

ISSUE BRIEF : Q1 2020

IOWA COMPANIES EXPLAIN CLIMATE CHANGE AND SEVERE WEATHER RISK



BUSINESSFORWARD
FOUNDATION

EXECUTIVE SUMMARY

This report examines how severe weather is disrupting supply chains, distorting commodity prices, damaging plants and equipment, and hurting consumer demand for Iowa businesses. It is meant to serve as a resource for local, state, and Congressional officials and media interested in energy and climate change policy. Specifically, the points made here should help media and officials answer a simple question about climate change: Can we fix climate change without wrecking our economy?

Iowa's top entrepreneurs, executives, investors, and small business owners are changing how they build, where they locate, and how they insure their assets. They are creating new business lines and models to mitigate the effects of climate change. And they are issuing warnings to their investors about climate change that skeptics in Des Moines and Washington, D.C. should not ignore.

Severe weather affects Iowa's greatest competitive advantages, including fast-moving global supply chains, model climate for corn and soybeans, and access to key waterways like the Mississippi and Missouri Rivers. Severe weather is affecting key industries, from farms and orchards to aerospace, auto suppliers, railroads, restaurants, and shipping.

Business Forward has worked with more than 990 entrepreneurs, executives, and small business owners across Iowa. These leaders have helped brief Congress, the White House, and state legislatures on a range of issues, including tax reform, trade agreements, infrastructure investment, and immigration reform. More than 260 of them have participated in our climate change and clean energy program, where they have learned about renewable energy options and shared their experience managing severe weather costs.

**BOTH OF IOWA'S
FORTUNE 500
COMPANIES
HAVE ISSUED WARNINGS TO
THEIR INVESTORS, AS WELL AS
INDUSTRY LEADERS IN ENERGY,
MANUFACTURING, FOOD
PROCESSING, AND MORE.**

KEY THEMES FROM FORTUNE 500 WARNINGS ABOUT CLIMATE CHANGE

“JUST IN TIME” INVENTORY AND GLOBAL SUPPLY CHAINS RAISE RISK

To boost profits, U.S. companies source from across the globe, encourage suppliers to specialize, and reduce overhead costs by operating with as little as two to four hours of parts inventory on site.

As our supply chains grow more global, more specialized, and faster, severe weather events become more expensive.

EXTREME TEMPERATURES THREATEN COMPARATIVE ADVANTAGES ACROSS SUPPLY CHAINS

Iowa farmers in 2019 were unable to plant a record 463,339 acres of crops like corn and soybeans due to flooding, heavy rains, and cold temperatures.¹

Fluctuating water levels on the Mississippi and Missouri rivers pose a threat to Iowa’s shipping industry.

DAMAGE TO THE DEVELOPING WORLD HURTS U.S. COMPANIES

Developing markets face greater climate risk: their populations live in hotter climates and are concentrated in coastal areas with poor infrastructure.

This hurts Fortune 500 companies, because those developing markets are expected to drive their future growth.²

WEATHER CAN BE THE DIFFERENCE BETWEEN A GOOD YEAR AND GOING OUT OF BUSINESS

For retailers, restaurants, and the entertainment industry, weather can make or break their year.

Good weather allows golf courses to sell more afternoon rounds and restaurants and sports teams to fill outdoor seating. For low-margin businesses, marginal sales are critical to survival.

SMALL BUSINESSES ARE LESS LIKELY TO SURVIVE SEVERE WEATHER LOSSES

They have smaller cash reserves, are more likely to operate out of a single location, less likely to have backup systems, and have a harder time relocating.

Small businesses are more likely to shut down due to severe weather events, and their failures are bad news for the big companies they supply.

CLIMATE CHANGE HITS IOWA WHERE IT HURTS - INFRASTRUCTURE

Iowa's infrastructure is particularly vulnerable to severe weather events. According to the American Society of Civil Engineers (ASCE), Iowa has the highest percentage of structurally deficient bridges in the nation, with nearly **20 percent of 24,000 total bridges rated as structurally deficient** in 2018.³ Roadways in Iowa are aging and the projected budgeting shortfall for Iowa's roads is **\$32.5 billion** over the next 20 years. Dams are one of Iowa's most pressing areas of need, as less than **30 percent of high hazard potential dams** have emergency action plans compared to **70 percent nationwide**. The state of Iowa spends less than **\$50 per dam** on maintenance each year, far lower than the national average of **\$700 per dam**. There is also a **\$664 million** shortfall in recreation and public parks infrastructure spending.

The Federal Government has been underfunding infrastructure for years, resulting in a system that fails: the ASCE gave the United States a **D+** on infrastructure in 2017. According to the Des Moines Register, Iowa has the **third** worst infrastructure in the United States.⁴ Without a strong federal partner, local and state governments are left to plan and fund infrastructure investments on their own. A high number of governmental units makes coordinating policy and collaborating more difficult. Iowa has **1,947** total governmental units, ranking 17th highest in the country.⁵

Because of these factors, Iowa companies are warning investors that climate change threatens to reduce productivity and profits.

C
**RATING FOR
INFRASTRUCTURE
FROM ASCE**

49TH
**IN THE U.S. IN
LAND AVAILABLE
FOR PUBLIC USE**

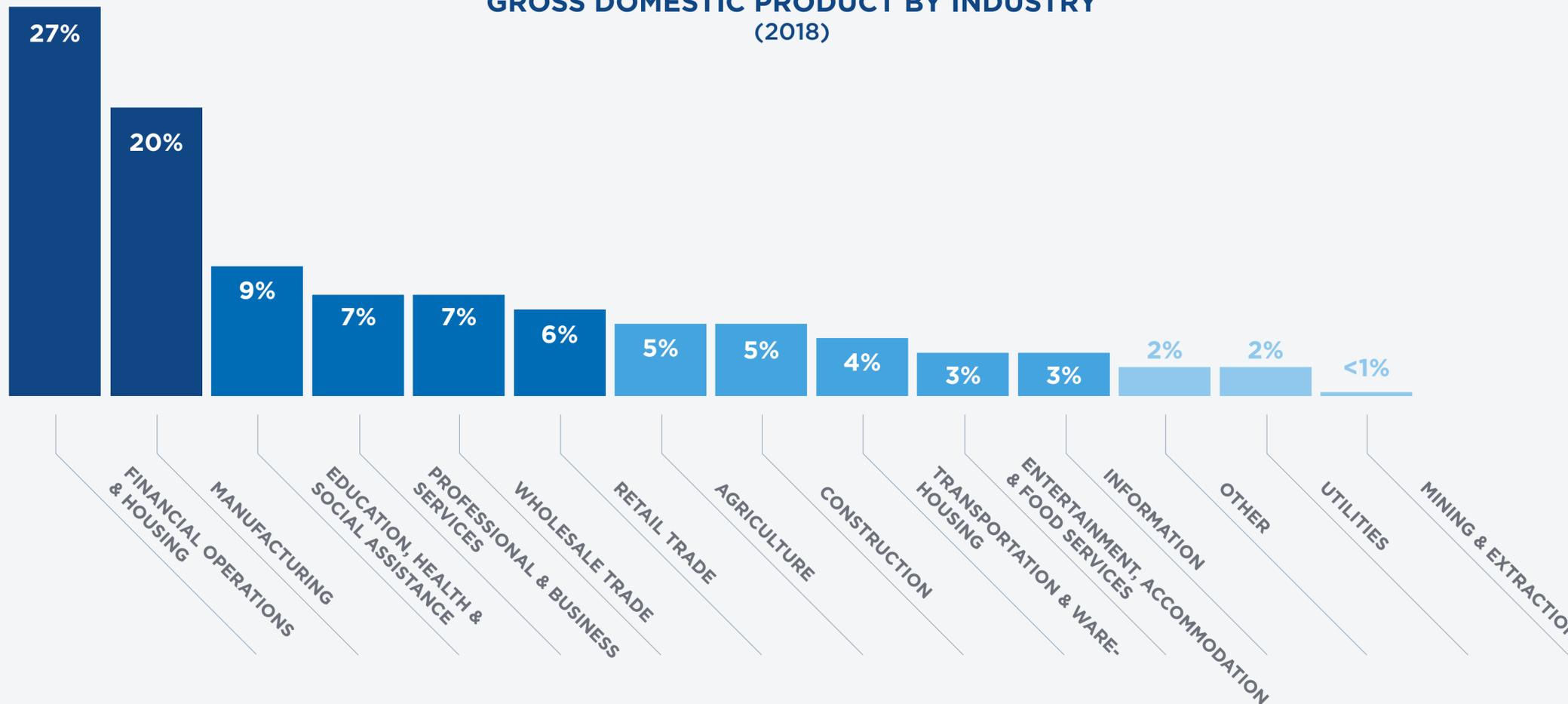
19%
**OF BRIDGES ARE
STRUCTURALLY
DEFICIENT**

\$2.4B
**IN DRINKING WATER
INFRASTRUCTURE
NEEDS OVER THE NEXT
20 YEARS**

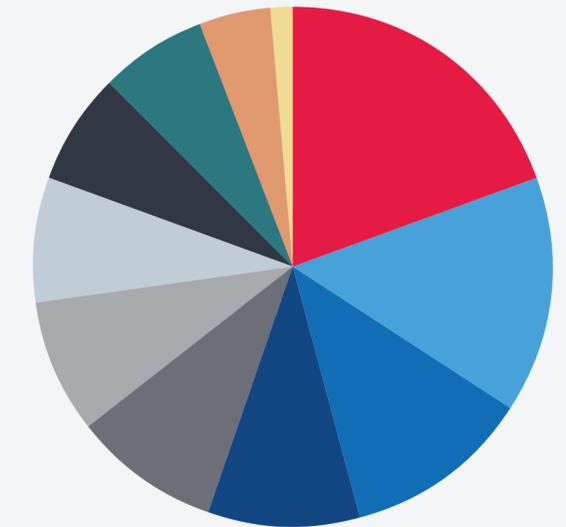
A SNAPSHOT OF IOWA'S ECONOMY



GROSS DOMESTIC PRODUCT BY INDUSTRY (2018)



EMPLOYMENT BY INDUSTRY (2018)



- 20% - OFFICE MANAGEMENT & SUPPORT
- 14% - FINANCIAL OPERATIONS & SALES
- 12% - CONSTRUCTION & MAINTENANCE
- 10% - MANUFACTURING
- 9% - FOOD SERVICES & AGRICULTURE
- 8% - HEALTH CARE
- 8% - TRANSPORTATION & SHIPPING
- 7% - EDUCATION
- 7% - PERSONAL & PROTECTIVE SERVICES
- 4% - SKILL INTENSIVE
- 1% - ENTERTAINMENT

SOURCE: GDP DATA IS FROM THE BUREAU OF ECONOMIC ANALYSIS. EMPLOYMENT DATA IS FROM THE BUREAU OF LABOR. POPULATION FROM THE CENSUS BUREAU. ENERGY DATA FROM EIA.

HOW SEVERE WEATHER AFFECTS KEY IOWA INDUSTRIES, AS EXPLAINED BY IOWA EXECUTIVES

AEROSPACE

Iowa State University is a leader in aerospace research and engineering programs. The university has close ties with **Collins Aerospace**, a leader in the global aerospace industry. The company employs more than 1,200 Iowa State alumni in its American and global offices.⁶

Collins Aerospace (under the parent company United Technologies and formerly under **Rockwell Collins**) has three key engine component locations in Iowa.⁷ Rockwell Collins stated that its aerospace business may “not always have alternate sources of supply readily available for certain goods or services, such as liquid crystal displays. A shortage of raw materials or components, the loss of a significant supplier or subcontractor or their inability to meet performance, quality or delivery requirements due to natural disaster... or other causes could have a material adverse effect on our business, financial condition, results of operations and cash flows.”⁸

AIRPORTS

Aviation is a critical part of Iowa’s economy. Twelve percent of Iowa’s economy is linked to aviation and the industry has an economic impact of \$18.4 billion, supporting 47,000 jobs around the state.⁹ There are two major airports in Iowa: Eastern Iowa Airport and Des Moines International Airport, where **Delta Airlines**, **United Airlines**, and **American Airlines** are the most popular airlines.¹⁰

Delta reports, “Our results of operations are impacted by severe weather, natural disasters and seasonality. Severe weather conditions and natural disasters can significantly disrupt service and create air traffic control problems. These events decrease revenue and can also increase costs. In addition, increases in the frequency, severity or duration of thunderstorms, hurricanes, typhoons or other severe weather events, including from changes in the global climate, could result in increases in delays and cancellations, turbulence-related injuries and fuel consumption to avoid such weather, any of which could result in loss of revenue and higher costs.”¹¹



**IOWA HAS HAD
16 BILLION-DOLLAR
WEATHER & CLIMATE
DISASTERS SINCE 2014¹²**

Two Fortune 500 companies are headquartered in Iowa, and both of them have issued warnings about severe weather risks.

Companies operating factories, farms, shops, restaurants, or hotels in Iowa have reported that rising temperatures, extreme weather, and drought are affecting their operations here.

Many also report that increasingly severe weather is affecting their global operations. As Iowa businesses grow, their severe weather risks grow too.

United Airlines states that the airline “may incur substantial costs as a result of changes in weather patterns due to climate change. Increases in the frequency, severity or duration of severe weather events such as thunderstorms, hurricanes, flooding, typhoons, tornadoes and other severe weather events could result in increases in delays and cancellations, turbulence-related injuries and fuel consumption to avoid such weather, any of which could result in significant loss of revenue and higher costs.”¹³

American Airlines is the largest airline in the world,¹⁴ and is also the most popular airline at Des Moines International Airport.¹⁵ The airline warns, “Our business has been and will continue to be affected by many changing economic and other conditions beyond our control, including global events that affect travel behavior, and our results of operations could be volatile and fluctuate due to seasonality...including, among others: weather and natural disasters, including increases in such disasters and related costs caused by more severe weather due to climate change.”¹⁶

CROPS & AGRICULTURE

Iowa produces nearly 10 percent of the nation’s food supply.¹⁷ Iowa’s top four crops are corn, soybeans, hay, and oats; together the four crops represent more than \$14 billion in economic output and the bulk of Iowa’s field crops.¹⁸ For every degree Celsius that the Earth warms, corn yields are projected to decrease 7.4 percent and soybean yields by 3.1 percent.¹⁹

Severe weather events disproportionately hurt states like Iowa that rely heavily on agriculture for revenue. In 2019, multiple instances of unprecedented flooding paralyzed farmers and wiped out fields of crops that could not be saved and were not insured. The estimated value of crops lost in a record flood in March was more than \$2 billion along the Missouri River basin.²⁰ The floods also weakened or destroyed existing levees, making the area more susceptible to future flooding. Soils became so saturated that they were unable to be used, and hundreds were displaced from their homes, yet to return.²¹

One of the hubs of agriculture processing in the United States is Cedar Rapids. The second largest city by population in Iowa, Cedar Rapids is the largest corn processing city in the nation. Fortune 500 companies like **General Mills** and **Archer Daniels Midland** have manufacturing plants or operations centers in Cedar Rapids.



HOW SEVERE WEATHER AFFECTS CASH CROPS (AND FOOD PRICES)

1.

Consistently warmer temperatures stress plants and livestock, reducing crop yields and livestock health.

2.

Rising surface temperatures are disrupting weather patterns, affecting rainfall, and even the timing and duration of growing seasons.

3.

More severe storms are damaging crops and livestock.

General Mills warns investors, “Our ability to make, move, and sell products is critical to our success. Damage or disruption to raw material supplies or our manufacturing or distribution capabilities due to weather, including any potential effects of climate change, natural disaster...could impair our ability to manufacture or sell our products. Many of our product lines are manufactured at a single location...Failure to take adequate steps to mitigate the likelihood or potential impact of such events, or to effectively manage such events if they occur, particularly when a product is sourced from a single supplier or location, could adversely affect our business and results of operations.”²²

Archer Daniels Midland is a global food processing corporation that recently invested \$200 million to update an existing grain processing plant in Iowa.²³ Its most recent annual report states, “The Company’s operations rely on dependable and efficient transportation services, the disruption of which could result in difficulties supplying materials to the Company’s facilities and impair the Company’s ability to deliver products to its customers in a timely manner. The Company relies on access to navigable rivers and waterways in order to fulfill its transportation obligations more effectively...Certain factors which may impact the availability of non-agricultural commodity raw materials are out of the Company’s control including, but not limited to, disruptions resulting from weather, economic conditions, manufacturing delays or disruptions at suppliers...”²⁴

“ **[Most farmers are already] managing for extreme weather events. It’s top of most guys’ minds. We live with mother Nature every day and we’re trying to adapt. We’re geared up to plant and harvest earlier and more quickly.**”²⁵

- RAY GAESSER
CORN AND SOYBEAN FARMER,
CORNING

“ **If you can name a conservation practice, we’re probably doing it... If we can’t make a go of it, on some of the best soil in the world, with a pretty competent farmer, the lights are going to go out for a lot of people.**”²⁶

- ANDY AND MELISSA DUNHAM
OWNERS,
GRINNELL HERITAGE FARM

ENERGY

Iowa is a leader in wind energy and biofuel production. More than one-third of the state's electricity was produced from wind in 2018, the second highest share of any state. While coal is still the primary source of net electricity production, its share of the energy market has significantly decreased over the last decade; in 2008, three-quarters of Iowa's electricity was produced from coal, and today coal produces only 45 percent of the state's electricity.²⁷

Iowa is also the nation's largest ethanol producer, with more than a quarter of the country's production capacity at over four billion gallons per year. After a series of floods in March 2019 in Iowa, Nebraska, and South Dakota, about 13 percent of the nation's ethanol production was impacted. Biorefineries were forced to shut down or slow production, and supply chain disruption caused by railroad damage led to higher prices in affected markets.²⁸

MidAmerican Energy Company provided its Iowa customers with more than half of their electricity from renewable sources in 2017.²⁹ MidAmerican Energy is a subsidiary of Berkshire Hathaway. The official statement from Berkshire Hathaway Energy warns, "The impact of events or conditions caused by climate change, whether from natural processes or human activities, are uncertain and could vary widely, from highly localized to worldwide, and the extent to which a utility's operations may be affected is uncertain. Climate change may cause physical and financial risk through, among other things, sea level rise, changes in precipitation and extreme weather events... Availability of resources to generate electricity, such as water for hydroelectric production and cooling purposes may also be impacted by climate change and could influence the Registrants' existing and future electricity generating portfolio. These issues may have a direct impact on the costs of electricity production and increase the price customers pay or their demand for electricity."³⁰

Renewable Energy Group is a Fortune 1000 biofuel company.³¹ Headquartered in Ames, Renewable Energy Group is the largest producer of biodiesel in North America by volume, and has a total of seven operations sites in Iowa.³² It warns, "If any transportation providers fail to deliver raw materials to us in a timely manner, we may be unable to manufacture products on a timely basis. Shipments of products and raw materials may be delayed due to weather conditions... Any failure of a third-party transportation provider to deliver raw materials or products in a timely manner could harm our reputation, negatively affect our customer relationships and have a material adverse effect on our business, financial condition and results of operations."³³

“ Climate change may cause physical and financial risk through, among other things, sea level rise, changes in precipitation and extreme weather events. ”

- MIDAMERICAN ENERGY COMPANY

“ Any failure of a third-party transportation provider to deliver raw materials or products in a timely manner could harm our reputation, negatively affect our customer relationships and have a material adverse effect on our business, financial condition and results of operations. ”

- RENEWABLE ENERGY GROUP

HEALTH CARE & PHARMACEUTICALS

Iowa has an aging population that requires more medical attention, making its health care industry particularly important.³⁴ Overall, health care has an \$18 billion annual economic impact and provides more than one-fifth of Iowa's non-farm jobs.³⁵

Iowa relies heavily on smaller, independently-owned pharmacies, particularly in rural areas. These pharmacies often serve as suppliers for medication and patient care facilities. For rural communities that lack health care facilities nearby, pharmacists offer the only opportunity to directly discuss patient care. But these pharmacies are more vulnerable to severe weather because they lack the cash reserves to offset financial losses. More than 16 percent of independently-owned pharmacies closed from 2003 to 2018.³⁶

Major pharmacies are impacted by extreme weather as well. **CVS** has 38 Iowa locations³⁷ and warns that severe weather is among the factors that could disrupt their operations, negatively impact consumer shopping patterns, and adversely affect their supply chain.³⁸

HOTELS

The lodging industry in Iowa generated more than \$1 billion in traveler spending for 2018, representing a 12 percent increase from the previous year.³⁹ Severe weather events can limit travel within and to the state, resulting in volatility in the industry.

Hilton operates 51 hotels in Iowa.⁴⁰ The hotel chain's annual report warns, "Macroeconomic and other factors beyond our control can reduce demand for hospitality products and services, including demand for rooms at our hotels. These factors include but are not limited to: climate change or availability of natural resources; natural or man-made disasters and extreme weather conditions, including earthquakes, tsunamis, tornadoes, hurricanes, typhoons, floods, wildfires, volcanic eruptions, oil spills and nuclear incidents."⁴¹

Starwood Hotels, which was recently acquired by Marriott, operates 47 hotels in the state of Iowa.⁴² Starwood's last annual report warned, "[we] are subject to risks from natural disasters such as earthquakes and severe weather, which may result in damage to our properties. Natural disasters and severe weather such as earthquakes, tornadoes, hurricanes or floods may result in significant damage to our properties.

EFFICIENCY & CLIMATE RISK

For decades, Iowa companies have built increasingly large, complex, and fast-moving supply chains. To reach the lowest-cost producers, Iowa companies depend more on Asian, South American, and African markets.

To maximize each individual supplier plant's efficiency, Iowa companies have encouraged their suppliers to specialize. And, to reduce overhead costs, more Iowa companies are following just-in-time inventory practices, which require their global supply chains to operate with greater speed.

As their supply chains become more global, Iowa factories, stores, and plants grow more vulnerable to severe weather in other countries.

The extent of our casualty losses and loss in operating income in connection with such events is a function of the severity of the event and the total amount of exposure in the affected area. When we have geographic concentration of exposures, a single catastrophe or destructive weather event affecting a region may have significant negative effect on our financial condition and results of operations. We may be materially and adversely affected by our exposure to losses arising from natural disasters or severe weather.”⁴³

INFORMATION & COMMUNICATIONS TECHNOLOGY

Rural areas in Iowa attract IT companies to start, relocate, and expand. The state has worked hard to develop relationships with technology companies to foster sustainable growth in the sector and help create jobs. Companies like IBM, Google, Facebook and Microsoft have all recently invested in Iowa to build data centers. In total, the technology industry employs more than 76,000 people and accounts for \$10.7 billion of the state’s economic output.⁴⁴

IBM reports, “Weather exerts a tremendous influence on the economy. It affects productivity, sales and energy consumption, and it can disrupt supply chains and transportation systems. Severe weather can upend lives and businesses for hours, weeks, years or even forever...severe weather is the leading cause of power disruptions in many countries. Global economic losses resulting from weather disasters totaled \$215 billion last year.”⁴⁵

Alphabet, Google’s parent company, informs its investors that “we may experience supply shortages and price increases driven by raw material availability, manufacturing capacity, labor shortages, industry allocations, natural disasters, the effects of climate change (such as sea level rise, drought, flooding, wildfires, and increased storm severity)....In addition, some of the components we use in our technical infrastructure and products are available only from a single source or limited sources, and we may not be able to find replacement vendors on favorable terms or at all in the event of a supply chain disruption.”⁴⁶

“

Severe weather can upend lives and businesses for hours, weeks, years or even forever.

”

- IBM

“

We may experience supply shortages and price increases driven by raw material availability, manufacturing capacity, labor shortages, industry allocations, natural disasters, the effects of climate change (such as sea level rise, drought, flooding, wildfires, and increased storm severity).

”

- ALPHABET

INSURANCE & FINANCIAL SERVICES

The Greater Des Moines area has the highest concentration of insurance employment of any metropolitan area in the United States.⁴⁷ The insurance industry accounts for about 16 percent of the region's jobs, and the area has been called a "global hub of the insurance industry" by the Chamber of Commerce.⁴⁸

Allied Insurance states that "natural disasters and severe weather such as floods, blizzards and rising temperatures may result in damage to the properties. The extent of Allied's casualty losses and loss in operating income in connection with such events is a function of the severity of the event and the total amount of exposure in the affected area...In addition, climate change, to the extent it causes changes in weather patterns, could have effects on Allied's business by increasing the cost of property insurance, and/or energy at the properties. As a result, the consequences of natural disasters, severe weather and climate change could increase Allied's costs and reduce Allied's cash flow."⁴⁹

Progressive Corporation reports that its 2018 "profit results were vastly affected by weather and natural catastrophes. Our catastrophe reinsurance program limited our retained losses and loss adjustment expenses from Hurricane Michael to \$60 million. Unfortunately, our retained catastrophe losses and loss adjustment expenses from hurricanes, hail, winter storms, and the California Wildfires totaled \$295 million."⁵⁰

Travelers Companies, Inc. warns that "severe weather events over the last two decades have underscored the unpredictability of future climate trends, and potentially changing climate conditions could add to the frequency and severity of natural disasters and create additional uncertainty as to future trends and exposures. During that time period, the insurance industry experienced increased catastrophe losses due to a number of potential causal factors, including, in addition to weather/climate variability...For example, hurricane activity has impacted areas further inland than previously experienced by us, and demographic changes have resulted in larger populations in coastal areas which historically have been subject to severe storms and related storm surge, thus expanding our potential for losses from hurricanes. Additionally, both the frequency and severity of tornado and hail storms in the United States have been more volatile during the last decade. The frequency and severity of wildfire losses have been elevated in more recent years."⁵¹

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Climate change, to the extent it causes changes in weather patterns, could have effects on Allied's business by increasing the cost of property insurance, and/or energy at the properties.

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- ALLIED INSURANCE

“

Profit results were vastly affected by weather and natural catastrophes.

”

- TRAVELERS COMPANIES, INC.

Principal Financial is a Fortune 500 financial services company with headquarters in Des Moines.⁵² Principal employs approximately 6,500 workers in Des Moines, making it the third-largest employer in the region.⁵³ Its annual report to investors warns that climate change has intensified severe weather events and natural disasters, which represent significant liabilities to its financial stability: “Atmospheric concentrations of carbon dioxide and other greenhouse gases have increased dramatically since the industrial revolution, resulting in a gradual increase in the frequency and severity of natural disasters...Potential impacts may include the following: climate change may impact asset prices, as well as general economic conditions. For example, rising sea levels may lead to decreases in real estate values in coastal areas. Changes in asset prices may impact the value of our fixed income, real estate and commercial mortgage investments.”⁵⁴

MANUFACTURING

Advanced manufacturing is among Iowa’s largest industries, contributing \$31.2 billion to the state’s economy. There are more than 6,000 manufacturing establishments that employ more than 213,000 Iowans, nearly 13 percent of the workforce.⁵⁵

HNI Corporation, a furniture manufacturer based in Muscatine, has five locations in the state.⁵⁶ HNI warns that “natural disasters, acts of God, force majeure events, or other catastrophic events, including severe weather, military action, terrorist attacks, power interruptions, and fires, could disrupt operations and likewise, the ability to produce or deliver products. Several of the Corporation’s production facilities, members, and key management are located within a small geographic area in eastern Iowa and a natural disaster or catastrophe in the area could have a significant adverse effect on the results of operations and business conditions. Further, several of our production facilities are single-site manufacturers of certain products, and an adverse event affecting any of those facilities could significantly delay production of certain products and adversely affect the operations and business conditions.”⁵⁷

John Deere, producer of farm equipment and other heavy machinery, employs more than 3,000 workers in Iowa.⁵⁸ John Deere warns, “Certain components and parts used in John Deere’s products are available from a single supplier and cannot be alternatively sourced quickly. Supply chain disruptions due to supplier financial distress, capacity constraints, labor shortages, business continuity, quality, delivery or disruptions due to weather-related or natural disaster events could affect John Deere’s operations and profitability...

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Rising sea levels may lead to decreases in real estate values in coastal areas. Changes in asset prices may impact the value of our fixed income, real estate and commercial mortgage investments.

”

- PRINCIPAL FINANCIAL

“

Several of the Corporation’s production facilities, members, and key management are located within a small geographic area in eastern Iowa and a natural disaster or catastrophe in the area could have a significant adverse effect on the results of operations and business conditions.

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- HNI CORPORATION

The potential physical impacts of climate change on John Deere's facilities, suppliers and customers and therefore on John Deere's operations are highly uncertain and will be particular to the circumstances developing in various geographical regions. These may include long-term changes in temperatures levels and water availability. These potential physical effects may adversely impact the demand for John Deere products and the cost, production, sales and financial performance of John Deere's operations."⁵⁹

Winnebago Industries is an RV manufacturing company with more than \$2 billion in revenue in 2018.⁶⁰ Based in Forest City, the company warns of severe weather's impact on its manufacturing operations: "We currently manufacture most of our products in northern Iowa and northern Indiana. These facilities may be affected by natural or man-made disasters and other external events. In the event that one of our manufacturing facilities was affected by a disaster or other event, we could be forced to shift production to one of our other manufacturing facilities or to cease operations. Any disruption in our manufacturing capacity could have an adverse impact on our ability to produce sufficient inventory of our products or may require us to incur additional expenses in order to produce sufficient inventory, and therefore, may adversely affect our net sales and operating results. Any disruption or delay at our manufacturing facilities could impair our ability to meet the demands of our customers, and our customers may cancel orders or purchase products from our competitors, which could adversely affect our business and operating results."⁶¹

TPI Composites is the largest U.S.-based independent manufacturer of composite wind turbines.⁶² The company has a transportation manufacturing facility and a wind blade manufacturing facility in Newton, representing its only two manufacturing facilities in the United States.⁶³ TPI Composites warns that severe weather impacts the installation, distribution, and operation of wind turbines, and negatively affects the company's reputation.⁶⁴

" In the event that one of our manufacturing facilities was affected by a disaster or other event, we could be forced to shift production to one of our other manufacturing facilities or to cease operations. "

- WINNEBAGO INDUSTRIES

" These potential physical effects [of climate change] may adversely impact the demand for John Deere products and the cost, production, sales and financial performance of John Deere's operations. "

- JOHN DEERE

MILITARY

Iowa has more than 11,000 active duty military members and reserve force members employed throughout the state.⁶⁵ There are three Army bases in Iowa: Camp Dodge Army Base in Johnston, Fort Des Moines Army Base in Des Moines, and Iowa Army Ammunition Base in Middletown.⁶⁶

Assistant Secretary of the Army for Civil Works R.D. James said, “As an engineer and after years as a member of the Mississippi River Commission, working with multiple Civil Works water resource projects designed to perform under extreme climatic conditions, I believe it is critical that we look at hydrologic data, analyze hydrologic trends, and understand what is happening on the ground at Army Civil Works projects. That kind of understanding is crucial to assuring those projects continue to perform as designed and that they are sufficiently resilient to face whatever future climatic events may occur...Because most Army Civil Works projects are specifically designed to safely perform and reduce risk under the extremes of the hydrologic cycle, from extreme floods to prolonged drought and everywhere in between, I believe we owe it to the communities, industries and economic sectors that depend on Civil Works systems to assure those systems are sufficiently resilient in order to dependably perform regardless of what future climatic conditions are presented.”⁶⁷

PORTS & SHIPPING

Iowa is the only state in the nation bordered by two navigable rivers, the Mississippi and Missouri.⁶⁸ In 2018, waterways and ports contributed \$4.3 billion to the state’s economy.⁶⁹ Water transport is the most cost-effective method of shipping grain and bulk commodities;⁷⁰ one standard barge has the carrying capacity of 16 rail cars or 70 large tractor trailers, but remains far less energy intensive.⁷¹

But poor infrastructure and the increased risk of flooding threaten the efficiency of water transport. All 11 locks on the Mississippi River that border Iowa are potential bottlenecks that, if damaged or delayed, can cause massive traffic jams along the waterway and limit the flow of goods out of the state.⁷² Additionally, the Missouri River’s unpredictable water levels and dam system, which is 60 percent older than initially intended, leave Iowa susceptible to weather events that could cost the state hundreds of millions of dollars.⁷³



SEVERE WEATHER TREND

HIGHER TEMPERATURES

Temperatures across the U.S. are 1.8 degrees warmer, on average, than they were at the beginning of last century, and most of this increase has occurred since 1970. The last five years have been the globe’s warmest on modern record, and 18 of the 19 warmest years have occurred this century.⁷⁴

Iowa currently averages fewer than 5 dangerous heat days per year; by 2050, Iowa is projected to experience nearly 40 dangerous heat days per year.⁷⁵

RAIL

Iowa is a key state for rail due to its central location in the United States and its robust agricultural economy. Iowa is served by 18 freight railroad companies which operate 3,825 miles of track within the state. Five of these railroads are major national companies operating throughout much of the United States. These Class One railroads are **BNSF Railway**, **Canadian Pacific Railway**, **Canadian National**, **Norfolk Southern**, and **Union Pacific**. They operate 83 percent of Iowa's total route miles, including much of the grain gathering network.⁷⁶

BNSF Railway Company has 631 miles of track and employs 830 people in Iowa.⁷⁷ The railway's annual report states that "the Company's success is dependent on its ability to operate its railroad system efficiently. Severe weather, climate change and natural disasters, such as tornadoes, fires, flooding and earthquakes, could cause significant business interruptions and result in increased costs and liabilities and decreased revenues. In addition, damages to or loss of use of significant aspects of the company's infrastructure due to natural or man-made disruptions could have an adverse effect on the Company's operating results... Extreme swings in weather could also negatively affect the performance of locomotives and rolling stock."⁷⁸

Union Pacific Corporation has 1,441 miles of track and 1,509 employees in Iowa.⁷⁹ Union Pacific warns, "Severe weather could result in significant business interruptions and expenditures - As a railroad with a vast network, we are exposed to severe weather conditions and other natural phenomena, including earthquakes, hurricanes, fires, floods, mudslides or landslides, extreme temperatures, and significant precipitation. Line outages and other interruptions caused by these conditions can adversely affect our entire rail network and can adversely affect revenue, costs, and liabilities, which could have a material adverse effect on our results or operations, financial condition, and liquidity."⁸⁰

RESTAURANTS

Iowa ranks 15th in the nation in restaurants per capita.⁸¹ Altogether, the accommodation and food services industry adds more than \$4.3 billion to Iowa's annual GDP.⁸²

Fast-food chains like **McDonald's** (173 locations),⁸³ **Wendy's** (42 locations),⁸⁴ **Arby's** (56 locations),⁸⁵ **Taco Bell** (53 locations),⁸⁶ and **Subway** (50 locations),⁸⁷ operate restaurants all across Iowa. **McDonald's** warns investors that severe weather or climate change will adversely impact their supply chains, food pricing, and consumer demand; similar effects are felt by their competitors.⁸⁸

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Damages to or loss of use of significant aspects of the company's infrastructure due to natural or man-made disruptions could have an adverse effect on the Company's operating results.

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- BNSF RAILWAY COMPANY

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As a railroad with a vast network, we are exposed to severe weather conditions and other natural phenomena, including earthquakes, hurricanes, fires, floods, mudslides or landslides, extreme temperatures, and significant precipitation.

”

- UNION PACIFIC CORPORATION

Casey's General Stores is one of Iowa's two Fortune 500 companies with headquarters in the state. The chain of convenience stores is based in Ankeny and has 526 locations in Iowa alone.⁸⁹ The company warns investors, "All of our stores are located in the central region of the United States, which is susceptible to tornadoes, thunderstorms, extended periods of rain or unseasonably cold temperatures, flooding, ice storms, and heavy snow. Inclement weather conditions could damage our facilities or could have a significant impact on consumer behavior, travel, and convenience store traffic patterns as well as our ability to operate our locations...In addition, we may have a single supplier or limited number of suppliers for certain products. While we believe there are adequate reserve quantities and alternative suppliers, shortages or interruptions in the receipt or supply of products caused by...inclement weather or other conditions could adversely affect the availability, quality and cost of products, and our operating results."⁹⁰

Dine Brands Global is the parent company of Applebee's and IHOP. There are a combined 20 Applebee's⁹¹ and IHOP⁹² locations in the state. Dine Brands warns that "we may experience shortages or interruptions in the supply or delivery of food and other products from third parties or in the availability of utilities. Our franchised restaurants are dependent on frequent deliveries of fresh produce, food, beverages and other products. Shortages or interruptions in food and beverage supplies may result from a variety of causes, including shortages due to adverse weather... Such shortages could adversely affect our and our franchises' revenue and profits."⁹³

Diversified Restaurant Holdings is the parent company to the Buffalo Wild Wings restaurant chain, which has 19 locations in Iowa.⁹⁴ Diversified Restaurant Holdings warns investors, "Our financial performance is highly dependent on restaurants located in Florida, Illinois, Indiana, Michigan, and Missouri...In particular, adverse weather conditions can impact guest traffic at our restaurants, cause the temporary underutilization of certain seating areas, and, in more severe cases, cause temporary restaurant closures...approximately 73.4% of our total restaurants are located in Illinois, Indiana, Michigan and Missouri, which are particularly susceptible to snowfall, and approximately 26.6% of our total restaurants are located in Florida, which is particularly susceptible to hurricanes."⁹⁵

“**Inclement weather conditions could damage our facilities or could have a significant impact on consumer behavior, travel, and convenience store traffic patterns as well as our ability to operate our locations.**”

- CASEY'S GENERAL STORES

“**Adverse weather conditions can impact guest traffic at our restaurants, cause the temporary underutilization of certain seating areas, and, in more severe cases, cause temporary restaurant closures.**”

- DIVERSIFIED RESTAURANT HOLDINGS

RETAIL

Retail is one of the most significant areas of Iowa's economy. Nearly 325,000 workers are directly employed by retailers, adding more than \$11 billion to the state's GDP.⁹⁶

Walmart, the United States' largest retail brand, has 69 total retail units in Iowa, employs nearly 17,000 store associates across the state, and supports almost 35,000 supplier jobs.⁹⁷ Walmart warns that "the occurrence of one or more natural disasters, such as hurricanes, tropical storms, floods, fires, earthquakes, tsunamis, cyclones, typhoons, weather conditions such as major or extended winter storms, droughts and tornadoes, whether as a result of climate change or otherwise, severe changes in climate... in a country in which we operate or in which our suppliers are located could adversely affect our operations and financial performance."⁹⁸

Target Corporation has 22 locations in Iowa.⁹⁹ Target warns that "uncharacteristic or significant weather conditions, alone or together with natural disasters, could adversely affect our operations. Uncharacteristic or significant weather conditions can affect consumer shopping patterns, particularly in apparel and seasonal items, which could lead to lost sales or greater than expected markdowns and adversely affect our short term results of operations... Natural disasters in those states or in other areas where our sales are concentrated could result in significant physical damage to or closure of one or more of our stores, distribution centers or key vendors, and cause delays in the distribution of merchandise from our vendors to our distribution centers, stores, and guests, which could adversely affect our results of operations by increasing our costs and lowering our sales."¹⁰⁰

Home Depot has ten locations in Iowa and is a leader in the home improvement industry.¹⁰¹ It reports that "natural disasters, such as hurricanes and tropical storms, fires, floods, tornadoes, and earthquakes; unseasonable, or unexpected or extreme weather conditions; or similar disruptions and catastrophic events can affect consumer spending...They can also, temporarily or on a long-term basis, disrupt or disable operations of stores, support centers, and portions of our supply chain and distribution network, including causing reductions in the availability of inventory and disruption of utility services. In addition, these events may affect our information systems, resulting in disruption to various aspects of our operations, including our ability to transact with customers and fulfill orders and to communicate with our stores. Unseasonable, unexpected or extreme weather conditions such as excessive precipitation, warm temperatures during the winter season, or prolonged or extreme periods of warm or cold temperatures could render a portion of our inventory incompatible with customer needs."¹⁰²



SEVERE WEATHER TREND

FLOODING

Warmer climate leads to increased moisture in the atmosphere and more precipitation. The January-May period of 2019 was the wettest start to a year in recorded American history, and this heavy rainfall (as well as significant winter snowfall across the Midwest) was a primary cause in the historic Midwest flooding in March.¹⁰³

The percent of days with very heavy rain in the Midwest has increased by 37% since the late 1950s, increasing the risk of flooding.¹⁰⁴ Severe rainfall can also flood sewer systems, causing the water to overflow into lakes and rivers and harm the water supply. Since 1988, Iowa has had the fourth most floods of any state.¹⁰⁵

Hy-Vee is the largest employer in the state of Iowa, with 82,000 employees in the state.¹⁰⁶ The supermarket chain, headquartered in West Des Moines, is privately owned by its employees and has taken steps to reduce its carbon emissions in an effort to display corporate leadership and responsibility to the communities the chain operates in.¹⁰⁷

TOURISM

Tourism is a proven economic driver for Iowa, generating more than \$8.5 billion in revenue (including more than \$500 million in state tax revenue) and supporting more than 69,000 jobs. Iowa invests \$4.4 million annually to promote tourism to the state.¹⁰⁸

Key tourist attractions in the state include **The National Mississippi River Museum** and the city of **Des Moines**.

The National Mississippi River Museum & Aquarium in Dubuque opened to the public in 2003 and highlights the biodiversity and rich history of the Mississippi River. Since opening, the museum has welcomed 2.25 million visitors and has an estimated economic impact of \$10 million per year.¹⁰⁹

Des Moines is the capital of Iowa and has the highest population of any city in the state, with 217,000 residents.¹¹⁰ The city is also a growing hub for visitors, with a record 13.7 million tourists visiting the city in 2017, up five percent from the previous year.¹¹¹ This tourism generated \$838 million for the metropolitan area and is a critical source of state funding for areas like schools, public safety, and infrastructure.¹¹²

With higher temperatures and more extreme rain events, the Mississippi River faces unpredictable water levels which threatens the water quality and puts a strain on outdoor restaurants, fishing and vacation rentals, and water recreation. Des Moines is also vulnerable to rising temperatures; extreme heat and humidity are particularly dangerous in densely populated urban areas.

“

Now when it rains, it comes down four or five inches at a pop, or we've got tornado warnings. Believe me, the weather is so extreme.¹¹³

”

- **GENE MEALHOW**
OWNER & FARMER,
TINY BUT MIGHTY POPCORN

“

With more and more concrete and severe weather, I don't know where the end is if we don't start doing these things.¹¹⁴

”

- **RONNIE WOLFE**
OWNER,
WOLFEY'S WASPI OUTBACK

REFERENCES

1. Eller, Donnelle. "FREEZE WATCH: Iowa Corn Farmers Face Another Hit –This Time, Yield Losses with Fall Freeze." Des Moines Register. September 6, 2019. <https://www.desmoinesregister.com/story/money/agriculture/2019/09/06/iowa-corn-farmers-face-possible-yield-losses-early-fall-freeze-weather-ethanol-waivers-trade-war/2224831001/>
2. "Global growth, local roots: The shift toward emerging markets." McKinsey and Company. August 2017. <https://www.mckinsey.com/business-functions/operations/our-insights/global-growth-local-roots-the-shift-toward-emerging-markets>
3. American Society of Civil Engineers. "2019 Iowa Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/ASCE_Brochure-IOWA2019.pdf
4. Stebbins, Samuel. "This Northeast State Has the Worst Infrastructure in the U.S. Where Does Yours Rank?" Des Moines Register. July 13, 2019. <https://www.desmoinesregister.com/story/money/2019/07/08/states-that-are-falling-apart/39644781/>
5. United States Census Bureau. "American Fact Finder." Last accessed November 12, 2019. <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>
6. Iowa State University Research Park. "Aerospace Leader Eyes a Win-Win with New Location." January 23, 2019. <http://www.isupark.org/news/aerospace-leader-eyes-a-win-win-with-new-location/>
7. Collins Aerospace. "Locations Guide." <https://utcaerospacesystems.com/locations-contacts/>
8. Rockwell Collins Inc. Annual Report Form 10-K for fiscal year ended September 30, 2018. https://www.sec.gov/Archives/edgar/data/1137411/000113741118000111/col_9302018x10k.htm
9. Iowa Department of Transportation. "Aviation." <https://iowadot.gov/aviation/aviation-in-iowa/aviations-impact-on-iowas-economy>
10. Des Moines Airport Authority. "Traffic Statistics." September 2019. <https://www.dsmairport.com/webres/File/about-the-airport/statistics/2019/09Sep2019.pdf>
11. Delta Air Lines Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000027904/5fcae838-aa00-4be0-95dd-1824e4f97799.pdf>
12. NOAA National Centers for Environmental Information. "Billion Dollar Weather and Climate Disasters." <https://www.ncdc.noaa.gov/billions/>
13. United Airlines Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <http://ir.united.com/static-files/efaf0aee-91ae-45b7-b949-f207111a2976>
14. Arnold, Kyle. "American Airlines Reign as the World's Largest Airline May Be Ending." Dallas News. July 25, 2019. <https://www.dallasnews.com/business/airlines/2019/07/25/american-airlines-reign-as-the-world-s-largest-airline-may-be-ending/>
15. Des Moines Airport Authority. "Traffic Statistics." September 2019. <https://www.dsmairport.com/webres/File/about-the-airport/statistics/2019/09Sep2019.pdf>
16. American Airlines Group Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://americanairlines.gcs-web.com/static-files/ceb67596-d59a-41e3-ad0c-b5556dd43b4a>
17. Iowa Area Development Group. "Value-Added Agriculture - Food Ingredients." https://www.iadg.com/iowa-advantages/value-added-agriculture-food_ingredients/
18. U.S. Department of Agriculture. "State Agriculture Overview." 2018. https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=IOWA
19. Zhao, Chuang and Bing Liu, Shilong Piao, Xuhui Wang, et al. "Temperature Increase Reduces Global Yields of Major Crops in Four Independent Estimates." PNAS. August 29, 2017. <https://www.pnas.org/content/114/35/9326>
20. Eller, Donnelle. "Farm Losses Drive Iowa's Flood Damage to \$2 Billion, Farm Bureau Economists Estimate." Des Moines Register. April 3, 2019. <https://www.desmoinesregister.com/story/money/agriculture/2019/04/03/iowa-flooding-nebraska-missouri-river-farm-losses-damage-2-billion-ag-group-bureau-crop-insurance/3351972002/>
21. Norvell, Kim. "'On Pins and Needles:' Flooded-Out Iowans Brace for a Third Round in Six Months." Des Moines Register. September 17, 2019. <https://www.desmoinesregister.com/story/news/2019/09/17/iowa-flooding-2019-missouri-river-levee-breaches-mills-fremont-county-pacific-junction-hamburg/2355669001/>
22. General Mills Inc. Annual Report Form 10-K for fiscal year ended May 26, 2019. <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000040704/Ofd13703-8eed-4b60-b46c-b2b3199887dc.pdf>
23. Associated Press. "ADM Plans to Invest \$196 Million in Iowa Grain Plant Updates." February 18, 2018. <https://apnews.com/86992337766c4f4bb5b09ab46aa7997a>
24. Archer-Daniels-Midland Company. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://archerdanielsmidland.gcs-web.com/static-files/084bcb66-8954-453e-9043-affdc4896757>
25. Futrell, Susan. "Grinnell Heritage Farm is Farming Against Type – and Against the Odds – in Iowa." Civil Eats. March 27, 2019. <https://civileats.com/2019/03/27/grinnell-heritage-farm-is-farming-against-type-and-against-the-odds-in-iowa/>
26. Eller, Donnelle. "Wetter springs, hotter summers: Climate change threatens Iowa farm economy." Des Moines Register. November 30, 2018. <https://www.desmoinesregister.com/story/money/agriculture/2018/11/30/climate-change-iowa-farm-agriculture-rain-drought-heat-temperature-national-climate-assessment/2115179002/>
27. U.S. Energy Information Administration. "Iowa: State Profile and Energy Estimates." <https://www.eia.gov/state/?sid=IA>
28. Batres-Marquez, S. Patricia. "New Record for U.S. Ethanol Production and Exports in 2018 and an Update on Iowa's Ethanol Industry." Iowa Farm Bureau. March 28, 2019. <https://www.iowafarmbureau.com/Article/New-Record-for-US-Ethanol-Production-and-Exports-in-2018-and-an-Update-on-Iowas-Ethanol-Industry>
29. MidAmerican Energy Company. "MidAmerican Energy Passes 50 Percent Mark in Renewable Energy." June 20, 2018. <https://www.midamericanenergy.com/nr-fiftypercentrenewable>
30. Berkshire Hathaway Energy Company. Annual Report Form 10-K for fiscal year ended December 31, 2018. https://www.brkenenergy.com/assets/upload/financial-filing/BHE%2012.31.18%20Form%2010-K_vFINAL.pdf
31. Fortune 500. "Renewable Energy Group." 2019. <https://fortune.com/fortune500/2019/renewable-energy-group/>
32. Renewable Energy Group Inc. "Growing Our Company and the Biofuel Industry." <https://www.regi.com/about/company/history>
33. Renewable Energy Group Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://investor.regi.com/sec-filings/all-sec-filings/content/0001628280-19-002647/0001628280-19-002647.pdf>
34. Iowa Department on Aging. "Older Iowans." 2019. <https://www.iowadatacenter.org/Publications/older2019.pdf>
35. Iowa Hospital Association. "Economic Impact Report." 2019. <https://www.ihaonline.org/Information/Economic-Impact-Report>
36. Ramm, Michaela. "Big-Pharma Drug Pricing Hurts Iowa's Smallest Pharmacies. Here's What They're Doing About It." The Gazette. July 17, 2019. <https://www.thegazette.com/iowaideas/stories/health-care/iowa-rural-pharmacies-drug-prices-health-care-providers-20190717>
37. CVS. "Locations: Iowa." <https://www.cvs.com/store-locator/cvs-pharmacy-locations/iowa>
38. CVS Health Corporation. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000064803/317e65d9-41c0-4975-b3e1-30f7f2616049.pdf>
39. Travel Iowa. "Economic Impact." 2018. https://www.traveliowa.com/userdocs/pages/Trsm_CountyImpact_08122019.pdf
40. Hotel Locations." <https://www.hilton.com/en/locations/usa/iowa>
41. Hilton Worldwide Holdings Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. https://otp.tools.investis.com/clients/us/hilton_worldwide2/SEC/sec-show.aspx?FilingId=13217616&Cik=0001585689&Type=PDF&hasPdf=1
42. "Find Hotels." <https://www.marriott.com/search/findHotels.mi>
43. Starwood Property Trust. "Annual Report." 2018. http://s22.q4cdn.com/794586023/files/doc_financials/annual/2019/STWD-Annual-Report-2018.pdf
44. Iowa Area Development Group. "Target Industries." <https://www.iadg.com/iowa-advantages/target-industries/>
45. IBM. "Annual Report." 2018. https://www.ibm.com/annualreport/assets/downloads/IBM_Annual_Report_2018.pdf
46. Alphabet Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://www.sec.gov/Archives/edgar/data/1652044/000165204419000004/goog10-kq42018.htm>
47. Greater Des Moines Partnership. "Insurance and Financial Services." 2019. <https://www.dsmpartnership.com/growing-business-here/key-industries/insurance--financial-services>
48. U.S. Chamber of Commerce. "The Insurance Capital of the U.S.? Look to Des Moines." <https://www.uschamber.com/co/good-company/growth-studio/des-moines-iowa-insurance>
49. Allied Insurance. "Annual Report." 2018. http://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_AP.UN_2018.pdf
50. Progressive Corporation. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://investors.progressive.com/static-files/572d8b9b-111a-4a0d-966e-72c1b5a366eb>
51. Travelers Companies Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <http://investor.travelers.com/Cache/396745432.pdf>
52. Fortune 500. "Principal Financial." <https://fortune.com/fortune500/2019/principal-financial/>
53. Greater Des Moines Partnership. "Major Employers." <https://www.dsmpartnership.com/growing-business-here/business-climate/major-employers>
54. Principal Financial Group Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <http://d18rn0p25nwr6d.cloudfront.net/CIK-0001126328/c5bf56a5-2e83-46df-a469-84d27dde7e73.pdf>
55. Iowa Area Development Group. "Target Industries." <https://www.iadg.com/iowa-advantages/target-industries/>
56. HNI Corporation. "Global Locations." <https://www.hnicorp.com/global-locations>
57. HNI Corporation. Annual Report Form 10-K for fiscal year ended December 29, 2018. <http://investors.hnicorp.com/Cache/396886753.pdf>
58. Greater Des Moines Partnership. "Major Employers." https://www.dsmpartnership.com/filesimages/Growing%20Business%20Here/Major%20Employers/DSM_USA_Regional_Major_Employers.pdf
59. Deere & Company. Annual Report Form 10-K for fiscal year ended October 28, 2018. <https://secfilings.nasdaq.com/filingFrameset.asp?FilingID=13111332&RcvdDate=12/17/2018&CoName=DEERE%20&%20CO&FormType=10-K&View=html>

REFERENCES

60. Fortune 500. "Winnebago Industries." <https://fortune.com/fortune500/2019/winnebago-industries/>
61. Winnebago Industries Inc. Annual Report Form 10-K for fiscal year ended August 25, 2018. <https://www.sec.gov/Archives/edgar/data/107687/000010768718000026/a201810-k.htm>
62. TPI Composites. "Welcome to TPI Composites." <http://www.tpicomposites.com/English/home/default.aspx>
63. TPI Composites. "Locations." <http://www.tpicomposites.com/English/contact-us/global-locations/default.aspx>
64. TPI Composites Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <http://d18rn0p25nwr6d.cloudfront.net/CIK-0001455684/569bbafc-51f7-4063-856e-f92f56cb0813.pdf>
65. Governing. "Military Active-Duty Personnel, Civilians by State." <https://www.governing.com/gov-data/public-workforce-salaries/military-civilian-active-duty-employee-workforce-numbers-by-state.html>
66. Military Bases. "Iowa." <https://militarybases.com/iowa/>
67. Femia, Francesco & Caitlin Werrell. "UPDATE: Chronology of U.S. Military Statements and Actions on Climate Change and Security: Jan 2017-Oct 2019." Climate and Security. November 1, 2019. <https://climateandsecurity.org/2019/11/01/update-chronology-of-u-s-military-statements-and-actions-on-climate-change-and-security-jan-2017-november-2019/>
68. Iowa Department of Transportation. "Systems Planning: Iowa's Waterway System." https://iowadot.gov/systems_planning/Planning/Waterway
69. American Society of Civil Engineers. "2019 Iowa Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/ASCE_Brochure-IOWA2019.pdf
70. Iowa Department of Transportation. "Systems Planning: Iowa's Waterway System." https://iowadot.gov/systems_planning/Planning/Waterway
71. Iowa Department of Transportation. "Compare: Cargo Capacity." <https://iowadot.gov/compare.pdf>
72. Patane, Matthew. "Can Iowa Keep Up with What It Needs to Ship?" The Gazette. May 8, 2019. <https://www.thegazette.com/iowaideas/stories/transportation/can-iowa-keep-up-with-what-it-needs-to-ship-20170709>
73. American Society of Civil Engineers. "2019 Iowa Infrastructure Report Card." https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/ASCE_Brochure-IOWA2019.pdf
74. Schwartz, John and Nadja Popovich. "It's Official: 2018 Was the Fourth-Warmest Year on Record." New York Times. February 6, 2019. <https://www.nytimes.com/interactive/2019/02/06/climate/fourth-hottest-year.html?mtrref=www.google.com&assetType=REGIWALL&mtrref=www.nytimes.com&gwh=4806433B8DOFB4F701FCD-2CF48E177BA&gwt=pay&assetType=REGIWALL>
75. States at Risk. "Iowa Extreme Heat." <https://statesatrisk.org/iowa/extreme-heat>
76. Iowa Department of Transportation. "Iowa Freight Rail Profiles." <https://iowadot.gov/iowarail/iowa-Freight-Rail/Profiles>
77. Iowa Department of Transportation. "BNSF Railway." <https://iowadot.gov/iowarail/pdfs/bnsf.pdf>
78. BNSF LLC. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://www.bnsf.com/about-bnsf/financial-information/pdf/10k-llc-2018.pdf>
79. Union Pacific Corporation. "Union Pacific in Iowa." https://www.up.com/cs/groups/public/@uprr/@corprel/documents/up_pdf_natedocs/pdf_iowa_usguide.pdf
80. Union Pacific Corporation. Annual Report Form 10-K for fiscal year ended December 31, 2018. https://www.up.com/cs/groups/public/@uprr/@investor/documents/investordocuments/pdf_up_10k_02082019.pdf
81. Carlson, Brian Taylor. "The Des Moines Metro Area Has Lost at Least 8 Restaurants Since June 1." Des Moines Register. July 8, 2019. <https://www.desmoinesregister.com/story/entertainment/dining/2019/07/06/restaurant-closings-des-moines-iowa-restaurant-association-food-trends-where-to-eat/1638387001/>
82. Bureau of Economic Analysis. "Gross Domestic Product by State." 2018. https://apps.bea.gov/itable/drilldown.cfm?reqid=70&stepnum=40&Major_Area=3&State=19000&Area=XX&TableId=505&Statistic=79&Year=2018&YearBegin=-1&Year_End=-1&Unit_Of_Measure=Levels&Rank=0&Drill=1
83. Sawicki, Beth. "See How Many McDonald's Restaurants Are Located in Your State." Rare. September 5, 2016. <https://rare.us/rare-life/food-and-drink/see-how-many-mcdonalds-restaurants-are-located-in-your-state/>
84. Wendy's. "Locations: Iowa." <https://locations.wendys.com/united-states/ia>
85. Arby's. "Locations: Iowa." <https://locations.arbys.com/ia.html>
86. Taco Bell. "Locations: Iowa." <https://locations.tacobell.com/ia.html>
87. Subway. "Locations: Iowa." <https://www.subway.com/en-US/FindAStore>
88. McDonald's Corporation. Annual Report Form 10-K for fiscal year ended December 31, 2018. <http://d18rn0p25nwr6d.cloudfront.net/CIK-000063908/94ad07bd-66c3-433c-a81e-94f1587b0ed8.pdf>
89. Casey's General Store. "Casey's Annual Report." 2019. [https://s2.q4cdn.com/194594550/files/doc_financials/annual/2019/FINAL-ANNUAL-REPORT-FOR-WEB-POSTING-\(WCAG\).pdf](https://s2.q4cdn.com/194594550/files/doc_financials/annual/2019/FINAL-ANNUAL-REPORT-FOR-WEB-POSTING-(WCAG).pdf)
90. Casey's General Store Inc. Annual Report Form 10-K for fiscal year ended April 30, 2019. <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000726958/7f0488a4-92a2-44a6-96f8-3d8f3197589c.pdf>
91. Applebee's. "Locations: Iowa" <https://www.applebees.com/en/restaurants?searchQuery=iowa>
92. IHOP. "Locations: Iowa." <https://www.ihop.com/en/restaurants?searchQuery=iowa>
93. Dine Brands Global Inc. Annual Report Form 10-K for fiscal year ended December 31, 2018. <https://investors.dineequity.com/static-files/b2c3cdd8-c3fe-4178-b35c-1c9a315103cb>
94. Buffalo Wild Wings. "Locations: Iowa." <https://www.buffalowildwings.com/en/locations/>
95. Diversified Restaurant Holdings, Inc. Annual Report Form 10-K for fiscal year ended December 30, 2018. <http://d18rn0p25nwr6d.cloudfront.net/CIK-0001394156/fa747ed0-2ef7-4102-a1de-35f048e13b47.pdf>
96. National Retail Federation. "Retail's Impact: Iowa." <https://nrf.com/retails-impact/iowa>
97. Walmart Inc. "Location Facts: Iowa." <https://corporate.walmart.com/our-story/locations/united-states/iowa?multi=false>
98. Walmart Inc. Annual Report Form 10-K for fiscal year ended January 31, 2019. <http://d18rn0p25nwr6d.cloudfront.net/CIK-0000104169/b23b2787-eb44-4e0b-82bd-fca01f140a3e.pdf>
99. AllStays. "Target Locations: Iowa." <https://www.allstays.com/c/target-iowa-locations.htm>
100. Target Corporation. Annual Report Form 10-K for fiscal year ended February 2, 2019. <https://investors.target.com/static-files/09567fb4-f6f4-4370-b758-c40184dc4e12>
101. Home Depot Inc. "Store Directory: Iowa." <https://www.homedepot.com/l/IA>
102. Home Depot Inc. Annual Report Form 10-K for fiscal year ended February 3, 2019. https://www.sec.gov/Archives/edgar/data/354950/000035495019000010/hd_10k02032019.htm
103. Bob Henson. "Wettest 12 Months in U.S. History—Again." Weather Underground. June 6, 2019. <https://www.wunderground.com/cat6/Wettest-12-Months-US-HistoryAgain>
104. National Climate Assessment. "Heavy Downpours Increasing." 2014. <https://nca2014.globalchange.gov/report/our-changing-climate/heavy-downpours-increasing>
105. Eller, Donnelle. "Wetter Springs, Hotter Summers: Climate Change Threatens Iowa Farm Economy." Des Moines Register. November 30, 2018. <https://www.desmoinesregister.com/story/money/agriculture/2018/11/30/climate-change-iowa-farm-agriculture-rain-drought-heat-temperature-national-climate-assessment/2115179002/>
106. Zippia. "The 100 Largest Companies in Iowa for 2019." <https://www.zippia.com/advice/largest-companies-in-iowa/>
107. Hy-Vee. "Our Sustainability Mission." 2019. <https://www.hy-vee.com/corporate/our-company/sustainability/>
108. Travel Federation of Iowa. "Iowa Tourism Facts." 2019. <https://www.travelfederationofiowa.com/wp-content/uploads/2019/01/2019IowaTourismFastFacts5th.pdf>
109. Community Foundation of Greater Dubuque. "National Mississippi River Museum & Aquarium." <https://www.dbqfoundation.org/donors/giving-center/national-mississippi-river-museum-aquarium>
110. World Population Review. "Population of Cities in Iowa." 2019. <http://worldpopulationreview.com/states/iowa-population/cities/>
111. Catch Des Moines. "Des Moines Draws Record Number of Visitors to Region." December 14, 2017. <https://www.catchdesmoines.com/articles/post/des-moines-draws-record-number-of-visitors-to-region/>
112. Ibid.
113. Severson, Kim. "From Apples to Popcorn, Climate Change is Altering the Foods America Grows." The New York Times. April 30, 2019. <https://www.nytimes.com/2019/04/30/dining/farming-climate-change.html>
114. Eller, Donnelle. "Flooding has slammed every Iowa county since 1988, some as many as 17 times." Des Moines Register. April 29, 2018. <https://www.desmoinesregister.com/story/money/agriculture/2018/04/29/iowa-flood-center-ranks-disaster-damages-billions-wapsipinicon-river/422336002/>

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The Business Forward Foundation is an independent research organization that takes a business-minded look at policy issues affecting America's economic competitiveness. The Foundation combines insights and advice from more than 100,000 local business leaders across the country with rigorous policy analysis to educate the general public on some of the most important issues of our time.



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