WORLD RESOURCES INSTITUTE

Working Paper

CASE STUDY

AQUEDUCT INFORMS OWENS CORNING CORPORATE WATER STRATEGY

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EXECUTIVE SUMMARY

The World Resources Institute (WRI) Markets and Enterprise Program conducted a global water stress assessment with Owens Corning, a leading producer of glass-fiber reinforcements and residential and commercial building materials. This working paper aims to help Owens Corning and other companies deepen their understanding of external water supply-related threats and inform on how to shape improvements to their corporate water strategy. WRI plotted Owens Corning facilities worldwide on global maps of current and projected water stress using the Aqueduct Water Risk Atlas. WRI concluded that Owens Corning facilities are evenly distributed across areas of high, medium and low stress. The Aqueduct Water Risk Atlas provided new metrics and an improved methodology for Owens Corning to determine water supply-driven risks to its operations. The results also allowed Owens Corning to rank its facilities worldwide based on their exposure to current and projected stress, prioritize areas for additional internal and external investment, and enhance the company's overall corporate water strategy.

This publication is part of a series of case studies that shed light on how companies can use the Aqueduct Water Risk Atlas to improve their methodology for assessing water-related risk and improve their water strategy.

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Disclaimer: *Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.*

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INTRODUCTION

The Aqueduct Water Risk Atlas

Water shortages have begun to constrain economic growth in many parts of the world. More than half (53 percent) of the Global 500 companies responding to the Carbon Disclosure Project (CDP) Global Water Report 2012 have already experienced detrimental water-related business impacts, with associated financial costs for some companies as high as US$200 million.[1] Furthermore, there remains an under-appreciation of the business implications of the issue and significant measurement and reporting gaps.[2] In response to this situation, the World Resources Institute (WRI) Markets and Enterprise Program (MEP) developed the Aqueduct Water Risk Atlas. The Aqueduct Water Risk Atlas is a publicly available global database and interactive mapping tool that highlights geographic exposure to water stress and aims to help companies, investors, and other users make more informed water management decisions. The Aqueduct Water Risk Atlas includes detailed global maps of Baseline Water Stress, Water Reuse, Socioeconomic Drought, and Projected Change in Water Stress (see Appendix).

The global maps and underlying data were developed by ISciences L.L.C. for the Coca-Cola Company, and donated to the World Resources Institute in 2011. Since then, WRI has developed methodological improvements and incorporated more recent data sources. The enhanced maps, and additional maps of physical, regulatory and reputational water-related risk, will be made available in January 2013.

Water Risk to Businesses

As competition for water increases, businesses and their investors are facing growing risks associated with their dependence on water. These risks threaten a company with financial losses stemming from disruption of production processes or supply chains; capital expenditures to secure, save, recycle or treat water; delayed growth due to competition amongst users; or increased regulatory requirements.[3] For example, Freeport-McMoRan, one of the world's largest producers of copper, gold and molybdenum, is investing US$300 million to construct a desalination plant and pipeline near the Pacific Ocean to meet long-term water supply needs at one of its mines. Similarly, Iberdrola, a Spanish multinational electric utility company, reported a 22.1 percent rise in procurement costs totaling €9.6 million due to lower water availability.[4]

It is clear that exposure to supply-related and other water risks varies greatly between geographies and industry sectors, as well as between companies depending on their level of tolerance to risk. However, most water risks to business and their investors can be grouped into three major categories: physical, regulatory and reputational (Table 1).

Table 1 | **Types of water risk to businesses**

WATER RISKS	DESCRIPTION[5]	AQUEDUCT GLOBAL MAP
Physical Risks	Current or predicted changes in water quantity (e.g. droughts or floods) or quality that may impact a company's direct operations, supply chains and/or logistics. Physical water risks also include disruption of needed electric power (many electricity sources require water for cooling or for generation).	Baseline Water Stress Water Reuse Socioeconomic Drought Projected Change in Water Stress Maps under development; available in January 2013.
Regulatory Risks	Impacts of current and/or anticipated water-related regulations on a given company. As physical and reputational pressures increase, many local and national governments are responding with more stringent water policies. If unanticipated, these regulatory changes can prove costly to companies and, in some cases, limit industrial activities in particular geographies.	Maps under development; available in January 2013.
Reputational Risks	Current or potential conflicts with the public regarding water issues that can damage a company's brand image or result in a loss of the company's license to operate in a certain community.	Maps under development; available in January 2013.

Managing Corporate Water Risk

To minimize these risks, companies need management plans in place that allow for proper accounting of water use, the identification of risks and potential impacts, and the development of strategies to respond to risks inside and outside of the company fence line. The World Business Council for Sustainable Development (WBCSD) defines five stages for corporate water management:[6]

1. Assessing the global and local water situations. Companies with worldwide operations can begin by thinking through how their overall water footprint relates to the global water situation, and then focus on the critical, local points in their value chain that deserve prioritization.
2. Accounting for water use and understanding its impacts on the local water situation.
3. Identifying specific water risks and opportunities by interpreting findings from stages one and two.
4. Determining action and setting targets.
5. Monitoring and communicating performance with internal and external stakeholders.

This case study assesses water stress across all of Owens Corning's facilities, providing Owens Corning with information that will help deepen their understanding of external water supply-related threats. The results can shape improvements to its corporate water strategy, and further minimize the risk of financial impacts to its bottom line. Most importantly, this case study sheds light on how other companies can also make use of the Aqueduct Water Risk Atlas to improve their methodology for assessing water-related risk and in turn enhance their overall water strategy.

OWENS CORNING COMPANY WATER PROFILE

Owens Corning (NYSE: OC) is a leading global producer of residential and commercial building materials, glass-fiber reinforcements and engineered materials for composite systems. Founded in 1938, Owens Corning is an innovator of glass-fiber technology with sales of US$5.3 billion in 2011 and approximately 15,000 employees in 28 countries on five continents. Owens Corning has been a Fortune® 500 company for 58 consecutive years.[7]

Fabricating glass fibers and other materials requires high-temperature manufacturing processes. In these processes, water is used to cool machinery and materials in order to protect equipment and improve productivity. Water is also used for equipment cleaning, pollution control and air handling processes, to mix liquid binders and sizings, as well as to provide for staff consumption and sanitation needs. Over the past five years, Owens Corning has not reported any water-related financial impacts to its business. However, Owens Corning operates in many parts of the world, some of which are subject to high levels of water stress, including parts of India, China and North America. For example, Owens Corning has two facilities in China and two in the United States that are located in areas of extremely high water stress. Similarly, several facilities in Spain and Mexico are also in areas of extremely high water stress. Operations in these regions face water-related risks that could materialize as impacts. For example, restrictions on water use during droughts can result in disruption of production processes, or increased operational costs driven by the need to access and transport alternative sources of water.[8] By developing and implementing a robust and company-wide corporate water management plan, Owens Corning aims to identify water supply-related risks at an early stage, prevent financial impacts, and improve watershed conditions.

Owens Corning is already implementing several water management practices. For example, total and consumptive water withdrawals[9] are measured at each of its facilities worldwide, and efficiency measures are derived from these to set targets and drive continuous improvement over time. For instance, Owens Corning reduced water use intensity[10] by 23 percent between 2002 and 2010, exceeding its 15 percent goal; and total water withdrawals were reduced by close to 20 percent from 2008 to 2011.[11] Owens Corning has set a new goal of a 35 percent water intensity reduction from 2010 to 2020, with added emphasis on facilities located in water stressed areas.[12] Reductions to date have been accomplished through low cost/no cost methods, including minimizing leakage, changing procedures, and through capital projects focusing on reusing water.

Finally, Owens Corning is also monitoring and communicating performance with its internal and external stakeholders. Owens Corning has published an annual corporate sustainability report since 2006, including information on its water footprint, goals and water efficiency progress, and also discloses information on water through the Global Reporting Initiative (GRI) Guidelines 3.1 and the CDP Water Disclosure Global Report.

The local water context at each of Owens Corning's facilities had been subject to assessment in the past. However, Owens Corning decided to use the Aqueduct Water Risk Atlas to further analyze the water context surrounding each facility in search for new opportunities to identify and reduce risks. This case study showcases how Owens Corning and other companies can use the Aqueduct Water Risk Atlas to determine water supply-driven risks to their operations and supply chains. The results can help rank company facilities worldwide based on their exposure to current and projected stress, prioritize areas for additional internal and external investment, and enhance corporate water strategies.

Table 2 | **Geographic distribution of the Owens Corning facilities assessed in this case study**

COUNTRY	NUMBER OF FACILITIES
Belgium	1
Brazil	2
Canada	4
China	8
France	2
India	2
Italy	1
Japan	1
Mexico	5
Netherlands	1
Romania	1
Russia	1
Singapore	1
South Korea	1
Spain	2
United Kingdom	1
United States	47
TOTAL	81

Table 3 | **Definition of stress levels**

WATER RISKS	DESCRIPTION
Baseline Water Stress	**Low:** Low (<10%) **Medium:** Moderate (10-<20%), Medium-High (20-40%) **High:** High, Extremely High (40->80%)
Water Reuse	**Low:** Low (<10%) **Medium:** Moderate (10-<20%), Medium-High (20-40%) **High:** High, Extremely High (40->80%)
Three-Year Socioeconomic Drought	**Low:** Relatively Wet (<1), Near Normal Conditions, (1-1.7x), Low-Impact Drought (1.7x) **Medium:** Moderate Drought (1.7-<2.0x) **High:** Severe Drought (2.0-2.8x), Extreme Drought (2.8-8.0x), Exceptional Drought (8.0x)
Projected Change in Water Stress to 2025, IPCC Scenario A1B	**Low:** Exceptionally Less Stressed (<0.125x), Extremely Less Stressed (0.125-0.357x), Significantly Less Stressed (0.357-0.500x), Moderately Less Stressed (0.500-0.588x), Wetter But Still Extremely High Stress (<0.588x), Near Normal Conditions (0.588-1.7x) **Medium:** Near Normal Conditions (0.588-1.7x) with uncertainty in direction or magnitude, Drier but Still Low Stress (>1.7x), Moderately More Stressed (1.7-2x) **High:** Severely More Stressed (2-2.8x), Extremely More Stressed (2.8-8x), Exceptionally More Stressed (>8x)

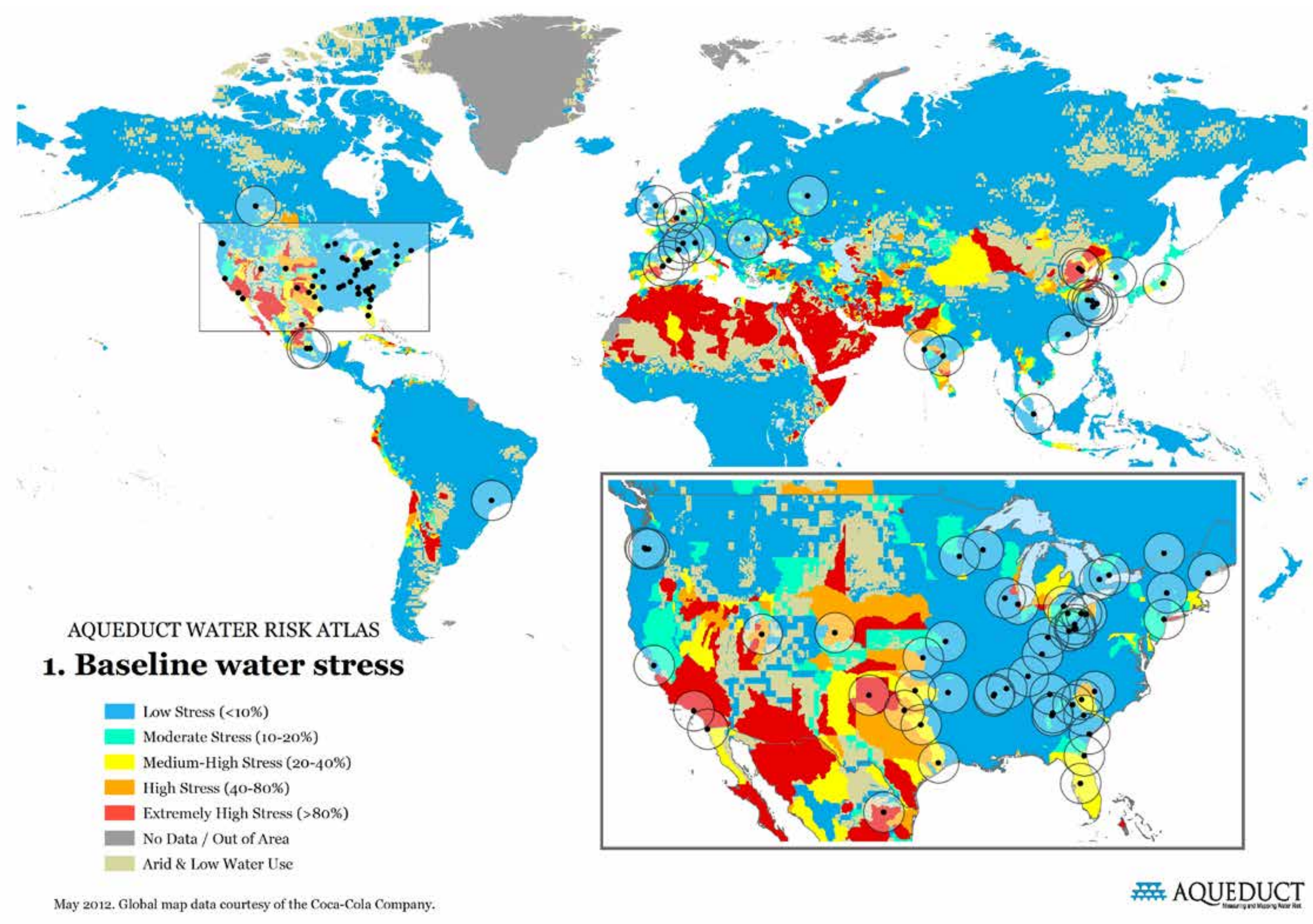
GLOBAL WATER STRESS ASSESSMENT

Analysis

Owens Corning has manufacturing plants in 17 different countries (Table 2) in North and South America, Europe and Asia. Approximately 59 percent of the total water withdrawals by volume are sourced from local municipal water systems, and the remainder is withdrawn directly from surface and groundwater.

To assess water stress in the vicinity of each manufacturing plant, including major research and headquarters facilities, sustainability staff at Owens Corning and staff from WRI's Market and Enterprise Program worked together to map all of Owens Corning's facilities on Aqueduct's global maps. Owens Corning provided WRI with the longitude and latitude of its 81 facilities worldwide and the coordinates were entered into the Aqueduct Water Risk Atlas online tool (www.wri.org/aqueduct). Results for all indicators at each location were obtained and exported into a spreadsheet for analysis. Each global map displays different threshold levels of baseline water stress, water reuse, socioeconomic drought and projected change in water stress. These thresholds were developed based on academic literature on the subject and expert advice. For easier interpretation, WRI grouped the threshold levels into three categories, based on the level of stress: low, medium or high (Table 3).

Figure 1 | **Owens Corning's facilities on Aqueduct map of Baseline Water Stress**

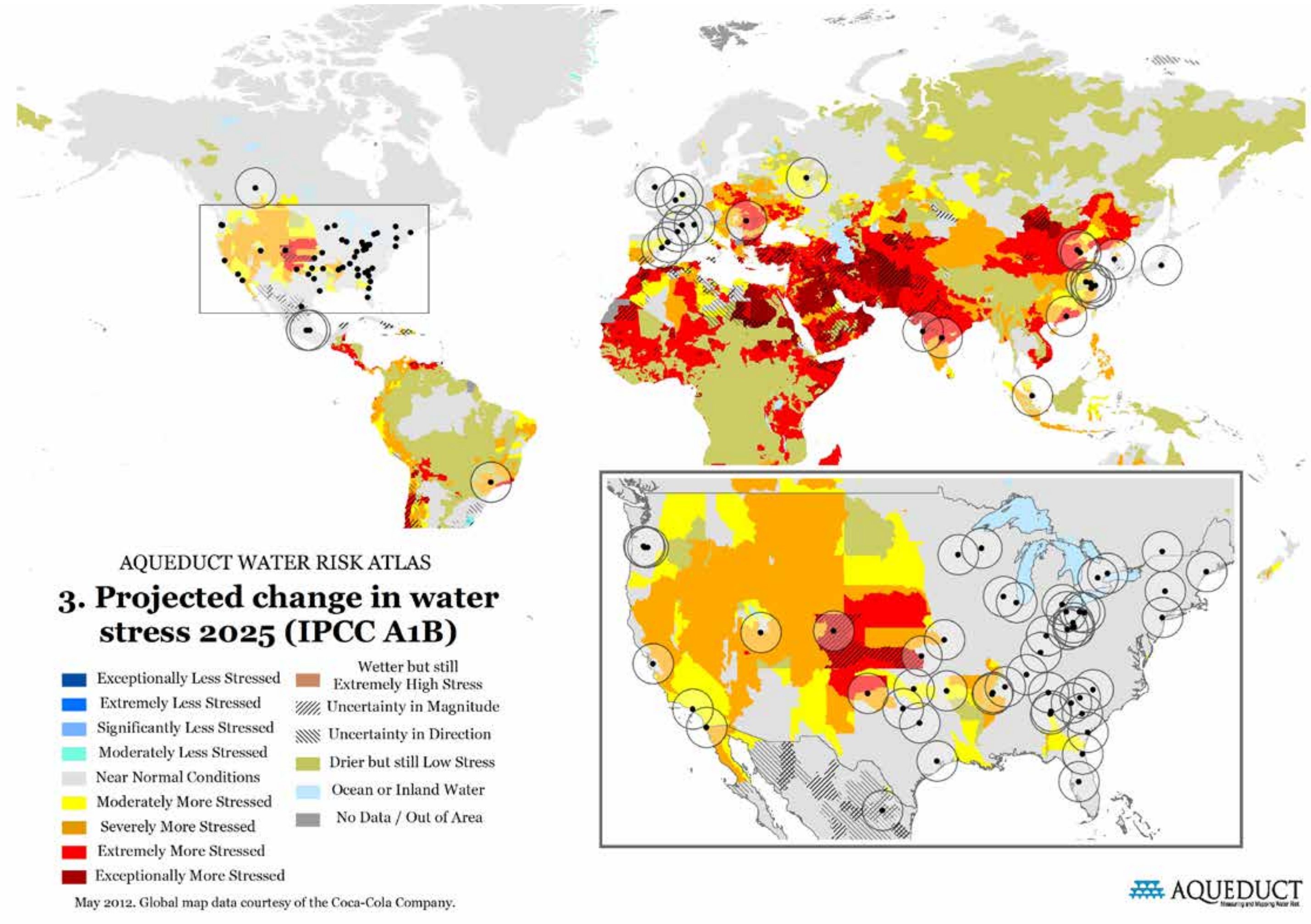


Baseline water stress (Figure 1) is the ratio of total annual freshwater withdrawals relative to available supply. High levels, above 40 percent, indicate that demand for fresh water approaches, or exceeds, the annual renewable supply, which leads to greater socioeconomic competition for fresh water and a higher risk of supply disruptions.

Water reuse is the percentage of water available for use that has been previously used and discharged as upstream wastewater. This indicator measures a region's dependency on wastewater treatment infrastructure and policy to ensure water quality. Higher values indicate that water users will have higher levels of dependency on upstream wastewater treatment systems.

Socioeconomic drought is the ratio of current water stress to baseline water stress, and measures the extent and severity of episodic drought conditions. Socioeconomic droughts occur when available fresh water supplies are insufficient to support normal water withdrawals in aggregate. Values above one indicate that there is more competition for water than in a typical year, leading to situations of increased competition for fresh water. For the purpose of this study WRI made use of the three-year socioeconomic indicator.

Figure 2 | **Owens Corning's facilities on Aqueduct map of Projected Change in Water Stress 2025 (IPCC A1B)**



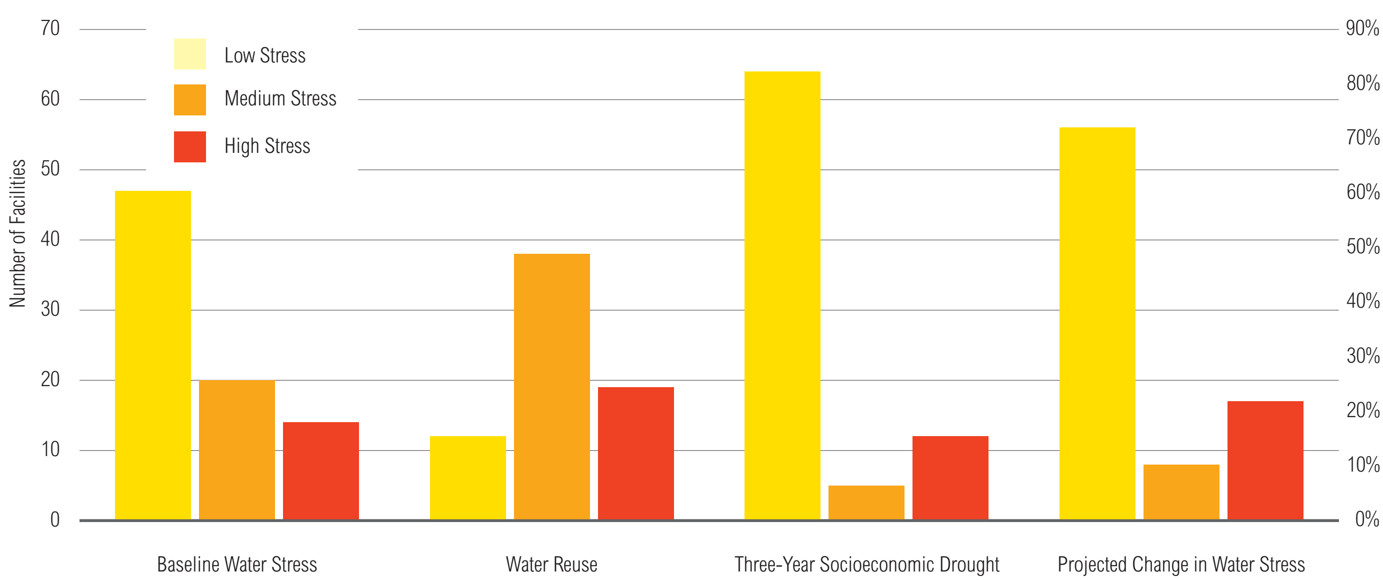
Projected change in water stress (Figure 2) measures the long-term change in water stress due to changes in economic growth, population growth, and climate change. Higher values indicate areas likely to see growing competition for fresh water and higher risk of supply disruptions over the coming years. For the purpose of this study WRI made use of the Projected Change in Water Stress 2025 Scenario A1B.

Table 4 | **Facilities located in areas of low, medium and high stress**

GLOBAL MAP	LEVEL OF STRESS		
	LOW	MEDIUM	HIGH
	NUMBER OF FACILITIES (% OF TOTAL FACILITIES)		
Baseline Water Stress	47 (58%)	20 (25%)	14 (17%)
Water Reuse*	12 (15%)	38 (47%)	19 (23%)
Three-year Socioeconomic Drought	64 (79%)	5 (6%)	12 (15%)
Projected Change in Water Stress 2025 IPCC Scenario A1B	56 (69%)	8 (10%)	17 (21%)

* Water Reuse is a proxy for surface water quality only, therefore results exclude facilities sourcing 65 percent or more of their water supply from groundwater.

Chart 1 | **Facilities located in areas of low, medium and high stress**



Results and interpretation

The results of this analysis indicate that a number of Owens Corning's facilities are located in areas of high water reuse, current and projected water stress and/or competition between water users (Table 4 and Chart 1). Detailed information on the type of facility, exact location, water consumption and associated stress levels has been excluded from this publication due to the proprietary nature of the data.

The results of this assessment indicate that 34 (42 percent) of Owens Corning's facilities are located in areas with high levels of at least one of the four measured stress parameters (Table 5). Of these, 26 facilities are located in areas already facing high levels of water stress, and 17 are in areas with stress levels projected to significantly worsen over the next decade. These facilities are more likely to face physical water-related risks. Detailed facility-level risk assessments should be conducted to validate results with relevant site information and determine the best course of action.

CONCLUSIONS AND RECOMMENDATIONS

Owens Corning has a corporate water strategy and management practices in place, including water accounting mechanisms and intensity reduction targets to help reduce the company's exposure to water-supply related risks and increase its tolerance to water stress. Additionally, Owens Corning discloses water use, risks, impacts, policies and management practices. However, as new data on water stress is made available the Sustainability Department at Owens Corning aims to improve their measuring and reporting strategies and continues to identify, manage and reduce their water-related risks.

Improved water risk computation methodologies, such as those provided in the Aqueduct Water Risk Atlas, are resulting in more granular and robust information on geographic water risk. They are frequently based on more up-to-date water supply and demand data and more sophisticated hydrological modeling techniques. Furthermore, the geographic context around water changes rapidly over time, particularly as industrial, domestic and agricultural demands increase in response to a growing population and emerging economies. Thus, companies operating worldwide and reliant on global supply chains, such as Owens Corning and many others, see the improvement of water risk measuring and reporting mechanisms as critical to sustaining company growth and maintaining profitability.

Through the use of the Aqueduct Water Risk Atlas, this case study has provided an improved methodology for Owens Corning to assess water supply-driven risks to its operations. It also offers an example of how other companies might assess their own geographic context for water risks. As a result, Owens Corning has adopted new and additional metrics to assess water stress (baseline water stress, socioeconomic drought and water reuse) and ranked its facilities worldwide to prioritize areas for additional internal and external investment. Additionally, by obtaining information on the projected changes in water stress levels, Owens Corning can adopt a more forward-looking approach to its corporate water strategy. For example, sustainability staff can engage with facility managers and others to discuss what measures could best help respond to future stress conditions. Finally, the results of the case study provided insight for Owens Corning to improve its water strategy and grow the company's maturity in corporate water stewardship. Specifically the results highlight the need to:

- **Assess regulatory & reputational risks.** Owens Corning, like many companies, has largely responded to water supply-driven risks in its direct operations by assessing the risks and establishing targets to reduce its dependency on water. However, there are other water-related risks to consider, as highlighted in Table 1, including uncertainty in regulatory change and increased competition with other users. These risks should also be assessed as part of a company's water strategy.
- **Evaluate risks across supply chain.** For many industries, water risks are most prominent in their supply chains. However, discussion and study of supply chain risk is still very limited.[14] Following the approach taken in this case study, water stress and the associated risks should be evaluated for water-intensive suppliers, particularly for those located in regions subject to high levels of water stress. Owens Corning has started working with its suppliers on environmental sustainability, and should aim to assess supply chain risks and require suppliers to disclose their water management practices.
- **Promote a collective response.** For companies where direct operations and suppliers are located in areas of current and projected high stress, engagement in facility-level water risk assessments can help determine the most prominent drivers of risk. By engaging with other stakeholders in the watershed, site-specific response plans can reduce risks and help improve the conditions in the surrounding watersheds. More information on water-related collective action and how to support the internal company discussion can be found in the CEO Water Mandate Guide to Water-Related Collective Action.[15]

Table 5 | **Total facilities located in areas of current and projected high water stress**

WATER STRESS	NUMBER OF FACILITIES (% OF TOTAL FACILITIES)
High Water Stress (High levels of Baseline Water Stress, Water Reuse*, and/or Socioeconomic Drought)	26 (32%)
Projected High Water Stress (High levels of projected Change in Water Stress 2025 IPCC Scenario A1B)	17 (21%)
Overall High Water Stress (High levels of at least one of the four measured parameters)	34 (42%)

END NOTES

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ABOUT WRI

WRI focuses on the intersection of the environment and socio-economic development. We go beyond research to put ideas into action, working globally with governments, business, and civil society to build transformative solutions that protect the earth and improve people's lives.

Solutions to Urgent Sustainability Challenges
WRI's transformative ideas protect the earth, promote development, and advance social equity because sustainability is essential to meeting human needs today, and fulfilling human aspirations tomorrow.

Practical Strategies for Change
WRI spurs progress by providing practical strategies for change and effective tools to implement them. We measure our success in the form of new policies, products, and practices that shift the ways governments work, businesses operate, and people act.

Global Action
We operate globally because today's problems know no boundaries. We are avid communicators because people everywhere are inspired by ideas, empowered by knowledge, and moved to change by greater understanding. We provide innovative paths to a sustainable planet through work that is accurate, fair, and independent.

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- John Deere
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APPENDIX

Appendix | **Definitions of Aqueduct Water Risk Atlas Global Maps**[16]

GLOBAL MAP	DEFINITION	INTERPRETATION
Baseline Water Stress	The ratio of total annual freshwater withdrawals for the year 2000, relative to expected annual renewable freshwater supply based on 1950-1990 climatic norms. This ratio assesses the demand for fresh water from households, industry, and irrigated agriculture relative to overall freshwater availability in a typical year.	High levels of baseline water stress (above 40%) indicate that demand for freshwater approaches (or exceeds) the annual renewable supply, which leads to greater socioeconomic competition for fresh water and a higher risk of supply disruptions.
Water Reuse	The ratio of renewable fresh water that has been previously withdrawn and discharged as upstream wastewater. Estimates for available renewable freshwater supply are based on 1950-1990 climatic norms and consumptive withdrawals for 2000.	Measures the fraction of renewable freshwater supply that has been previously withdrawn and discharged as upstream wastewater. It measures the degree to which water quality is an ongoing concern, and captures a proxy for dependency on water treatment.
Socioeconomic Drought	The ratio of current water stress to baseline water stress. Two versions of the indicator are computed. The one-year indicator is more sensitive to annual fluctuations in weather. The three-year indicator describes long-term droughts that may persist even if the most recent year of weather is more typical.	Measures the extent and severity of episodic drought conditions. Socioeconomic droughts occur when available freshwater supplies are insufficient to support normal water withdrawals in aggregate. Values above one indicate that there is more competition for water than in a typical year. For the purpose of this study WRI made use of the three-year Socioeconomic indicator.
Projected Change in Water Stress	The ratio of projected water stress during three eleven-year time frames, centered on the years 2025, 2050, and 2095, to water stress in the year 2000. The analysis looks at three benchmark scenarios of economic and environmental change used by the Intergovernmental Panel on Climate Change (IPCC scenarios B1, A1B, and A2) in its Fourth Assessment Report.	Measures the long-term change in water stress due to changes in economic growth, population growth, and climate change. For the purpose of this study WRI made use of the Projected Change in Water Stress 2025 Scenario A1B.

NOTE: The computations and results of these maps do not explicitly measure available groundwater supply.