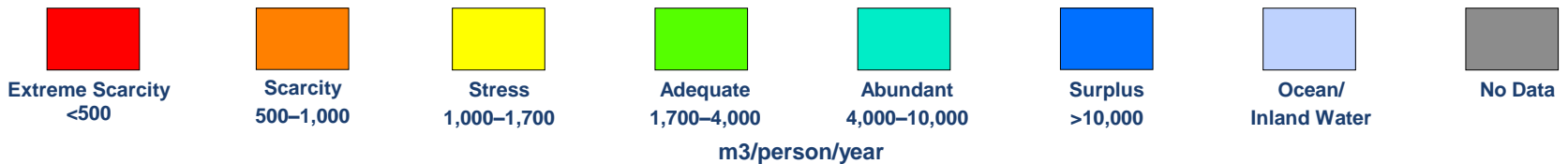
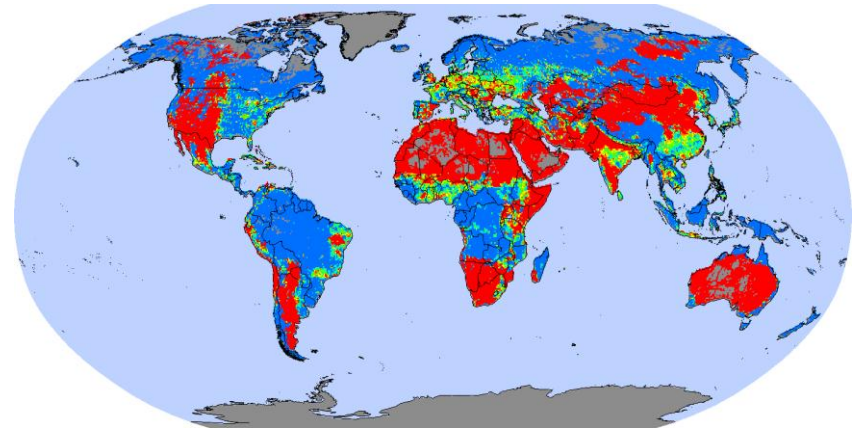
Water Availability: 2000¹

- Regions of water stress, scarcity, and extreme scarcity across Asia, Africa, and Europe



Water Availability: 2025¹

- Extreme water scarcity projected to be widespread across all continents

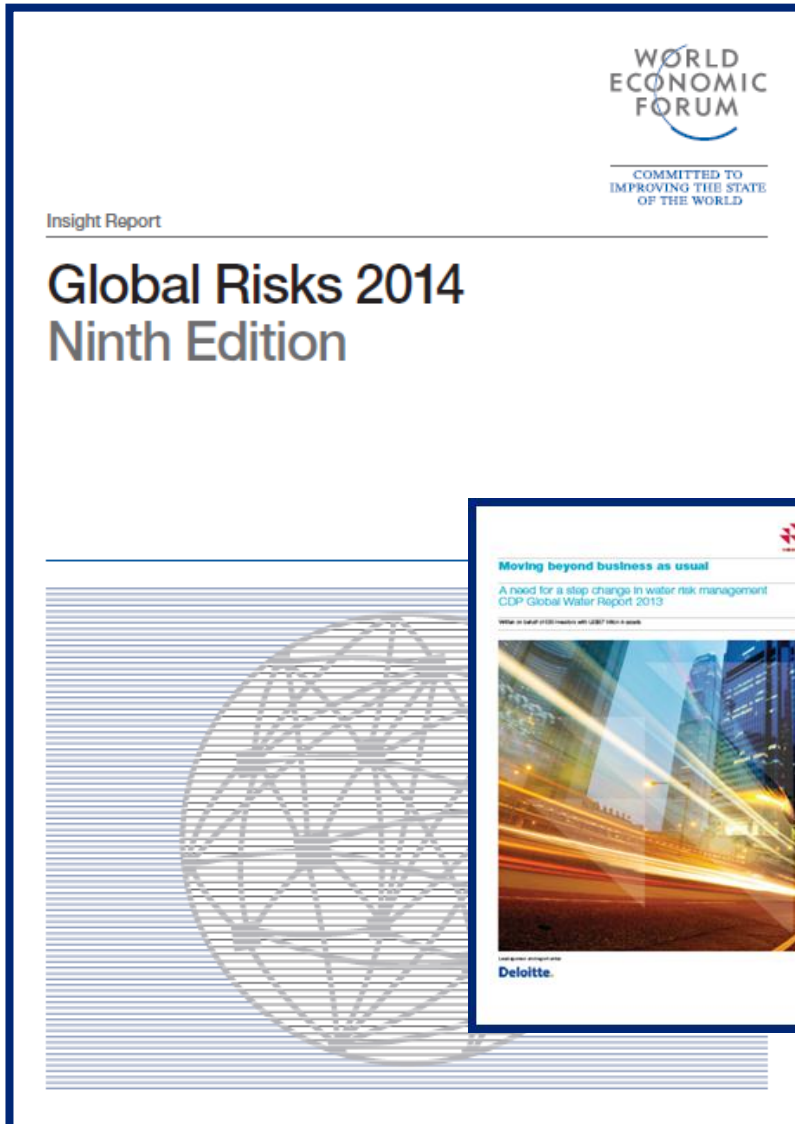


Water withdrawals are predicted to increase by 50% in developing countries, and 18% in developed countries by 2025.²

1 – Center for Environmental Systems Research, University of Kassel.

2 – “[Water Use Statistics](#)”, UN Water.

Water scarcity risk is a *current* business risk




2014 World Economic Forum

- # 3 – Water Crisis
- # 8 – Food Crisis

2013 CDP Water Program Global 500 Report

- **70%** of respondents have identified water risks as a **substantive business risk**
- **64%** of reported risks are expected to impact businesses **now or within the next five years**
- **Near-term substantive risks** reported have increased by **16%**

Water and economic growth – no water, no.....



Water Scarcity a Potential Drain on the Texas Economy

By Keith Phillips, Edward Rodriguez and Mine Yizci

▶ As Texas' growing population has strained its limited water resources, the allocation of water has become increasingly important.

Texas has abundant natural resources, but water scarcity has the potential to impede the state's economic growth. Prolonged drought in Texas has renewed awareness of water availability as one of the most pressing economic issues facing the state.

As water supplies shrink, demand is projected to rise, with Texas' population doubling to 52 million residents by 2047, according to the Texas State Data Center. Farming consumes the lion's share of the water supply. With the state's metropolitan areas expanding, however, urban demand for water has intensified.

Historically, users drew water freely from nearby streams or from groundwater aquifers – subterranean bodies of water replenished by rain seeping through the soil and rock. But as Texas' growing population has strained its limited water resources, the allocation of water has become increasingly important. Property rights

and markets can play a significant role in allocating water efficiently by establishing ownership and setting prices to reflect water's scarcity.

Running Dry

In 2011, Texas suffered its worst single year of drought since records began in 1865, and the state's climatologist anticipates the region will remain drier than normal for another 15 years. Texas has a long history of regular and severe droughts.¹

The states are particularly high for farmers, especially in the arid western half of the state, where low-margin, high-acreage crops such as alfalfa and cotton are harvested.

Along the Coastal Bend, where drought reduced water availability in 2012 and 2013, the Lower Colorado River Authority (LCRA) cut off most rice farmers' water to limit curtailment in Austin. The action reduced agriculture's share of water from the LCRA – one of 16 water authorities in the state – to 21 percent in 2012 from 60 percent the year before (Chart 1).

The farm sector uses the most water statewide, 61 percent, followed by municipalities at 17 percent (Chart 2). Manufacturing uses 6 percent, power generation 3 percent and livestock 2 percent, while oil and gas drilling accounts for about 1 percent.²

As Texas cities grow, water demand expands. Farmers, whose water rights are traditionally allocated based on historical use, can't benefit from selling their water to cities without developed markets. Municipalities, whose water prices often don't reflect scarcity and thus discourage conservation, are forced to ration supplies during dry spells.

Relieving supply with new reservoirs is becoming more difficult. Dallas

Source: Lower Colorado River Authority

Chart 1 Lower Colorado River Authority Drought Curtailment Cuts Into Agricultural Use

Year	Agriculture	Municipal	Environmental	Industrial	Other uses	Livestock
2011	60%	17%	6%	7%	1%	1%
2012	21%	42%	7%	7%	1%	2%

Southwest Economy • Federal Reserve Bank of Dallas • Fourth Quarter 2013

May 9, 2013

Goldman Sachs

Sustainable Growth: Taking a Deep Dive into Water

Global Markets Institute

Water could be a constraint on growth

The world's freshwater resources are unevenly distributed around the planet: over 80% of the Earth's freshwater supply is found in just 10 countries. Severe water stress affects 9 billion people, two-thirds of whom reside in the BRICs. Water needs are quickly increasing in emerging economies such as China and India, which together account for nearly 40% of global population and a third of global water demand. Moreover, water resources in many developing countries are becoming heavily polluted and unsuitable for human use. Inadequate water resources could be an impediment to growth as developing nations face rapidly growing demand for food and energy.

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Growing energy demand drives water use

Energy needs are increasing rapidly in emerging economies and the fuel mix used has a direct impact on water resources. Currently, close to a third of global energy demand is met by oil, an extremely water-intensive fuel source. Natural gas is a growing alternative to oil, led by the "shale revolution" in the United States. The extraction of unconventional gas is water-intensive and an adequate water supply is a critical ingredient in shale production. US shale gas development has been aided by the country's abundant water resources. In contrast, inadequate water supplies could be a constraint for prospective shale-producing countries like China and Mexico.

Virtual water trade to feed the expanding middle class

The expansion of the middle class in developing countries is expected to shift dietary preferences from predominantly plant-based foods to more water-intensive meat and dairy products. To manage these dietary changes, many water-scarce nations have engaged in "virtual water" trade, reducing domestic agricultural water use by importing water-intensive products from water-rich countries.


Market opportunities in water risk mitigation

Many water-scarce countries have adopted strategies to mitigate water risk; for example, the large-scale desalination plants in the Middle East and Israel's treatment and reuse of wastewater for irrigation. The global water industry, which includes sectors like desalination and water-efficiency technologies, is estimated to total over \$300 billion.

EPA United States Environmental Protection Agency Office of Water November 2013

The Importance of Water to the U.S. Economy

Synthesis Report



The business questions

Will you have access to water in 20 years *at any price?*

What strategies do you have in place to ensure access to water?

~ What is my business value at risk from water risk?

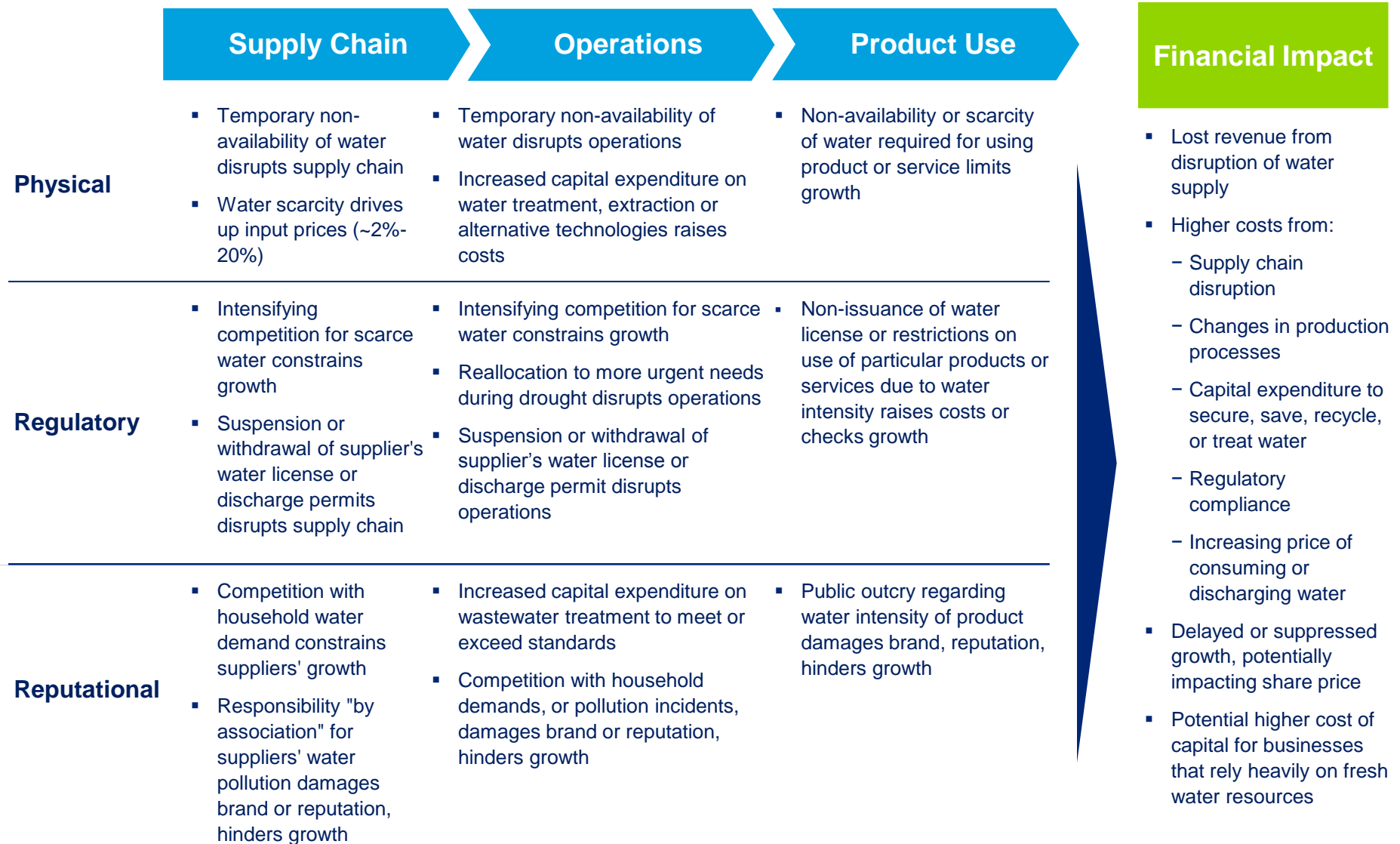
What are the Capex water requirements to support business growth?

Multinational growth projections....are they reasonable?

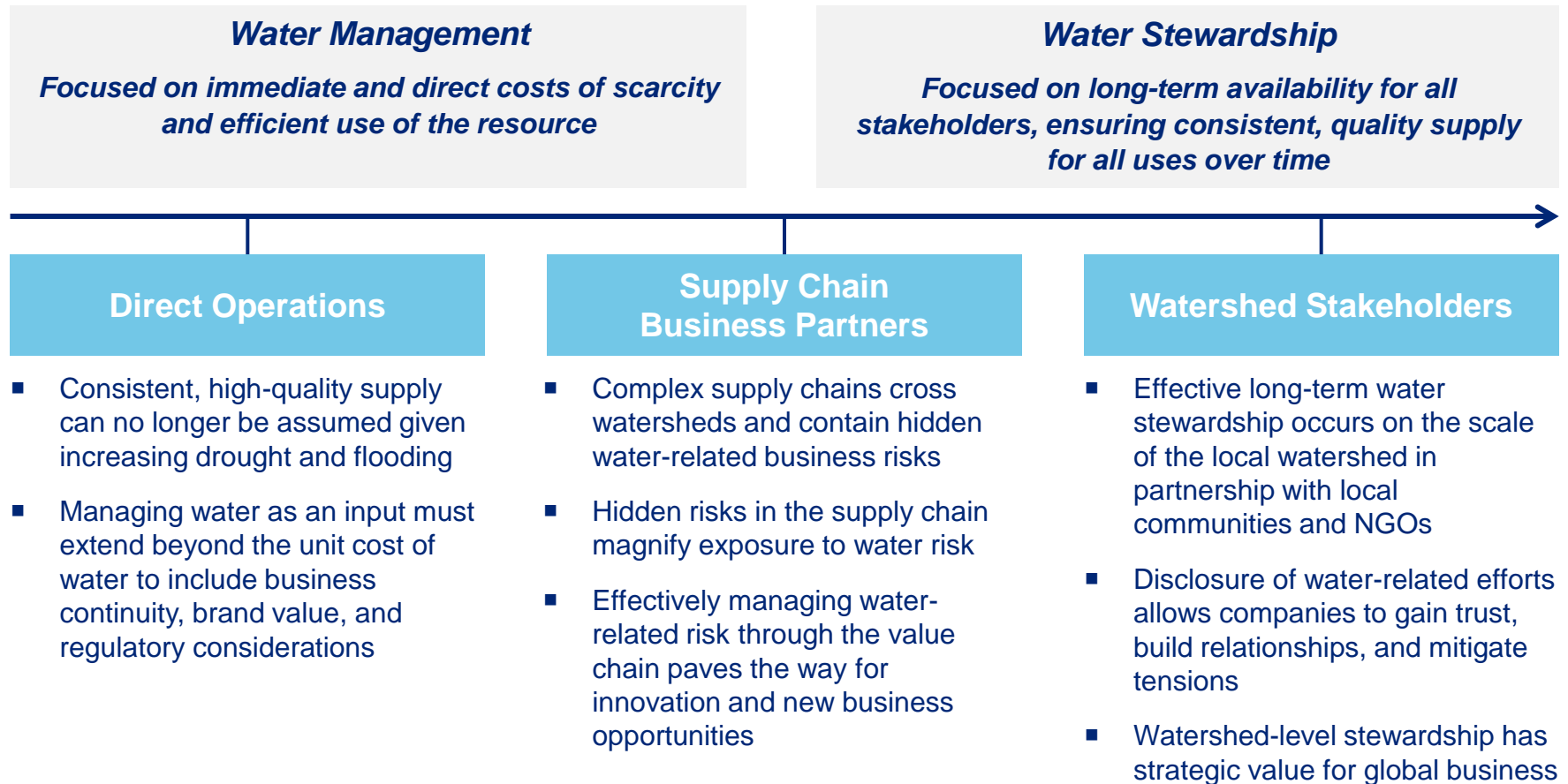
Business responses



Water risk - physical, regulatory, reputational



The move from water management to stewardship

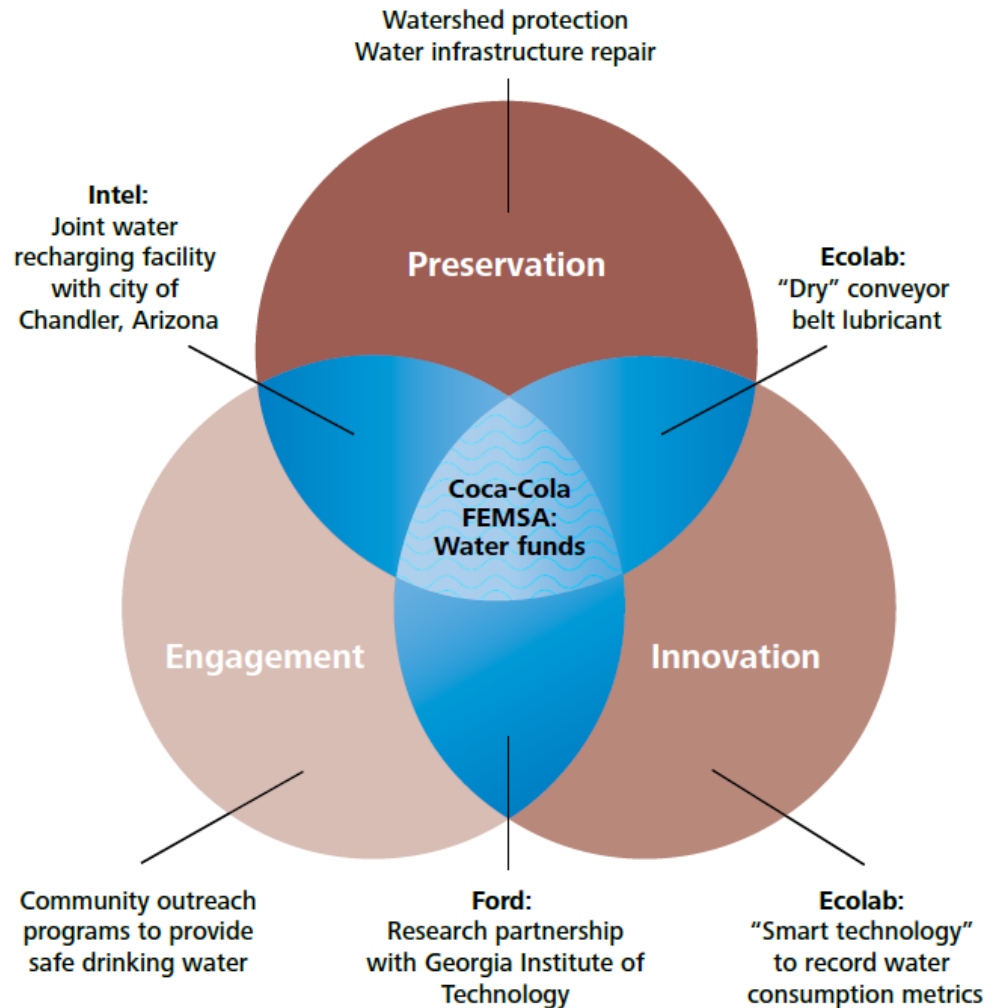


Companies are at different levels of maturity with respect to addressing water scarcity; stewardship is the most strategic, long-term approach.

A view of water stewardship

Companies should:

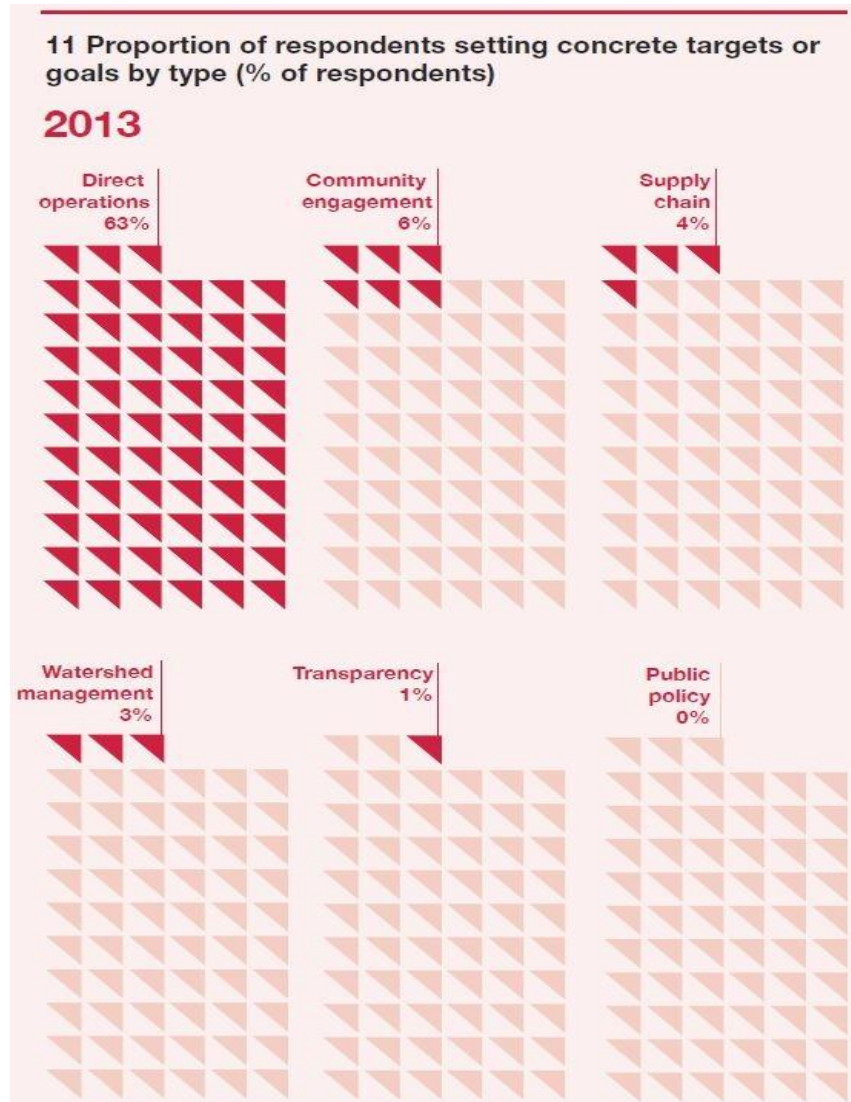
- Incorporate water risk into ‘traditional’ corporate risk management processes
- Quantify the “real” value of water to the business
- Understand the energy-water nexus and its potential business implications
- Increase focus on engagement and innovation
- Look for opportunities in the overlaps
- Make a public commitment to water stewardship
- Practice “radical transparency”



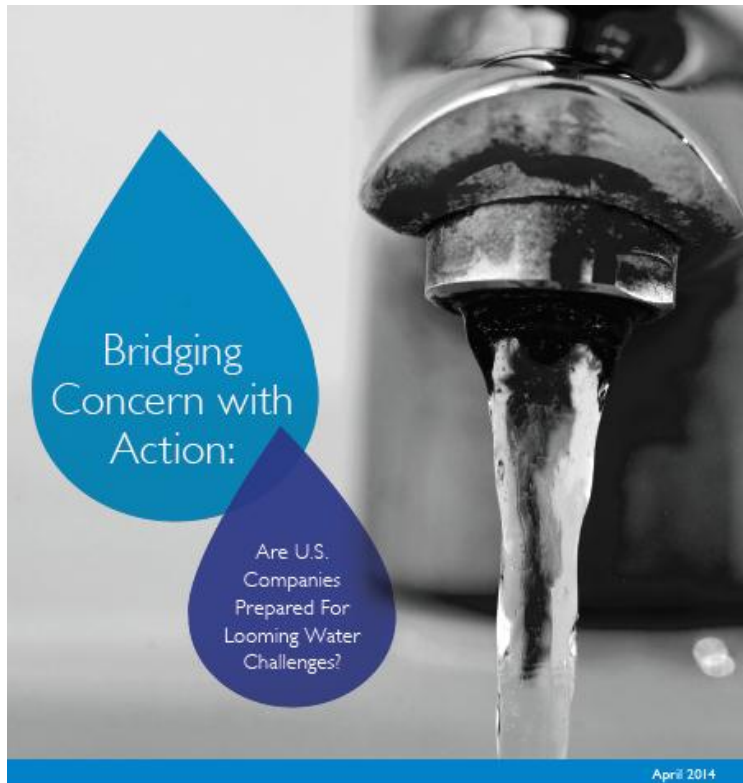
2013 CDP Water Program – Global 500

“Respondents’ water stewardship activities are notably lacking”

- ▼ **63%** of respondents set concrete targets or goals for their **direct operations**
- ▼ Many are focused on **reducing water use** or **increasing water recycling/reuse**
- ▼ Companies that continue with such a narrow focus could be **missing potential opportunities** and **overlooking serious risks**



Linking water scarcity and business growth



Study Partners: VOX Global and Pacific Institute
Authors: Peter Schulte, Jason Morrison, Stefanie Woodward,
Jen Anderson, Tony Calandro, Sarah Howell, and Leah Stonefeld
Contributors: GDP, AT&T, Cummins, The Hershey Company,
MillerCoors, and Union Pacific



79 percent of responding companies claim that they **currently face water challenges** and **84 percent** believe they **will face water challenges** in the next five years.

Nearly **60 percent** of responding companies indicated that **water is poised to negatively affect business growth and profitability** within five years and will significantly worsen in the next five years.

“nearly **70 percent** of responding companies said their current level of **investment in water management is sufficient.**”

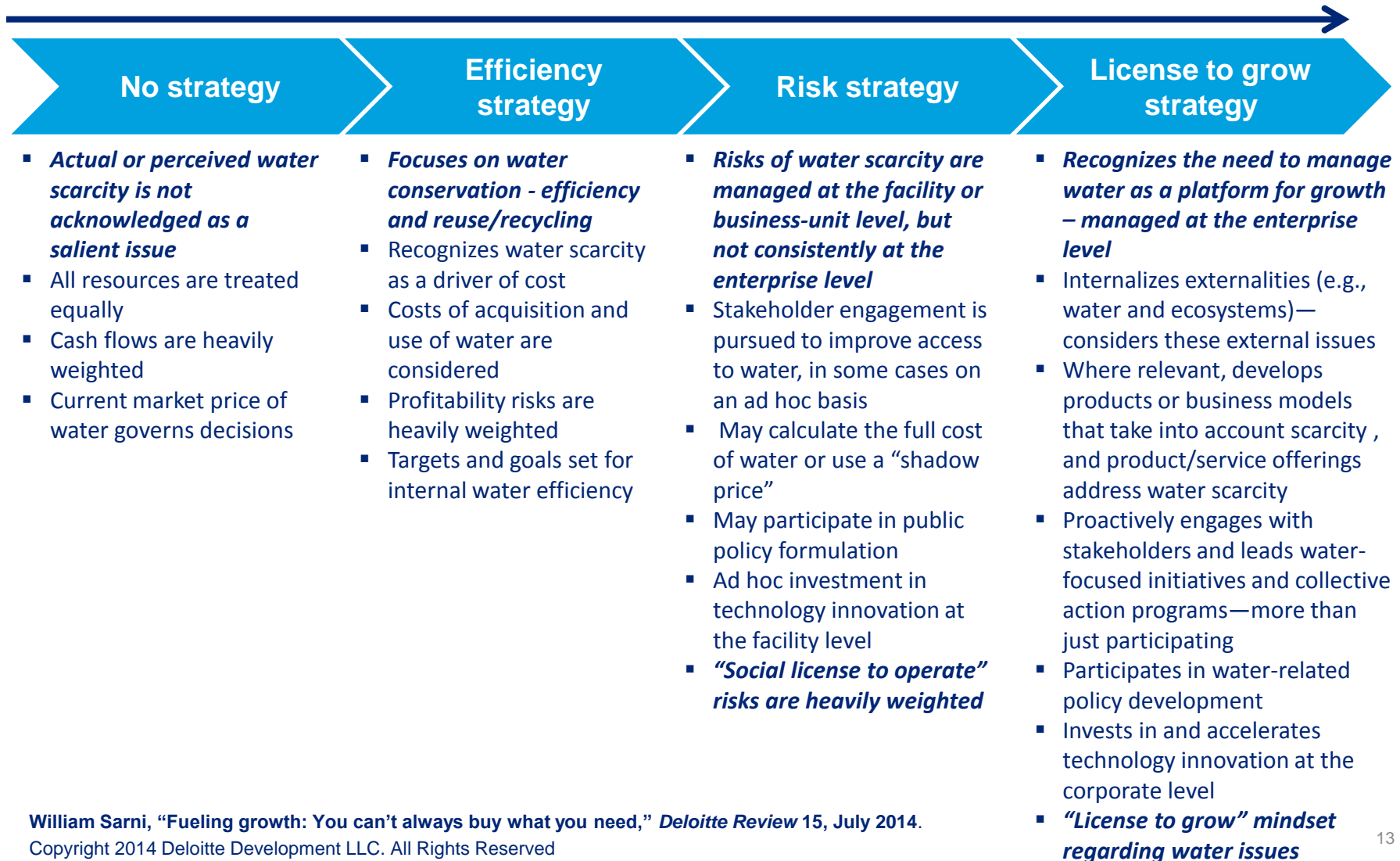
The report points to “a **failure to adequately evaluate the true cost of water**” as one potential reason for this disconnect, and further states: “Though survey **respondents noted the importance of integrating water into their business strategy, it may be premature to assume that all have done so.**”

Source: 2014 Pacific Institute and VOX Global

Maturity model for addressing water and business growth

Water cost considered
Pursues internal initiatives

Water value considered
Pursues collective action



William Sarni, “Fueling growth: You can’t always buy what you need,” *Deloitte Review* 15, July 2014.

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