

State by state: An analysis of U.S. companies and cities across seven states

Bracing for the impacts of climate change



2,000+ responses

from U.S. companies and cities from 2014 to 2017 revealed their attitudes to major risks and opportunities to their businesses and communities in the face of dangerous climate change and a chaotic policy landscape.

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This report's findings are based on disclosures of 638 companies who responded to CDP's 2014–2017 climate change, water and supply chain information requests, made on behalf of investors with over \$87 trillion in assets, and purchasing organizations with over \$3 trillion in spending power as well as 127 U.S. cities who responded to CDP's 2017 cities information request. In this report, all price values are in USD unless otherwise stated; and all emissions are reported in metric tons.

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Key findings

The absence of a coherent policy landscape across the whole country continued to put companies at risk of climate change.

This report examines how corporations and cities across the United States react to climate change in states spread across key economic regions: in Texas and Florida, Arizona and Colorado, California, Ohio, and Illinois.

A clear picture emerges from the environmental disclosures they voluntarily made to CDP in the 2017 disclosure cycle:

- ▼ **Environmental regulations remained a widely reported risk.** But that was not the full story. Absence of a coherent policy landscape across the whole country continued to put companies at risk of climate change:
 - Some companies, like **Deere and Co**, made unambiguous statements affirming that climate change is an important global business issue affecting its business interests and that of its customers.
 - For others, like **American Electric Power**, a shifting regulatory landscape was a greater concern than the impact of the climate policy itself. This could suggest that companies who have taken steps to get ahead of actual or expected regulations see little benefit in abrupt shifts in policy direction.
- ▼ **U.S. businesses continued to report potential risks—and often actualized disruptions—to their operations linked to a rapidly changing climate.** They further reported the steps they were taking to manage these risks, since their investors and customers expected them to. However, not all companies were acting in this way to neutralize risk, and too few were fully “future-proofing” themselves to adapt to a low carbon economy. The data did reveal a few instances of comprehensive action, which could serve as emerging best-practice examples.
 - In the real estate sector, 88 percent of all disclosing U.S. companies, like **Ventas**, pointed to the impact of risks stemming from flooding, hurricanes, storm surges, and sea level rise on their businesses.

- Insurance companies, like **Allstate** and **American International Group (AIG)**, are already managing the risks associated with extreme weather events through strategies such as adjusting product pricing and discontinuing coverage in certain areas prone to such events.
- By measuring and monitoring its risk exposure, this led **United Airlines** to conclude that it was facing real operational disruptions; it has since set a goal to reduce its greenhouse gas emissions by 50 percent by 2050.

- ▼ **This year's report looks at disclosures by cities for the first time.** Since 2014, disclosure to CDP by U.S. cities have grown three-fold to 127 cities across 35 states, as has the trend of local policy leadership and innovation. What U.S. cities said about key risks and opportunities provides an additional layer of intelligence about how climate change is managed across the country. Insights into policies, targets and investments at the city-level intersect geographically with where corporate assets and operations are physically located, and where companies' workforces, customers and suppliers live and work.

Rising cost of climate change set against an incoherent policy landscape

Much has transpired in the United States since 2015, when the world's governments reached a historic agreement to curb greenhouse gas emissions in line with what climate science said was crucial to avoid the worst outcomes of dangerous climate change. U.S. climate negotiators played a leading role in brokering this deal—the Paris Agreement—and the U.S. government pledged to cut this country's net greenhouse gas emissions by 26–28 percent by 2025. Buttressing this pledge was a groundswell of city- and state-level leadership, and robust commitments from some of the country's biggest companies to do their part as well.

Over the last three years, macroeconomic and socio-political developments have changed this landscape markedly:

At the national level, the current Federal Administration has signalled that it will withdraw from the Paris Agreement (a decision that will not take effect before November 4, 2020, the day after the next presidential election). Once that happens, this will leave only the United States and Nicaragua in opposition to this international effort. But, again, that is not the full story.

At the state level, California has legislated to have 100 percent carbon-free electricity by 2045, Colorado has introduced a fresh Climate Action Plan (complementing a 2017 target to reduce greenhouse gas emissions by 26 percent by 2025), and North Carolina this year committed to cut greenhouse gas emissions by 40 percent by 2025 (to expressly demonstrate that state's support of the Paris Agreement).¹ Political commentators saw a mixed result for climate in the 2018 midterm election results: in Washington, for the third time voters rejected laws to put a price on carbon, while in Florida, voters embraced a measure to ban oil and gas drilling in state waters.²

Another perspective comes from the latest U.S. National Climate Assessment, a government-wide examination of this country's progress in tackling climate change, including a quantification of the impact of action versus inaction on the national economy.³ The Fourth Assessment concluded that economic contraction could be attributable to climate change, citing projected annual losses in some sectors to reach hundreds of billions of dollars by the end of this century. The report further concluded that the forecasted impacts of climate change were already a reality, with higher instances of wildfires, hurricanes, and heat waves becoming a new normal.⁴

Why does all of this matter?: 2020 aka "Paris +5"

In two years' time, in 2020, the world will return to the international negotiating table to do two things: First, to assess progress made toward curbing the worst dangers of climate change since the Paris Agreement was made in 2015. Second, to table new plans of action that, hopefully, will match the ambition outlined in the Paris Agreement.

So, the more that U.S. companies and cities are buffeted by policy instability and inconsistency, the more difficult it will be for them to shift gears to match the global economy's shift to being low carbon and resilient. And the less the global economy is smoothly "re-tooled" for a low carbon future, the more value will be undermined or eliminated altogether due to the impacts of climate change.

This report shows that substantial numbers of companies and cities are already on "the journey"; however, too many are preoccupied with bracing for the dual impacts of dangerous climate change and a chaotic policy landscape, rather than focusing on future preparedness and resilience. ▼

1. California legislation: SB100, enacted September 10, 2018; New York bill: Climate and Community Protection Act, passed the NYS Assembly April 24, 2018; Colorado executive order: D2017-015, "Supporting Colorado's Clean Energy Transition", signed July 11, 2017; North Carolina executive order: EO80, "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy", signed October 29, 2018. State policies resource: [C2ES State Climate Policy Maps](#).

2. "What do midterms mean for climate change, the economy and other issues?" The Guardian, November 7, 2018.

3. This Assessment is prepared for Congress as required by the Global Change Research Act of 1990. Its authors—13 federal agencies including the Departments of Commerce, Energy, Defense and State, and the Environment Protection Agency—are required to develop and coordinate "a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." The latest publication, Volume II of the Fourth National Climate Assessment published on November 23, 2018 "analyze[s] the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity," [GCRA Mandate](#), November 30, 2018.

4. "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II," U.S. Global Change Research Program, November 23, 2018.

Chapter 1

Texas and Florida

2017 was the most expensive natural disaster year in U.S. history to date, with damages costing over \$300 billion nationwide.⁵ The gulf states of Florida and Texas were particularly impacted.

\$300 billion

Cost of damages in 2017, the most expensive natural disaster year in history

Unsurprisingly, natural disasters were also a heavily reported risk by companies headquartered there. In August that year, Floridian and Texan businesses and communities experienced the worst of Hurricane Harvey, a single event that alone brought damages of ~\$125 billion, and Hurricane Irma that followed shortly thereafter (damage bill: at least \$50 billion⁶). In 2018, Hurricanes Florence and Michael have wreaked similar havoc, with estimations placing total damages between \$17 billion and \$22 billion,⁷ and \$2 billion and \$3 billion,⁸ respectively.

Extreme weather a top risk for Gulf Coast companies

2017 corporate disclosure to CDP by Gulf Coast companies captured many reports of the financial implications of extreme weather, particularly how it would harm physical assets and affect normal business operations. Tropical cyclones were a top risk reported by companies headquartered in Florida.⁹ At the national level, since 2014, the number of times U.S. companies reporting the risk 'changes in mean (average) precipitation' has jumped by 30 percent.¹⁰

In the real estate sector, 88 percent of all disclosing U.S. companies pointed to the impact of risks stemming from flooding, hurricanes, storm surges, and sea level rise.¹¹ **Ventas**, one of the world's largest real estate investment trusts, has significant property holdings in the healthcare industry across the U.S. and Canada, of which its Floridian and Texan properties represent 11 percent.¹² Ventas expressed how this type of risk could translate into quantifiably higher costs to its business.

"... we are vulnerable to extreme weather due to precipitation extremes and droughts. These risks can result in (a) more frequent payments of insurance deductibles due to damage to our properties, (b) higher insurance premiums due to increased claims, and (c) temporary service disruption. Insurance related costs could be in the tens of thousands of dollars."

Ventas Inc., Real Estate

Nationwide commercial fleet and supply chain management company **Ryder System** reported direct financial impact in the form of property damage due to extreme weather events.

"... [Tropical cyclones] would present a direct risk and financial impact to our operations. The financial implications would include damage to our facilities, vehicles, or other equipment that would increase our operational cost. For example, in 2012, Ryder incurred a charge of \$8 million for property damage to vehicles owned by full service lease customers due to superstorm Sandy. Additionally, company-owned units with a carrying value of \$15.7 million were damaged or completely destroyed as a direct result of the storm."

Ryder System, Inc., Ground Transportation—Trucking Transportation

In November 2018, Ryder announced the purchase of 1,000 medium-duty electric vehicle vans (the largest reported EV order in the U.S.), and a new deal with its customer, FedEx, to service its commercial and residential parcel delivery business in California.¹³

Insurance risks emerging in disclosures

Noble Energy, a Texan oil and gas company with operations in the Gulf of Mexico as well as in the Mediterranean and West Africa, reported the financial and operational impacts of extreme weather and raised the possibility that damages might not be fully recoverable due to insufficient insurance.

"...Extreme weather conditions increase the Company's operating costs, and damages may not be fully insured...Additionally, any severe weather increase in areas of the Company's operations could potentially impact its ability to conduct normal activities, which could negatively affect revenue."

Noble Energy Inc., Oil and Gas

5. "2017 was the costliest US natural disaster year on record," Public Radio International, January 27, 2018.

6. "US shatters record for disaster costs in 2017," CNN, January 8, 2018.

7. "Hurricane Florence damage estimated at \$17 billion to \$22 billion and could go higher—Moody's Analytics," CNBC, September 17, 2018.

8. "Hurricane Michael Wind and Storm Surge Cause An Estimated \$3 Billion to \$5 Billion in Losses," CoreLogic Analysis Shows," CoreLogic, October 12, 2018.

9. Six out of the nine companies with headquarters in Florida that disclosed to CDP in 2017 disclosed tropical cyclones as a risk.

10. The number of times U.S. companies reported the risk 'changes in mean (average) precipitation' to CDP jumped from 30 in 2014 to 39 in 2017.

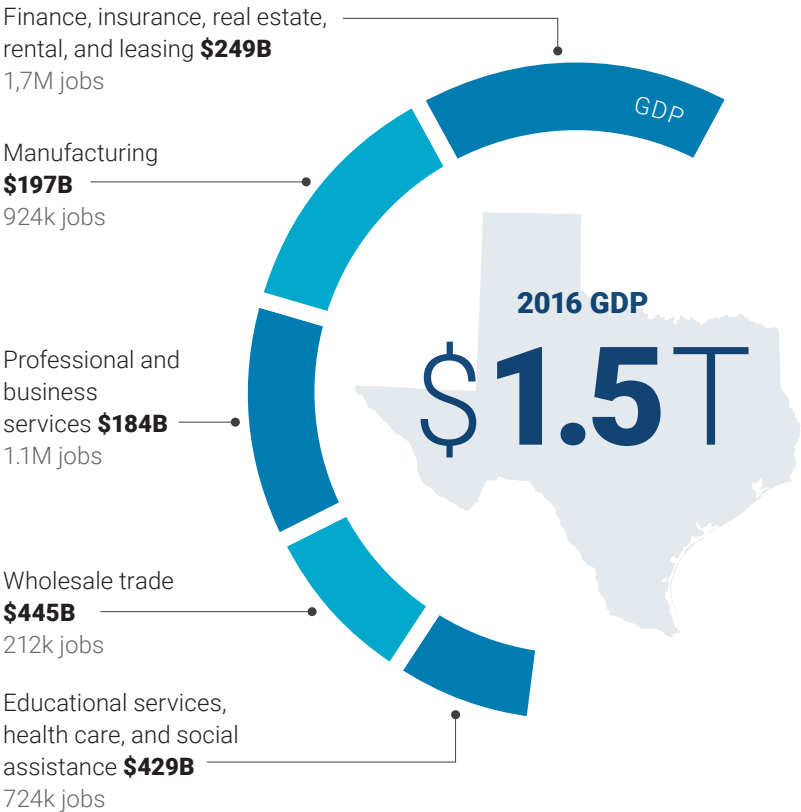
11. 16 out of the 18 U.S. real estate companies that disclosed to CDP in 2017 reported risks related to flooding, hurricanes, storm surges, and sea level rise. These risks are: sea level rise, tropical cyclones (hurricanes and typhoons), changes in precipitation extremes and droughts, changes in precipitation patterns, and uncertainty of physical risks.

12. 137 out of 1,184 properties across the U.S. and Canada in Ventas's portfolio as of Q3 2018 were located in Texas and Florida. *Ventas Properties by Location*, Ventas Inc., September 30, 2018.

13. "Ryder Paves the Way for Adoption of Commercial Electric Vehicles with the Largest Electric Truck Order and Service Footprint in the U.S.," Ryder System Inc., November 25, 2018.

Texas // State profile

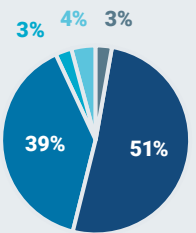
Major industries by GDP and employment



#6 in energy consumption per capita
20.3% share of US energy production

Energy production

- Coal
- Natural gas
- Crude oil
- Nuclear
- Renewables



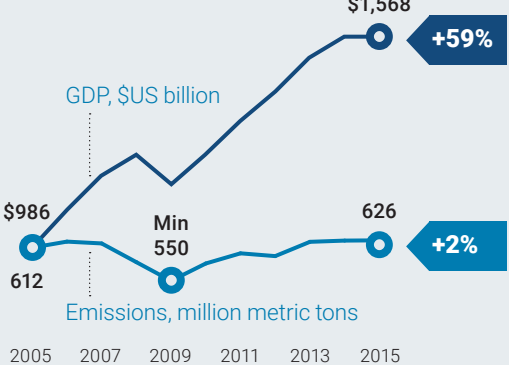
Energy consumption per dollar GDP

Thousands BTU/dollar

Texas 8.9

US 5.8

CO₂ emissions and GDP



Flooding in Houston, TX after hurricane Harvey, 2017



State emissions reduction target

NONE

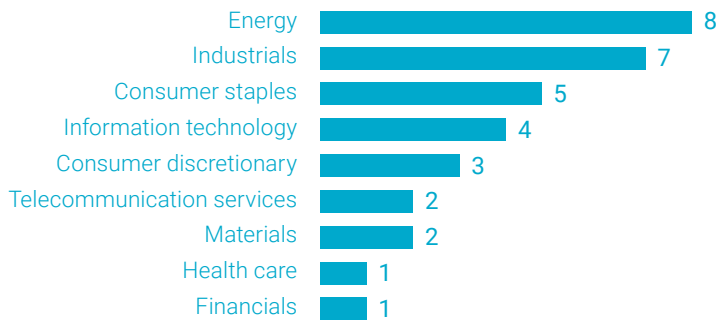


State climate change action plan

NONE

Texas // Companies

33 disclosing companies



1.5T

total market capitalization,
\$USD

335.6M

reported GHG emissions
by companies, mtCO₂e

24

companies with emissions
reduction targets

9

companies reporting
science-based targets

10

companies pricing or planning
to apply internal carbon pricing



**Risk
drivers**

Top risk drivers

- Carbon pricing
- Emission reporting obligations
- General environmental regulations, including planning & Reputation (tie)

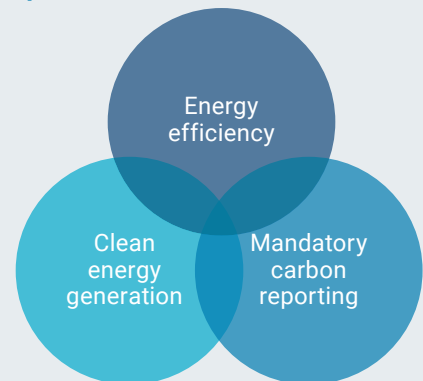


**Opportunity
drivers**

Top opportunity drivers

- Reputation
- Carbon pricing
- Fuel/energy taxes and regulations

Top policy engagement activities by companies



Texas // Cities

9

disclosing cities*

1

city with emissions
reduction targets

7.7M

total populations
of disclosing cities

35M mtCO₂e

reported GHG emissions by cities



**Risk
drivers**

Top risk drivers

- Extreme hot days
- Drought
- Flash/surface flood



**Opportunity
drivers**

Top opportunity drivers

- Development of new business industries (e.g., clean tech)
- Increased infrastructure investment
- Increased attention to other environmental concerns

* Two cities submitted a private response and are not shown on the map.

80%

of U.S. real estate companies reported risks of flooding, hurricanes, storm surges, and sea level rise

This is significant since 2017 is already recorded as the most expensive disaster year for insurance companies, in terms of insured losses, according to **Munich Re**.¹⁴ The North Atlantic hurricane season was especially costly, with overall losses amounting to \$215 billion, of which roughly \$120 billion was expected to be uninsured.¹⁵

Insurance companies, like **Allstate** and **American International Group (AIG)**, are already managing the risks associated with extreme weather events through strategies such as adjusting product pricing and discontinuing coverage in certain areas prone to such events.

"... On a countrywide [level] in areas most exposed to hurricanes, we are limiting personal homeowners, landlord package and manufactured home new business policies, implementing tropical cyclone deductibles where appropriate, and not offering continuing coverage on certain [properties]. We continue to seek appropriate returns for the risks we write.

...Severe weather data enters our pricing models quickly. Should climate change produce changes in weather patterns, Allstate will be able to quickly adjust our product pricing to ensure appropriate returns for the risks we write."

Allstate, Banks, Diverse Financials, Insurance

"...Climate change may increase both the frequency and severity of claims or the cost of defending such claims. An example of specific actions taken are that AIG policies are primarily written for 12-month periods providing the ability to modify underwriting practices and pricing procedures, limiting the financial impact of such increase in claims."

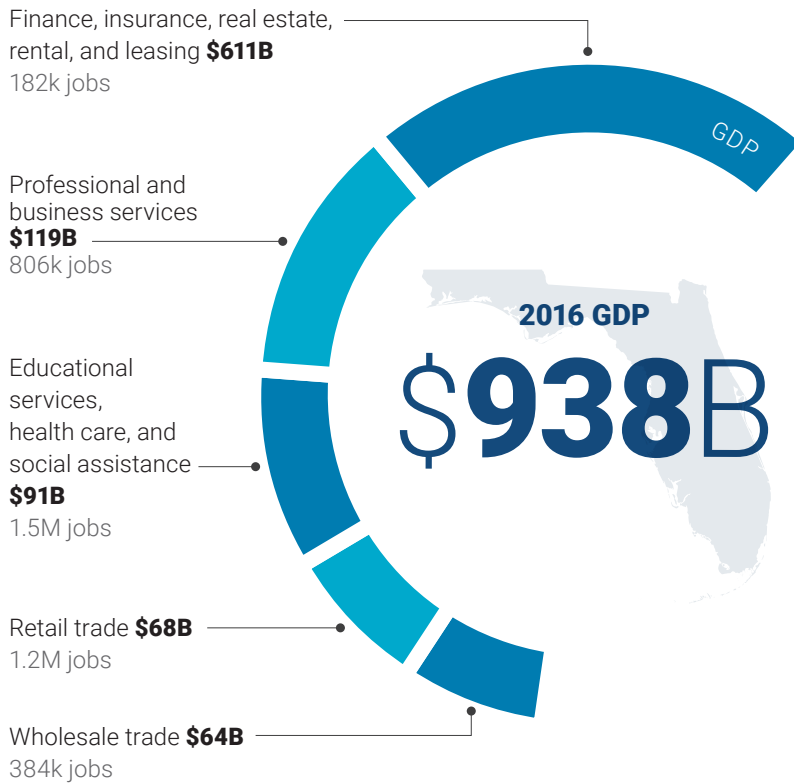
American International Group, Inc., Banks, Diverse Financials, Insurance

14. "Natural catastrophe review: Series of hurricanes makes 2017 year of highest insured losses ever," Munich RE, January 4, 2018.

15. "Hurricanes cause record losses in 2017—The year in figures," Munich RE, January 4, 2018.

Florida // State profile

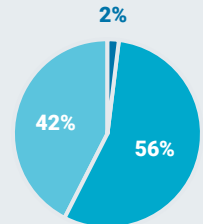
Major industries by GDP and employment



#46 in energy consumption per capita
0.7% share of US energy production

Energy production

■ Crude oil
■ Nuclear
■ Renewables



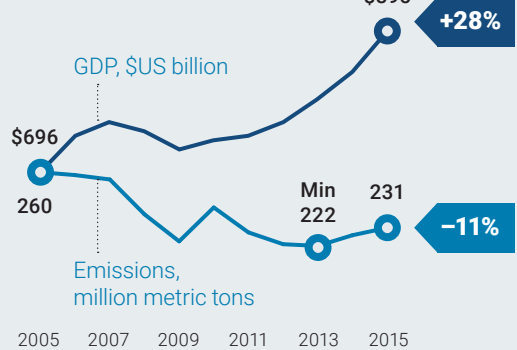
Energy consumption per dollar GDP

Thousands BTU/dollar

Florida **5.2**

US **5.8**

CO₂ emissions and GDP



Storm approaching Miami, FL



State emissions reduction target

1990 levels by 2025

80% below 1990 levels by 2050



State climate change action plan

Finalized in **2008**

Florida // Companies

9 disclosing companies



159.6B

total market capitalization in USD

22.9M

reported GHG emissions by companies, mtCO₂e

5 

companies with emissions reduction targets

1 

companies reporting science-based targets

1 

companies pricing or planning to apply internal carbon pricing



Risk drivers

Top risk drivers

- Carbon pricing
- Tropical cyclones (hurricanes and typhoons)
- Fuel/energy taxes and regulations

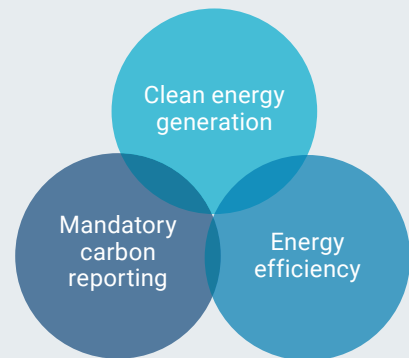


Opportunity drivers

Top opportunity drivers

- Changing consumer behavior
- General environmental regulations, including planning
- Product efficiency regulations and standards

Top policy engagement activities by companies



Florida // Cities

7

disclosing cities*

3

cities with emissions reduction targets

1.1M

total populations of disclosing cities

5.8M mtCO₂e

reported GHG emissions by cities

- Disclosing city
- Disclosing city with target(s)



Risk drivers

Top risk drivers

- Coastal flood
- Precipitation extremes and storms
- Vector-borne disease



Opportunity drivers

Top opportunity drivers

- Increased attention to other environmental concerns
- Increased infrastructure investment
- Development of new business industries (e.g. clean tech)

* One city submitted a private response and is not shown on the map.

Chapter 2

Arizona and Colorado

Arizona, a state with an annual GDP amounting to over \$300 billion¹⁶ and a population of 7 million,¹⁷ is situated entirely within the Colorado River watershed, making its economy particularly linked to the health of this watershed.

70+

serious water risks were reported by companies operating along the Colorado River basin in 2017.

Almost half of the water consumed by Arizona's agricultural sector is supplied by the Colorado River, alongside 40 percent of all industrial and municipal water use. Without this water source, Arizona's GDP could drop by over \$185 billion and put over 2 million jobs at risk.¹⁸ In June 2018, the Arizona Department of Water Resources warned that under current water allocation rules, an extended drought could cause central Arizona to lose its entire Colorado River supply in the next five years.¹⁹

Water risks reported as a disruption to operations and growth

In 2017, more than 70 serious water risks were reported by companies operating along the Colorado River Basin, who represent a combined market cap of over \$783 billion.²⁰ Over 70 percent of these water-related risks were linked to expectations of higher operating costs and plant/production disruption.²¹

Defense company **Raytheon** reported that 11–20 percent of its global revenue (more than \$25 billion in 2017) could be affected by water risk in the Colorado River Basin, including its Airport and Palo Verde Tucson operations in Arizona. It reported that the potential impact of increased water scarcity would be constraint to growth.

"We have made capital investments for water conservation measures in water scarce areas where we operate. Examples include cooling tower upgrades in Tucson and El Segundo, which saved many gallons of water annually. We also did xeriscaping in Tucson and El Segundo that completely eliminated the need for irrigation water."

Raytheon Company, Aerospace and Defense

Freeport McMoran, a Phoenix-based mining company and one of the world's largest copper producers, identified water risks affecting its mines in Arizona as well as management strategies like water banking to protect against operational disruptions.

"During 2016, Freeport-McMoRan stored about 16,600 acre-feet (20,500 megaliters) of renewable surface water supplies at Groundwater Savings Facilities (GSFs) within Arizona for the purpose of accruing Long-Term Storage Credits that can later be withdrawn to support existing operations or potential future mine expansions at many of our Arizona operations."

Freeport-McMoran, Inc., Mining—Iron, Aluminum, Other Metals

Unilever's dairy facility in the region—producing brands such as Breyers, Ben & Jerry's, Klondike, and Good Humor—reported water risks that could disrupt plans to grow production to meet the ice cream demands across the Western seaboard.²²

"...In the event that water levels in Lake Mead continue to drop, and a similar response from the water authorities imposed to that taken by neighboring California, it is very probable that our ice cream production at the site would be disrupted."

Unilever, Consumer Durables, Household and Personal Products

Companies also reported efforts to calculate the cost of investing in strategies to curb water risks. One company, **Caesar's Entertainment**, which operates over 50 casinos and hotels worldwide, reported that "\$10M–\$15M would be the cost to significantly reduce water use at four resort/casino locations in the Colorado River Basin considered at risk."

16. "Annual Gross Domestic Product (GDP) by State," Bureau of Economic Analysis, November 14, 2018.

17. "QuickFacts: Arizona, United States," United States Census Bureau, July 1, 2017.

18. "The Economic Importance of the Colorado River to the Basin Region," Arizona State University, December 18, 2014.

19. "Joint Briefing: Lower Basin Drought Contingency Plan," Arizona Department of Water Resources and Central Arizona Project, June 28, 2018.

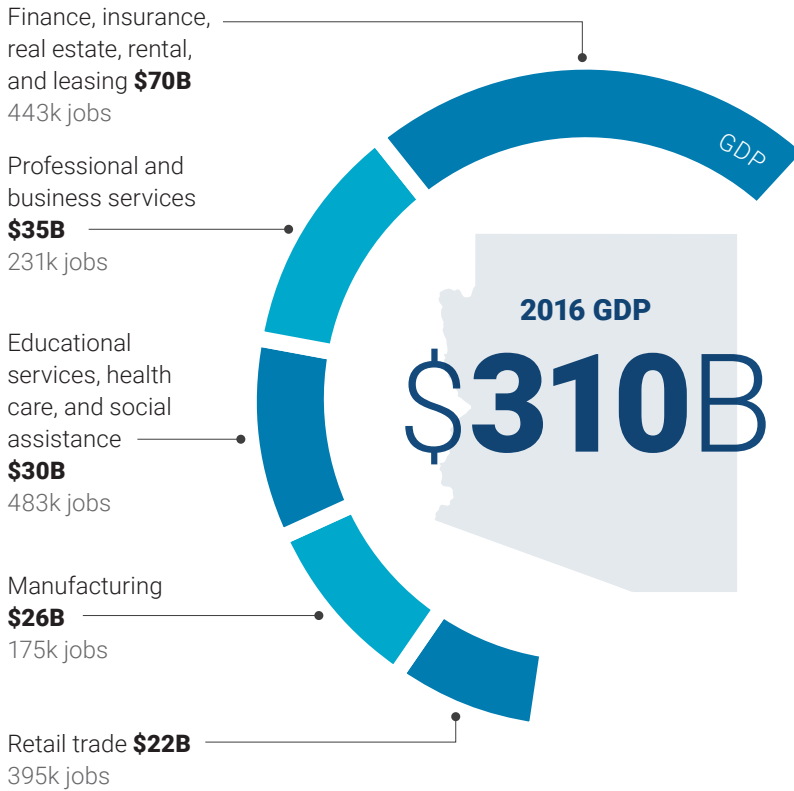
20. This figure has been updated to reflect market capitalization data from January 3, 2019 via Google Finance.

21. This represents 24 U.S. companies with operations along the Colorado River Basin who disclosed 72 serious water risks to CDP in 2017 from the following industries: Aerospace & Defense; Automobiles & Components; Consumer Durables; Household and Personal Products; Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy); Electrical Equipment and Machinery; Food & Beverage Processing; Home building; Hotels, Restaurants & Leisure, and Tourism Services; Mining—Iron, Aluminum, Other Metals; Oil & Gas; Pharmaceuticals, Biotechnology & Life Sciences; Software & Services; and Technology Hardware & Equipment. 53 out of the 72 risks reported mentioned higher operating costs and plant/production disruption as potential impacts.

22. "Unilever—Welcome to Henderson," Vimeo, 2016.

Arizona // State profile

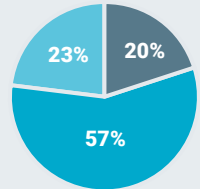
Major industries by GDP and employment



#47 in energy consumption per capita
0.7% share of US energy production

Energy production

■ Coal
■ Nuclear
■ Renewables



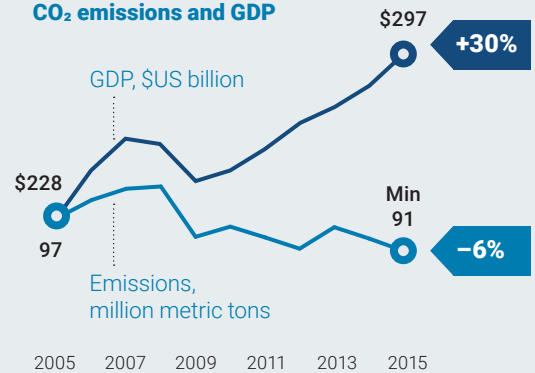
Energy consumption per dollar GDP

Thousands BTU/dollar

Arizona **5.5**

US **5.8**

CO₂ emissions and GDP



Low water level at Lake Mead on Colorado river



State emissions reduction target

2000 levels by 2020

50% below 2000 levels by 2040

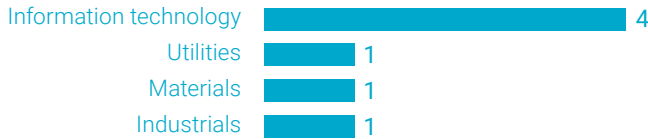


State climate change action plan

NONE

Arizona // Companies

7 disclosing companies



70.7B

total market capitalization,
\$USD

38.6M

reported GHG emissions
by companies, mtCO₂e

5

companies with emissions
reduction targets

1

companies reporting
science-based targets

3

companies pricing or planning
to apply internal carbon pricing



**Risk
drivers**

Top risk drivers

- Carbon pricing
- Emission reporting obligations
- Physical climate drivers

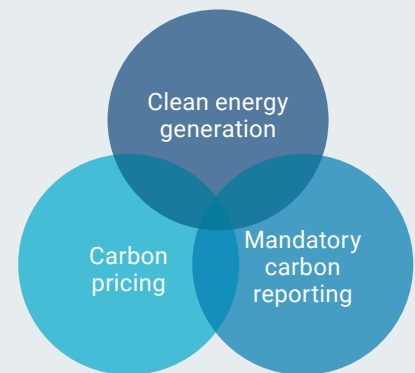


**Opportunity
drivers**

Top opportunity drivers

- Changing consumer behavior
- Other regulatory drivers
- Renewable energy regulation

Top policy engagement activities by companies



Arizona // Cities

3

disclosing cities

0

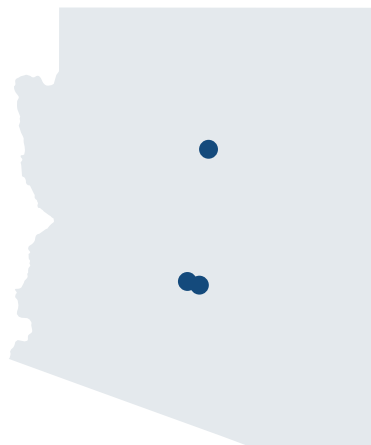
cities with emissions
reduction targets

1.7M

total populations of disclosing cities

1.4M mtCO₂e

reported GHG emissions by cities



- Disclosing city
- Disclosing city with target(s)



**Risk
drivers**

Top risk drivers

- Drought
- Extreme hot days
- Flash/surface flood



**Opportunity
drivers**

Top opportunity drivers

- Green jobs
- Tourism

Solar, storage and water savings go together: one of the largest solar-fueled battery technologies in the country will be in Arizona by 2021.²³

Heavy emitters tackle water issues through the energy-water nexus

Considerations of the energy-water nexus emerged in disclosures by Arizona companies. As climate change exacerbates water issues, heavy emitters such as electric utilities reported seeing the two-fold benefits of reducing emissions alongside reducing water use.

Arizona Public Service Company (APS), the largest electric utility in Arizona and the principal subsidiary of publicly traded S&P 500 member **Pinnacle West Capital Corporation**, reported a new partnership with another Arizona company, **First Solar**, to bring a first-of-its-kind 50-megawatt solar-fueled battery to the desert to provide clean power to Arizonans on hot summer days. This project would make Arizona home to one of the largest battery storage systems in the country.

"First Solar is offering a clean energy solution to the energy-water nexus, therefore a clear understanding and transparency around our corporate water footprint is an important part of our mission. Responding to CDP's water questionnaire for the first time acted as a useful gap analysis for our water strategy and enabled us to identify opportunities for improvement."

Andreas Wade, Global Sustainability Director

APS also reported the opportunity associated with the closure of coal units (820 megawatts retired since 2013), which would result in the reduction of water consumption by approximately 20 percent. The business cited a broader plan to diversify its generation mix by moving from coal-fired power to natural gas and renewable energy.

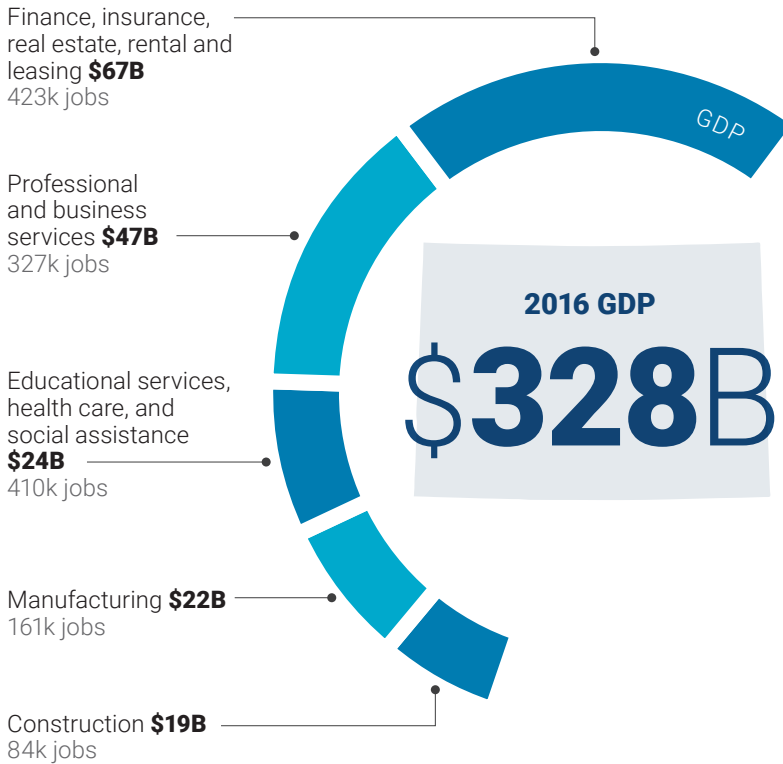
"APS plans to retire an additional 767 megawatts of coal by 2025, which is projected to further reduce water consumption at the Cholla Power Plant to less than 10 percent of current consumption. Shift in load from coal to natural gas will result in significant water savings as the water intensity (gallons/megawatt hour) at gas plants is less than half of the coal plant water intensity. Continued development of renewable energy such as PV solar and wind will reduce fleet wide water intensity. When combined with reduction in coal generation plus the retirement of steam units at Ocotillo (replaced with more efficient combustion turbines), APS expects fleet wide water intensity reductions of 20 percent by 2025."

Arizona Public Service

23. "APS, First Solar Partner on Arizona's Largest Battery Storage Project," First Solar, February 12, 2018.

Colorado // State profile

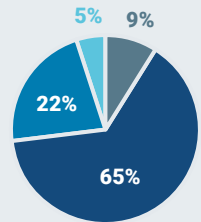
Major industries by GDP and employment



#34 in energy consumption per capita
3.7% share of US energy production

Energy production

- Coal
- Natural gas
- Crude oil
- Renewables



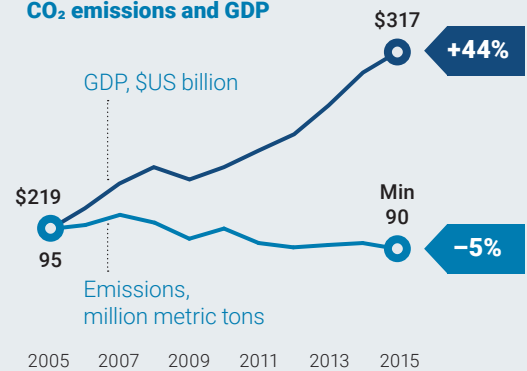
Energy consumption per dollar GDP

Thousands BTU/dollar

Colorado **5.1**

US **5.8**

CO₂ emissions and GDP



Forest fire in the Rocky Mountains of Colorado



State emissions reduction target

**More than 26% below
2005 levels** by 2025

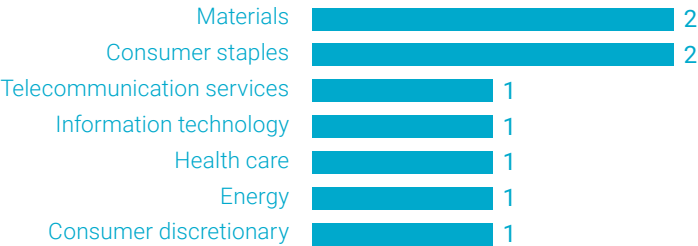


State climate change action plan

Finalized in **2011**

Colorado // Companies

9 disclosing companies



Top risk drivers

- Carbon pricing
- Emission regulations and environmental planning
- Change in precipitation extremes and droughts



Top opportunity drivers

- Reputation
- Change in mean (average) temperature
- Emission regulations and environmental planning

96.8B

total market capitalization in \$USD

9.2M

reported GHG emissions by companies, mtCO₂e

7

companies with emissions reduction targets

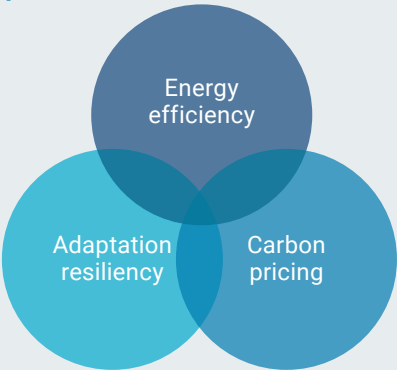
2

companies reporting science-based targets

4

companies pricing or planning to apply internal carbon pricing

Top policy engagement activities by companies



Colorado // Cities

6

disclosing cities

6

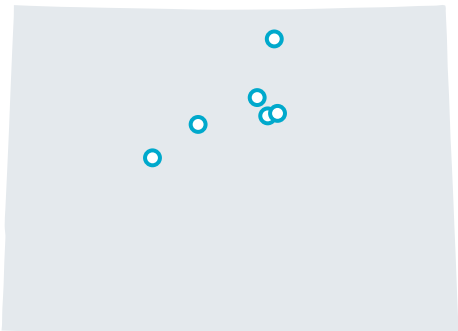
cities with emissions reduction targets

1.1M

total populations of disclosing cities

394K mtCO₂e

reported GHG emissions by cities



- Disclosing city
- Disclosing city with target(s)



Top risk drivers

- Drought
- Forest fire
- Extreme hot days & Flash/surface flood (tie)



Top opportunity drivers

- Development of new business industries (e.g., clean tech)
- Increased infrastructure investment
- Increased attention to other environmental concerns

Chapter 3

California

In 2018, California legislated a target to produce only zero-emissions electricity statewide by 2045. The world's fifth largest economy annually produces nearly 200 million megawatt hours in electricity,²⁴ supporting key industries like real estate, information technology, and manufacturing.

81%

of Californian companies disclosed inherent benefits to their business from climate-related regulation

Long the stated position of the Brown Administration to establish California as a climate action leader, the target would also require 50 percent renewable electricity generation by 2025, and 60 percent by 2030. California also signed a Memorandum of Understanding, along with eleven states and provinces in 2015, to commit to "either reduce greenhouse gas emissions 80–95 percent below 1990 levels by 2050 or achieve a per capita annual emission target of less than two metric tons by 2050."²⁵

Business reactions to Californian climate policy

The anticipation of climate legislation did not correlate with an uptick in the number of companies reporting environmental regulations as a material risk. (The most commonly reported risk was to corporate reputation.) In fact, California companies reported to CDP more opportunities from environmental regulation than companies headquartered in any other state,²⁶ with 81 percent of California companies disclosing inherent benefits to their business from climate-related regulation. These companies identified opportunities from regulations associated with fuel and energy, product efficiency, or renewable energy. In addition, half of these companies recognizing opportunities cited multiple instances of the potential for increased demand for existing products and services, and almost a third of these companies linked expectations of reduced operational costs to policy-related opportunities.

Software and services company **Adobe Systems** saw potential cost savings ranging from \$1 to \$5 million per annum as well as an anticipated cost stabilization from proposed legislation to expand California's Direct Access program, which authorizes direct transactions between electricity suppliers and nonresidential customers.

"...If this [legislation] passes, it opens many more opportunities for Adobe to purchase renewable energy from additional projects in CA (CAISO) at cost parity or cost savings. This legislation would enable Adobe to meet the majority of our RE100 goals (100% RE electricity at owned & managed CA sites) prior to 2020."

Adobe Systems, Inc., Software & Services

The 2017 disclosures also suggested that some California companies improved their management methods, allowing them to better assess and respond to the impact of risks related to environmental regulations.

In 2014, **Oracle**, the multinational computer technology company, recognized fuel and energy taxes and regulation as risks to its business, with the potential to have an "unknown" degree of impact upon it. The company described its management method as the following:

"The methods we use to manage this risk are: maintaining existing alternate sources of supply for most of our hardware products, when possible... Additionally, Oracle purchases energy in the open market when possible and uses advance purchasing and hedging to further minimize risk. We strive to maximize energy efficiency in data centers and elsewhere to reduce exposure to energy price fluctuations."

Oracle Corporation, Software and Services

Three years later, Oracle responded to this same risk not only by changing the magnitude of impact of this risk from "unknown" in 2014 to "low" in 2017 but also by improving its management method.

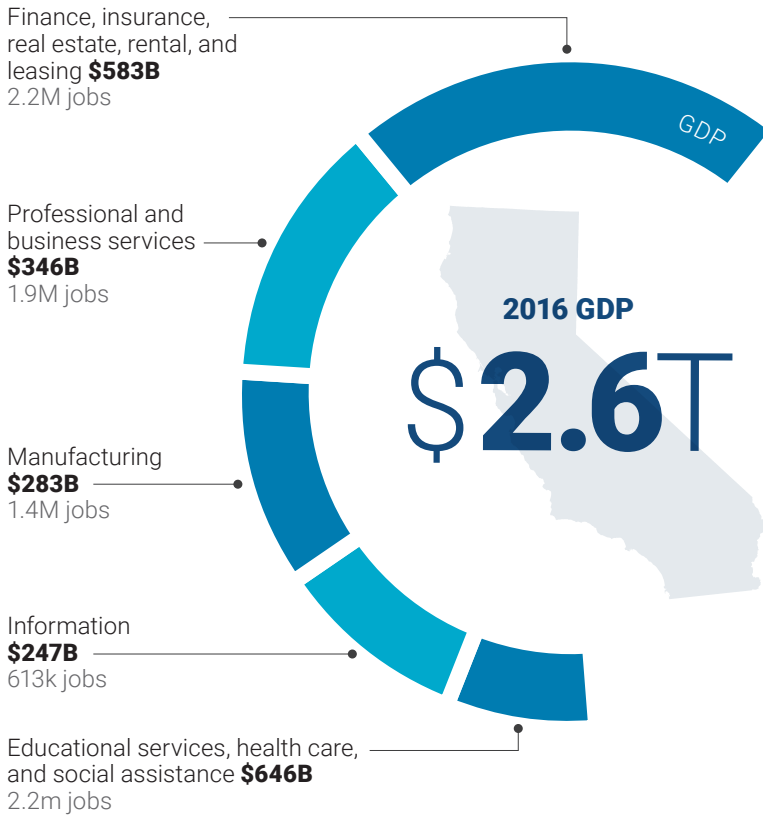
24. "California Electricity Profile 2016" U.S. Energy Information Administration, 2016.

25. "Governor Brown, International Leaders Form Historic Partnership to Fight Climate Change." Office of Governor Edmund G. Brown Jr., May 19, 2015.

26. In 2017, 54 out of 66 companies in California reported 109 opportunities related to environmental regulation to CDP, with the nationwide average of reported opportunities link to environmental regulation by state being approximately 24. Thirty-three out of 66 California companies reported the potential for increased demand for existing products and services from these opportunities. Twenty-one out of 66 California companies reported expected reduced operational costs from these opportunities.

California // State profile

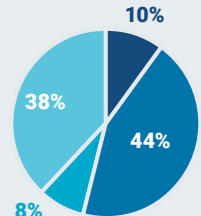
Major industries by GDP and employment



#48 in energy consumption per capita
2.9% share of US energy production

Energy production

■ Natural gas
■ Crude oil
■ Nuclear
■ Renewables

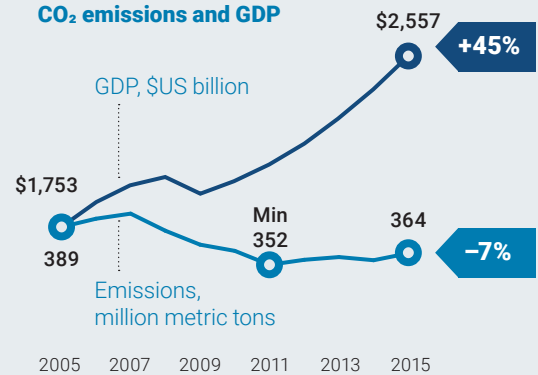


Energy consumption per dollar GDP

Thousands BTU/dollar

California **3.4**
US **5.8**

CO₂ emissions and GDP



Wind Turbines in Altamont Pass Wind Farm at Sunset, California.



State emissions reduction target

1990 levels by 2020
40% below 1990 levels by 2030
80% below 1990 levels by 2050



State climate change action plan

Finalized in **2009**



“...We implemented a number of energy efficiency measures at our data centers in 2016, including the ongoing Lab Energy Optimization initiative, enhanced IT and cooling, power monitoring and tracking, power usage effectiveness (PUE) tracking, airflow management, heat containment, hot aisle/cold aisle barriers, efficient airflow, efficient cooling production, airside economizer, evaporative humidification, and evaporative cooling. These measures resulted in an estimated emissions reduction of 1,635 MT CO₂e.”

Oracle Corporation, Software and Services

Simultaneously, Oracle saw opportunity from fuel and energy regulation by creating products and services, specifically its cloud product offerings, that helped its customers (the likes of Unilever²⁷ and the City of Memphis²⁸) better manage exposure to such policies. Oracle reported that, as a result of this strategy, its total revenues from its cloud products “increased by 62 percent to \$1.1 billion in the quarter end[ing] November 30, 2016 as compared with the same period in 2015.”

Californian companies respond to changing consumer and investor attitudes

In 2017, over half of Californian companies pointed to corporate reputation and changing consumer behaviors as drivers of business opportunities, with 69 percent reporting either or both drivers in their responses to CDP.²⁹ Almost two-thirds of these companies described examples of the potential for increased demand for existing products and services.³⁰

Alphabet, the parent company of Google, identified the potential financial benefits for its brand value from addressing climate change risks.

“[Reputation] could have a positive impact on our brands. For example, the 2016 Best Global Brands report, produced independently by Interbrand, estimates Google’s brand value at approximately \$133 billion. Using Interbrand’s estimated brand value, a hypothetical increase in brand value of 0.1 percent could result in a gain of future brand equity of approximately \$133 million.”

Alphabet, Inc., Software & Services

Consumers are not the only stakeholder group whose preferences and behavior matter to Californian companies. **eBay**, another software and services company based on the West Coast, also recognized reputational benefits due to its ability to meet shifting investor expectations on climate change.

“Investors are increasingly expecting companies to manage their climate risk and look for financial opportunity in a low-carbon market... Increased positive brand recognition and sentiment could translate into positive competitive advantage and increased stock price. For example, if the 12-month price target of \$35/share issued by analysts in 2016 increased by 10 percent, each share would then be worth \$38.50.”

eBay Inc., Software & Services

27. “Unilever Cuts CO₂ Emissions in North America, Drives Sustainability and Cuts Transport Costs with Help from Transportation Management Solution,” Oracle, June 25, 2016.

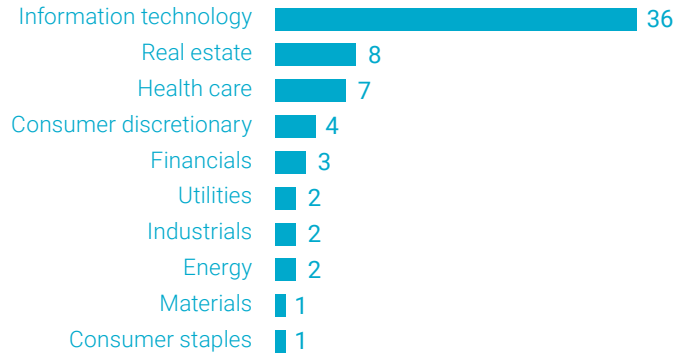
28. “Memphis Uses Oracle HCM Cloud to Become an HR Innovator,” Oracle, November 29, 2018.

29. Forty-six out of 66 California companies cited corporate reputation and/or changing consumer behavior as driver for business opportunities in their 2017 CDP disclosure.

30. In 2017, 30 out of the 46 California companies that reported reputation and/or changing consumer behavior as a business opportunity also disclosed the potential for increased demand for existing products and services.

California // Companies

66 disclosing companies



3.1T

total market capitalization
in \$USD

112.9M

reported GHG emissions
by companies, mtCO₂e

54

companies with emissions
reduction targets

18

companies reporting
science-based targets

19

companies pricing or planning
to apply internal carbon pricing



**Risk
drivers**

Top risk drivers

- Reputation
- Change in precipitation extremes and droughts
- Fuel/energy taxes and regulations & Carbon pricing (tie)

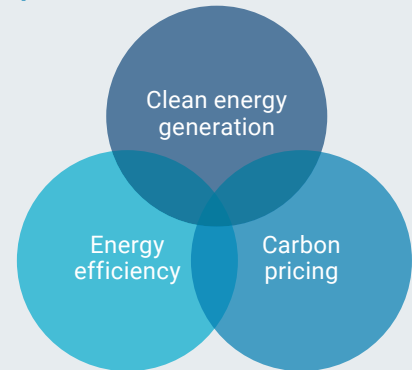


**Opportunity
drivers**

Top opportunity drivers

- Reputation
- Changing consumer behavior
- Other physical climate opportunities

Top policy engagement activities by companies



California // Cities

24

disclosing cities

22

cities with emissions
reduction targets

10.2M

total populations of disclosing cities

6.01M mtCO₂e

reported GHG emissions by cities



**Risk
drivers**

Top risk drivers

- Drought
- Extreme hot days
- Coastal flood



**Opportunity
drivers**

Top opportunity drivers

- Development of new business industries (e.g., clean tech)
- Improved efficiency of operations
- Increased energy security

Chapter 4

Illinois

Illinois hosts a large number of national and international consumer-facing brands.

Many Illinoisan companies reported to CDP that the changing climate regulatory landscape was a risk they needed to monitor and evaluate on a consistent basis.

Companies like **Deere & Company**, the leading American supplier of agricultural and construction machinery with key markets in Latin America and Europe, saw the climate problem as an important global business issue:

In addition to regulatory and physical risks, we consider our company to be exposed to other interconnected risks as a result of climate change. Global climate change, its causes, methods of mitigation and adaptation, coupled with growing populations and increasing demand for higher-value food, feed, fiber, fuel, and energy, present complex and interconnected challenges which will continue to increase in the coming years.

John Deere has taken the position that climate change is an important global business issue and that the company must proactively participate in finding solutions that also consider John Deere's business interests and those of our customers.

Deere & Company, Electrical Equipment and Machinery

Anticipating regulatory burdens can trigger timely strategic responses

Many Illinoisan companies reported to CDP that the changing climate regulatory landscape was a risk they needed to monitor and evaluate on a consistent basis. By measuring and monitoring its risk exposure, this led **United Airlines** to conclude that it was facing real operational disruptions, as well as potential regulatory burdens. United Airlines has put in place short-term and long-term management techniques, including a target to reduce its greenhouse gas emissions by 50 percent by 2050.³¹ The company's long-term strategy includes developing the market for sustainable aviation biofuels, which could accelerate its industry's transition away from fossil fuels.

"Climate change related regulations on fuel could cause the price of fuel to rise and increase the company's operational costs. Jet fuel consumption is United's second largest cost, so any increase in fuel prices due to regulations would cause operational costs to rise...

United proactively evaluates the financial impact of new regulations or proposed regulations to help determine the most appropriate methods to manage the risk. United is committed to pursuing reductions in fuel consumption and improvements in fuel efficiency. In the short term, United is pursuing a number of fuel efficiency measures. In the long term, United has taken a leading role in developing the market for sustainable aviation biofuel. In addition, United significantly mitigates its impact on climate change through investments in its aircraft fleet. Monitoring new regulations, managing fuel efficiency, and renewing the aircraft fleet have long been embedded into United's business strategy, so they are considered costs of doing business rather than additional cost drivers."

**United Continental Holdings,
Air Transportation—Airlines**

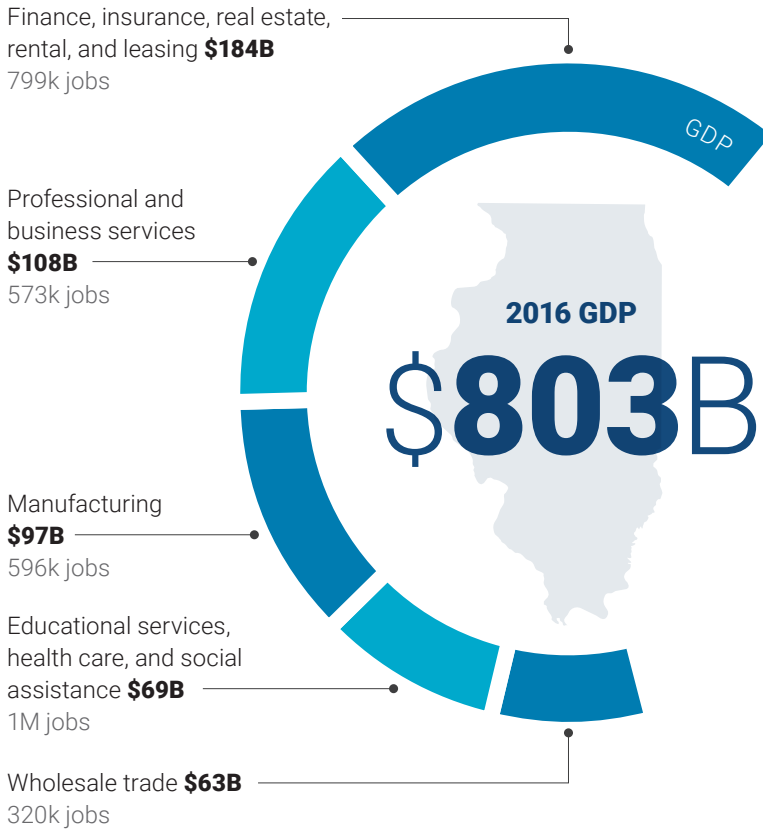
Disruptions to production and availability of agricultural raw materials bring different management approaches

Changing weather patterns, leading to new extremes in rainfall and temperatures, were a common risk reported by companies that produce or rely upon agricultural products in their businesses. Potential supply chain disruptions—alongside the opportunities associated with understanding changing customer or consumer tastes—drove companies like McDonald's to deploy risk assessment protocols, build long-term relationships with suppliers, and set aspirational goals (like its "commitment to source all of the agricultural raw materials used for our food and packaging from verified sustainable sources").

31. "United Airlines Commits to a Cleaner Future: Becomes First U.S. Airline to Pledge to Reduce Own Emissions by 50 Percent by 2050," United Airlines, September 13, 2018.

Illinois // State profile

Major industries by GDP and employment



#25 in energy consumption per capita
2.9% share of US energy production

Energy production



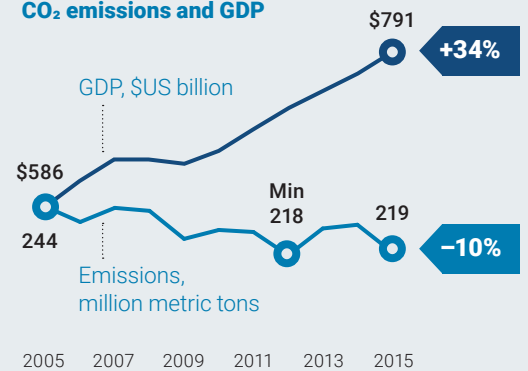
Energy consumption per dollar GDP

Thousands BTU/dollar

Illinois **5.6**

US **5.8**

CO₂ emissions and GDP



In the coming decades, Illinois will have more extremely hot days.*
North Beach, downtown Chicago, Illinois



State emissions reduction target

1990 levels by 2020
60% below 1990 levels by 2050



State climate change action plan

NONE

* "What Climate Change Means for Illinois," EPA, August 2016.

"Due to [McDonald's] dependence on agricultural productivity, our supply chain could be exposed to disruptions from changes in the physical climate which could impact our ability to sell products in our Company & Franchisee restaurants, causing us to lose revenues. Extreme weather could increase global food prices & increase the costs of several of our commonly purchased raw material commodities..."

We understand the value and strength of our supply chain and therefore we invest a lot of time, energy, and resources to mitigate our supply chain risks in order to help ensure we have an assured supply of the resources we procure. We do this by creating long-term relationships with our suppliers and ensuring we have due diligence built into our supply chain management..."

McDonald's Corporation, Hotels, Restaurants & Leisure, and Tourism Services

Others like **Ingredion**, the global ingredients company, and **Archer Daniels Midland**, the global agricultural commodities trading and food processing company, took a different approach to weather-related risks presented to their agricultural raw materials businesses presented. Both companies stated that their diversified global production capacity would enable them to manage these disruptions, which were considered "more likely than not" to occur but would not be expected to have a "material impact" (Ingredion), or else was "unlikely" to occur (ADM).

"Ingredion has built a strong presence around the world and in some of the largest and fastest-growing markets. For example, we have presence in Colombia, Brazil and the Midwestern U.S., which have less risk of extreme changes in precipitation leading to droughts. This positions our Company for long-term, profitable growth in a number of local, regional, and global market environments, while balancing potential risk. The cost of responding to potential supply chain risks is mitigated by the Company's ability to move production or growth projects to other sites within the company portfolio."

**Ingredion Incorporated,
Forest and Paper Products—Forestry, Timber,
Pulp and Paper, Rubber**

ADM's Internal Risk Management team "estimated a potential financial risk of \$10-70M based on increased price of commodities, increased transportation costs, loss in revenue if facilities are unable to acquire enough raw material to operate."

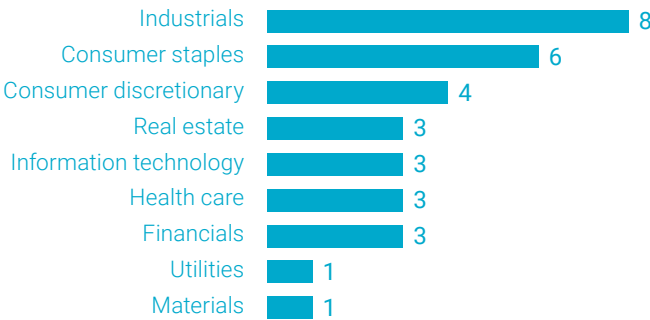
ADM's management method: "The geographic diversity of ADM's operations lowers risk. In-house commodity economics group continually analyzes global supply and demand to predict price fluctuations. ADM's transportation network spans multiple methods of transport allowing alternative movement of commodities if, for example, drought causes rivers to be impassable by barge."

**Archer Daniels Midland,
Forest and Paper Products—Forestry, Timber,
Pulp and Paper, Rubber**

Finally, **Sears Holdings Corporation** identified seven risks in its 2017 response to the question of whether it saw risks that could generate a substantive change in its business operations, revenue or expenditure. Of the three risks associated with changing weather patterns that Sears identified, it expected those risks would lead to "increased operational costs" or "reduction or disruption to production capacity." Sears did not disclose any management methods to address these potential impacts upon its business.

Illinois // Companies

32 disclosing companies



902B

total market capitalization in \$USD

106M

reported GHG emissions by companies, mtCO₂e

27



companies with emissions reduction targets

5



companies reporting science-based targets

4



companies pricing or planning to apply internal carbon pricing



Risk drivers

Top risk drivers

- Carbon pricing
- Change in precipitation extremes and droughts
- Fuel/energy taxes and regulations

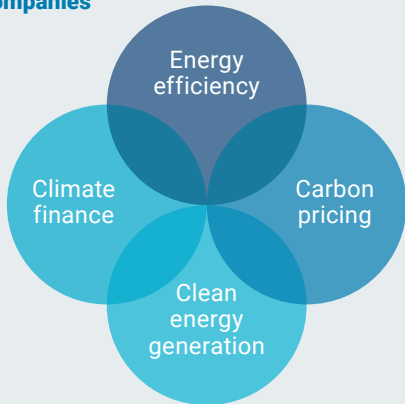


Opportunity drivers

Top opportunity drivers

- Reputation
- Changing consumer behavior
- Other drivers

Top policy engagement activities by companies



Illinois // Cities

4

disclosing cities

2

cities with emissions reduction targets

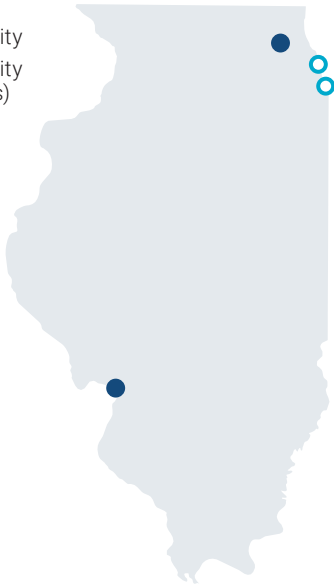
2.8M

total populations of disclosing cities

402K mtCO₂e

reported GHG emissions by cities

- Disclosing city
- Disclosing city with target(s)



Risk drivers

Top risk drivers

- Flooding
- Heat wave
- Heavy snow



Opportunity drivers

Top opportunity drivers

- Development of new business industries (e.g. clean tech)
- Increased infrastructure investment
- Increased energy and environmental concerns

Chapter 5

Ohio

Ohioan companies have consistently reported fuel and energy regulation as a top risk since 2015.

Ohioan companies not only identify but also manage risks associated with energy regulation.

This Midwestern state, historically one of the highest-emitting, has reduced its carbon emissions by almost 38 percent in one decade, the steepest decline in the country.³² Ohio is now ranked eighth in the country for employment in clean energy.³³ Yet, Ohio-based companies have consistently reported fuel and energy regulation as a top risk since 2015. Closer examination of the data suggests that uncertainty surrounding such regulations is a significant factor for some.

American Electric Power Company, an electric utility based in Ohio responsible for serving over five million customers across 11 states, including Texas, West Virginia, Virginia, Louisiana, and Kentucky, considered uncertainty around climate regulation as a “direct” risk to its business that was “virtually certain” to have an impact in the form of “increased capital and operating costs.” AEP reported that the impact of regulatory uncertainty would be more difficult to manage than the actual impact of the regulation itself.

“Until regulations are finalized, there is significant uncertainty as to the ultimate outcome. Additionally, in recent years, legal challenges to almost every major EPA rulemaking have added additional uncertainty and cost. This uncertainty can lead to uneconomic decisions being made during the planning process as the ultimate goals are subject to change. These uneconomic decisions will lead to increased capital and operating costs. While general environmental regulations mentioned above will have a large impact on AEP operations, the uncertainty regarding climate regulation or legislation is a more challenging risk to manage.”

American Electric Power Company, Inc., Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)

FirstEnergy Corporation, another utility based in Ohio that serves roughly six million customers across Ohio, Pennsylvania, West Virginia, Virginia, Maryland, and New Jersey, also reports that the “lack of a clear policy framework surrounding carbon regulations potentially impacts [its] clean energy portfolio.”

Fuel and energy regulation have triggered some Ohioan companies to reevaluate how existing and future regulations could potentially expose their businesses to risk—and to improve their energy use and management practices as a result.

In 2014, **Goodyear**, an international tire manufacturing company, identified fuel and energy regulation as a risk that could bring increased operational costs, but did not disclose any management methods to address this risk. By contrast, in 2017 Goodyear reported the following strategy to manage the onset and fluctuations in energy regulation:

“Goodyear has established a global energy and greenhouse gas management system and strategy to generate savings designed to offset these headwinds. Goodyear has also implemented an Energy Cost Management work stream where we are applying the zero-loss thinking to prioritize cost savings opportunities at all our manufacturing plants. This workstream, which targets cost reductions and increases in efficiency, has been implemented and supported with scorecards and metrics to continuously monitor the progress to ensure long-term success. Each plant recalculates their energy zero losses biannually to help prioritize the most important loss categories. Goodyear has extended our goals to 2020 with 25 percent energy and GHG emissions reduction goals for all operations.”

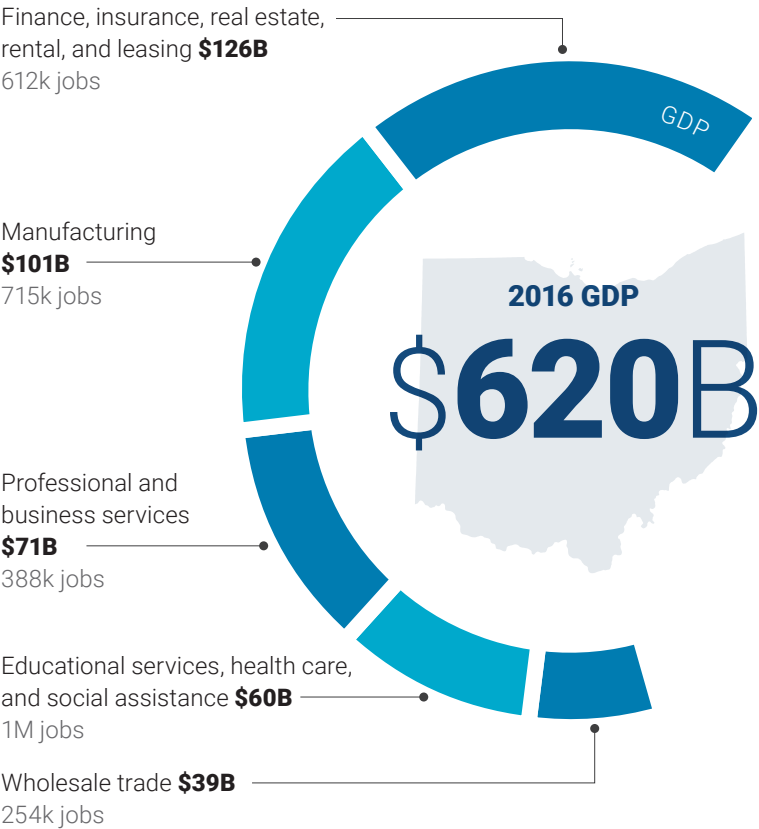
Goodyear Rubber & Tire Company, Tires

32. “This Midwestern state is the surprising stand-out on cutting carbon pollution,” Environmental Defense Fund, January 4, 2018.

33. “Clean Jobs Midwest 2018,” Clean Energy Trust (CET) and E2 (Environmental Entrepreneurs), 2018.

Ohio // State profile

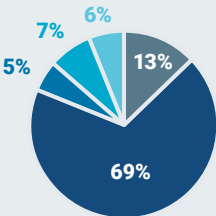
Major industries by GDP and employment



#22 in energy consumption per capita
2.9% share of US energy production

Energy production

- Coal
- Natural gas
- Crude oil
- Nuclear
- Renewables



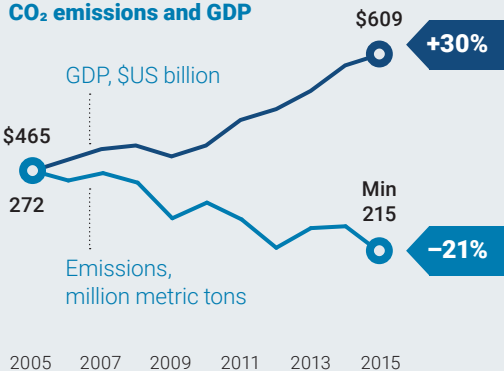
Energy consumption per dollar GDP

Thousands BTU/dollar

Ohio 6.7

US 5.8

CO₂ emissions and GDP



Wind turbine in Cleveland, Ohio



State emissions reduction target
NONE



State climate change action plan
NONE

Clean tech development was cited as the top driver for opportunity by Ohioan cities reporting to CDP.

KeyCorp, which provides various commercial and retail banking services in the U.S., has managed risks associated with fuel and energy regulations through investments that resulted in both cost and energy savings.

"Key mitigates these potential risks by continuing to invest in energy efficiency, managing our utilities expenses and consolidating our purchasing power and gas for our facilities. KeyBank implemented 82 HVAC upgrade projects, 68 building envelope projects and 33 lighting projects in 2016 with an investment of over \$6 million dollars. The projected savings from these projects [are] predominately concentrated around electricity and natural gas, spanning both scope 1 and 2 emission sources."

KeyCorp, Banks, Diverse Financials, Insurance

Ohioan cities see clean tech development as a priority

Ohio has seen corporate as well as local government initiatives to reduce its impact notwithstanding weakened federal environmental regulation over the past several years. While renewables make up just 6 percent of energy production in Ohio, the sector boasts more than 100,000 jobs³⁴ and Ohioan cities reporting to CDP cite clean tech development as their number one opportunity. In contrast, almost 90 percent of energy produced in Ohio comes from fossil fuels, yet the number of jobs totals under a quarter of those in renewables.³⁵

For the region as a whole, Northeast Ohio has an energy-intensive economy dependent largely on coal. Therefore, strategically reducing energy use and carbon emissions will improve efficiency for both residents and businesses, while also making the economy more resilient through increased energy security. Along with energy efficiency, the city is increasing energy security through the development of distributed clean energy resources. One example is [an] offshore wind pilot [and] the County's solar co-op program, which seeks to make it as easy as possible for homeowners and small businesses to go solar on their rooftops. Finally, the County, Cleveland State University, Case Western Reserve University, the City, and other partners are in the early stages of developing a microgrid feasibility study in Cleveland.

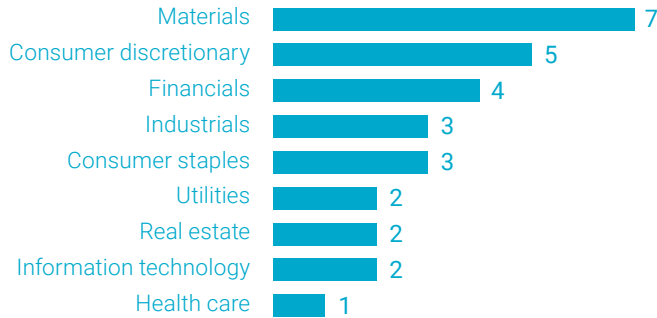
City of Cleveland, Ohio

34. [U.S. State Profiles and Energy Estimates](#), U.S. Energy Information Administration.

35. [2017 US Energy and Employment Report](#), U.S. Department of Energy.

Ohio // Companies

29 disclosing companies



577.6B

total market capitalization in \$USD

255M

reported GHG emissions by companies, mtCO₂e

19

companies with emissions reduction targets

4

companies reporting science-based targets

6

companies pricing or planning to apply internal carbon pricing



Risk drivers

Top risk drivers

- Fuel/energy taxes and regulations
- Reputation
- Carbon pricing

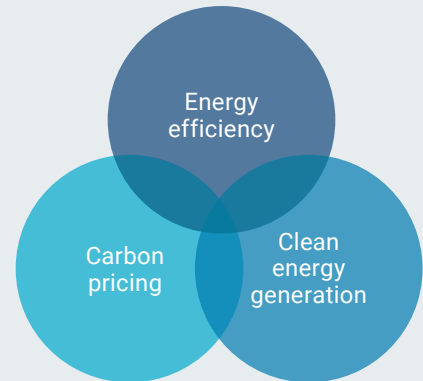


Opportunity drivers

Top opportunity drivers

- Changing consumer behavior
- Reputation
- Fuel/energy taxes and regulations

Top policy engagement activities by companies



Ohio // Cities

4

disclosing cities*

3

cities with emissions reduction targets

1.5M

total populations of disclosing cities



No reported GHG emissions by cities

- Disclosing city
- Disclosing city with target(s)

* One city submitted a private response and is not shown on the map.



Risk drivers

Top risk drivers

- Flash/surface flood
- Heat wave
- Natural resource availability/quality



Opportunity drivers

Top opportunity drivers

- Development of new business industries (e.g. clean tech)
- Additional funding options
- Improved efficiency of operations

Appendix

This appendix includes sources used for each state profile in this report as well as a full list of companies and cities featured in each state profile. These companies and cities disclosed to CDP in the 2017 reporting cycle through the Climate Change and Cities questionnaires, respectively. Companies that disclosed water risks in the Colorado River Basin in their 2017 Water and/or Supply Chain response(s) are also included in this appendix.

The following sources correlate to their titled section in each state profile in this report.

Please note that all totals³⁶ featured in the state profiles are based on available data, either online or as reported by disclosing companies or cities to CDP in the 2017 Climate Change questionnaire.

External Data

Major private industries by GDP and employment³⁷
[GDP & Personal Income](#), Bureau of Economic Analysis, 2016 data.

[Annual State Personal Income and Employment](#), Bureau of Economic Analysis, 2016 data.

State energy profile

[State Profiles and Energy Estimates](#), U.S. Energy Information Administration, 2016 data.

CO₂ emissions

[State Carbon Dioxide Emissions Data](#), U.S. Energy Information Administration, 2015 data.

Energy consumption per dollar GDP

[Energy Consumption per Real Dollar of GDP](#), U.S. Energy Information Administration, 2016 data.

State emissions reduction target

[Greenhouse Gas Emissions Targets](#), Center for Climate and Energy Solutions, updated September 2016.

State-led climate change adaptation plan

[State and Local Adaptation Plans](#), Georgetown Climate Center, updated July 2018.

CDP Data

Corporate 2017, including the following figures:

- Disclosing companies
- Companies with emissions reduction targets
- Companies with science-based targets³⁸
- Companies pricing or planning to apply internal carbon pricing
- Reported greenhouse gas emissions by companies
- Corporate risk and opportunity drivers
- Disclosing companies by sector
- Top policy engagement activities by companies

Other:

Total market cap downloaded from Bloomberg Terminal July 7, 2018

Cities 2017, including the following figures:

- Disclosing cities
- Cities with emissions reduction targets
- Total populations of disclosing cities
- Reported greenhouse gas emissions by cities
- City risk and opportunity drivers

36. Corporate: Market cap of disclosing companies, reported GHG emissions by companies; Cities: Total population of reporting cities, reported GHG emissions by cities.

37. Employment for the professional and business services industry also includes scientific and technical services.

38. While a company may be headquartered in a certain state, the emissions reductions associated with a target and the plans to carry out these reductions may occur in another geographic area where the company operates. Additionally, these companies self-reported that they either have had their emissions reduction targets approved by the Science Based Targets Initiative or have considered their emissions reduction targets to be aligned with climate science.

Arizona companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
First Solar Inc	Semiconductors & Semiconductors Equipment	Yes		
Freeport-McMoRan Inc.	Mining—Iron, Aluminum, Other Metals			
Microchip Technology	Semiconductors & Semiconductors Equipment	Yes		Applying
ON Semiconductor	Semiconductors & Semiconductors Equipment	Yes	Yes	
Pinnacle West Capital Corporation	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Republic Services, Inc.	Trading Companies & Distributors and Commercial Services & Supplies	Yes		Planning
<i>1 company submitted private responses and is not listed.</i>				

Arizona cities

City	Emissions reduction target
City of Flagstaff	
City of Phoenix	
City of Tempe	

Colorado companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
Ball Corporation	Semiconductors & Semiconductors Equipment	Yes		
DaVita Inc.	Mining—Iron, Aluminum, Other Metals			
Level 3 Communications, Inc.	Semiconductors & Semiconductors Equipment	Yes		Applying
Molson Coors Brewing Company	Semiconductors & Semiconductors Equipment	Yes	Yes	
Newmont Mining Corporation	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Westmoreland Coal Company	Trading Companies & Distributors and Commercial Services & Supplies	Yes		Planning
WhiteWave Foods	Food & Beverage Processing	Yes		Applying
<i>2 companies submitted private responses and are not listed.</i>				

Colorado cities

City	Emissions reduction target
City of Aspen	Yes
City of Boulder	Yes
City of Denver	Yes
City of Fort Collins	Yes
City of Lakewood	Yes
Town of Vail	Yes

Colorado River Basin companies

Company	Country	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
ACCIONA S.A.	Spain	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes	Yes	
Anadarko Petroleum Corporation	USA	Oil & Gas	Yes		Planning
Caesars Entertainment	USA	Hotels, Restaurants & Leisure, and Tourism Services	Yes	Yes	Applying
Freeport-McMoRan Inc.	USA	Mining—Iron, Aluminum, Other Metals	Yes	Yes	Applying
Kellogg Company	USA	Food & Beverage Processing	Yes		Applying
Kingston Technology	USA	Electrical Equipment and Machinery	Yes		Applying
Lexmark International, Inc.	USA	Technology Hardware & Equipment	Yes		Applying
NRG Energy Inc	USA	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
PepsiCo, Inc.	USA	Food & Beverage Processing			
Pinnacle West Capital Corporation	USA	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Raytheon Company	USA	Aerospace & Defense	Yes		
Ricoh Co., Ltd.	Japan	Technology Hardware & Equipment	Yes	Yes	
Sekisui Chemical Co., Ltd.	Japan	Home building	Yes	Yes	
Sempra Energy	USA	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)			
Toyota Motor Corporation	Japan	Automobiles & Components			
Unilever plc	United Kingdom	Consumer Durables, Household and Personal Products	Yes		
Western Digital Corp	USA	Technology Hardware & Equipment	Yes	Yes	
Xcel Energy Inc.	USA	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Planning
6 companies submitted private responses and are not listed.					

California companies

Company	GIS sector	Emissions reduction target	Science-based target	Internal price on carbon
Actiontec Electronics	Technology Hardware & Equipment	Yes		
Adobe Systems, Inc.	Software & Services	Yes	Yes	Applying
Advanced Micro Devices, Inc	Semiconductors & Semiconductors Equipment	Yes	Yes	
Agilent Technologies Inc.	Pharmaceuticals, Biotechnology & Life Sciences	Yes		
Allergan plc	Pharmaceuticals, Biotechnology & Life Sciences	Yes		Applying
Alphabet, Inc.	Software & Services	Yes		Applying
Amgen, Inc.	Pharmaceuticals, Biotechnology & Life Sciences	Yes		
Apple Inc.	Technology Hardware & Equipment	Yes	Yes	
Applied Materials Inc.	Semiconductors & Semiconductors Equipment			
Autodesk, Inc.	Software & Services	Yes	Yes	Applying
Avery Dennison Corporation	Containers & Packaging	Yes	Yes	Planning
California Resources Corp	Oil & Gas			Applying
CBRE Group, Inc.	Real Estate	Yes	Yes	
Charles Schwab Corporation	Banks, Diverse Financials, Insurance	Yes		
Chevron Corporation	Oil & Gas			Applying
Cisco Systems, Inc.	Technology Hardware & Equipment	Yes	Yes	
Clorox Company	Consumer Durables, Household and Personal Products	Yes		
Cypress Semiconductor Corporation	Semiconductors & Semiconductors Equipment			
DW Morgan, LLC	Air Freight transportation and Logistics	Yes	Yes	
eBay Inc.	Software & Services	Yes		Planning
Edwards Lifesciences Corp	Healthcare Providers & Services, and Healthcare Technology	Yes		
EQUINIX, INC.	Software & Services			Planning
Flextronics International	Technology Hardware & Equipment	Yes		
Franklin Resources, Inc.	Banks, Diverse Financials, Insurance			
Gap Inc.	Retailing	Yes	Yes	
HCP Inc.	Real Estate	Yes		
Hewlett Packard Enterprise Company	Technology Hardware & Equipment	Yes	Yes	Planning
HP Inc	Technology Hardware & Equipment	Yes	Yes	
Illumina Inc	Pharmaceuticals, Biotechnology & Life Sciences			
Integrated Device Technology, Inc.	Semiconductors & Semiconductors Equipment	Yes		
Intel Corporation	Semiconductors & Semiconductors Equipment	Yes		
Intuit Inc.	Software & Services	Yes	Yes	
Juniper Networks, Inc.	Technology Hardware & Equipment	Yes		
KLA-Tencor Corporation	Semiconductors & Semiconductors Equipment	Yes		
Lam Research Corp.	Semiconductors & Semiconductors Equipment	Yes		
Levi Strauss & Co.	Textiles, Apparel, Footwear and Luxury Goods	Yes		
Macerich Co.	Real Estate	Yes		
Mattel, Inc.	Consumer Durables, Household and Personal Products	Yes		
NetApp Inc.	Technology Hardware & Equipment	Yes		

Company	GIS sector	Emissions reduction target	Science-based target	Internal price on carbon
NVIDIA Corporation	Semiconductors & Semiconductors Equipment	Yes		
Oracle Corporation	Software & Services	Yes	Yes	
PG&E Corporation	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes	Yes	Applying
Prologis	Real Estate	Yes		
QUALCOMM Inc.	Technology Hardware & Equipment	Yes		Planning
salesforce.com	Software & Services	Yes	Yes	Planning
Sanyo Denki America Inc	Technology Hardware & Equipment			
Sempra Energy	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Symantec Corporation	Software & Services	Yes	Yes	
Synopsys, Inc.	Software & Services			
Varian Medical Systems Inc	Healthcare Providers & Services, and Healthcare Technology	Yes		
Veritas Technologies LLC	Software & Services			
Visa	Software & Services			
VMware, Inc	Software & Services	Yes		Planning
Walt Disney Company	Media	Yes		Applying
Wells Fargo & Company	Banks, Diverse Financials, Insurance	Yes		Applying
Western Digital Corp	Technology Hardware & Equipment	Yes		Planning
Xilinx Inc	Semiconductors & Semiconductors Equipment	Yes		
9 companies submitted private responses and are not listed.				

California cities

City	Emissions reduction target	City	Emissions reduction target
City of Bakersfield		City of Palo Alto	Yes
City of Benicia	Yes	City of Piedmont	Yes
City of Brisbane	Yes	City of Richmond	Yes
City of Cupertino	Yes	City of Sacramento	Yes
City of Davis	Yes	City of San Diego	Yes
City of Emeryville	Yes	City of San Francisco	Yes
City of Hayward	Yes	City of San José	Yes
City of Huntington Beach		City of San Leandro	Yes
City of Lancaster	Yes	City of Santa Cruz	Yes
City of Long Beach	Yes	City of Santa Monica	Yes
City of Los Angeles	Yes	City of West Hollywood	Yes
City of Oakland	Yes	Los Altos Hills	Yes

Florida companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
Cal Development	Construction & Engineering			
Carnival Corporation	Hotels, Restaurants & Leisure, and Tourism Services	Yes		
CSX Corporation	Ground Transportation—Railroads Transportation	Yes		
Fidelity National Financial Inc	Banks, Diverse Financials, Insurance			
Jabil Inc.	Technology Hardware & Equipment	Yes		
Office Depot, Inc.	Retailing			
Royal Caribbean Cruises Ltd	Hotels, Restaurants & Leisure, and Tourism Services	Yes	Yes	Planning
Ryder System, Inc.	Ground Transportation—Trucking Transportation	Yes		
<i>1 company submitted a private response and is not listed.</i>				

Florida cities

City	Emissions reduction target
City of Hollywood	
City of Lake Worth	
City of Miami	Yes
City of Miami Beach	
City of Miramar	
City of West Palm Beach	Yes
<i>1 city submitted a private response and is not listed</i>	

Illinois companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
Abbott Laboratories	Healthcare Providers & Services, and Healthcare Technology	Yes		
AbbVie Inc	Pharmaceuticals, Biotechnology & Life Sciences	Yes	Yes	
Allstate Insurance Company	Banks, Diverse Financials, Insurance	Yes		
AptarGroup	Containers & Packaging	Yes		
Archer Daniels Midland	Forest and Paper Products—Forestry, Timber, Pulp and Paper, Rubber	Yes		Applying
Baxter International Inc.	Healthcare Providers & Services, and Healthcare Technology	Yes		Planning
Boeing Company	Aerospace & Defense	Yes		
Deere & Company	Electrical Equipment and Machinery	Yes		
Dover Corporation	Electrical Equipment and Machinery	Yes		
Exelon Corporation	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes	Yes	Applying
GGP	Real Estate	Yes		
Hyatt Hotels	Hotels, Restaurants & Leisure, and Tourism Services	Yes		
Ingredion Incorporated	Forest and Paper Products—Forestry, Timber, Pulp and Paper, Rubber	Yes		
JLL	Real Estate	Yes		
McDonald's Corporation	Hotels, Restaurants & Leisure, and Tourism Services	Yes		
Mead Johnson Nutrition Company	Food & Beverage Processing	Yes	Yes	
Molex Incorporated	Technology Hardware & Equipment	Yes		
Mondelez International Inc	Food & Beverage Processing	Yes	Yes	
Motorola Solutions	Technology Hardware & Equipment			
Navistar International Corporation	Electrical Equipment and Machinery	Yes		
Northern Trust	Banks, Diverse Financials, Insurance	Yes		
Sears Holdings Corporation	Retailing	Yes		
Tenneco	Automobiles & Components	Yes		
United Continental Holdings	Air Transportation—Airlines	Yes		Applying
Ventas Inc	Real Estate	Yes	Yes	
W.W. Grainger, Inc.	Trading Companies & Distributors and Commercial Services & Supplies	Yes		
Walgreens Boots Alliance	Food & Staples Retailing	Yes		
5 companies submitted a private response and are not listed.				

Illinois cities

City	Emissions reduction target
City of Alton	
City of Chicago	Yes
City of Elgin	
City of Lake Forest	Yes

Ohio companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
A Schulman Inc	Chemicals			
Abercrombie & Fitch Co.	Retailing			
American Electric Power Company, Inc.	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Cardinal Health Inc.	Healthcare Providers & Services, and Healthcare Technology			
Cincinnati Financial Corporation	Banks, Diverse Financials, Insurance			
Diebold Nixdorf	Technology Hardware & Equipment	Yes		
Eaton Corporation	Electrical Equipment and Machinery	Yes		
Fifth Third Bancorp	Banks, Diverse Financials, Insurance	Yes		
FirstEnergy Corporation	Electric Utilities & Independent Power Producers & Energy Traders (including fossil, alternative and nuclear energy)	Yes		Applying
Forest City Realty Trust	Real Estate			
Goodyear Tire & Rubber Company	Tires	Yes	Yes	
Greif Inc	Containers & Packaging	Yes		
Huntington Bancshares Incorporated	Banks, Diverse Financials, Insurance			Planning
KeyCorp	Banks, Diverse Financials, Insurance	Yes	Yes	
Kroger	Food & Staples Retailing	Yes		
L Brands, Inc.	Retailing			
Macy's, Inc.	Retailing			
Owens Corning	Building Products	Yes	Yes	Applying
Owens-Illinois	Containers & Packaging			Applying
Parker-Hannifin Corporation	Electrical Equipment and Machinery	Yes		Applying
Procter & Gamble Company	Consumer Durables, Household and Personal Products	Yes	Yes	
Sherwin-Williams Company	Chemicals	Yes		
Teradata Corp.	Software & Services	Yes		
The J.M. Smucker Company	Food & Beverage Processing	Yes		
Welltower Inc.	Real Estate	Yes		
Worthington Industries	Mining—Iron, Aluminum, Other Metals	Yes		
3 companies submitted a private response and are not listed.				

Ohio cities

City	Emissions reduction target
City of Cincinnati	Yes
City of Cleveland	Yes
City of Columbus	Yes
1 city submitted a private response and is not listed.	

Texas companies

Company	GRI sector	Emissions reduction target	Science-based target	Internal price on carbon
Alliance Data Systems	Software & Services	Yes		
American Airlines Group Inc	Air Transportation—Airlines			
Anadarko Petroleum Corporation	Oil & Gas			
AT&T Inc.	Telecommunication Services	Yes	Yes	
Baker Hughes, a GE Company	Oil & Gas	Yes	Yes	Planning
Celanese Corporation	Chemicals	Yes		
Comerica Incorporated	Banks, Diverse Financials, Insurance	Yes		
ConocoPhillips	Oil & Gas	Yes		Applying
D.R. Horton, Inc.	Home building			
Dean Foods Company	Food & Beverage Processing	Yes		Applying
Dell Technologies	Software & Services	Yes	Yes	
Dr Pepper Snapple Group Inc	Food & Beverage Processing	Yes		
EOG Resources, Inc.	Oil & Gas	Yes		
Exxon Mobil Corporation	Oil & Gas			Applying
Farmer Brothers	Food & Beverage Processing	Yes	Yes	
Fluor Corporation	Construction & Engineering			
GameStop Corp.	Retailing			
Halliburton Company	Oil & Gas	Yes		
Jacobs Engineering Group Inc.	Construction & Engineering	Yes	Yes	Applying
jcpenney	Retailing	Yes		
Kimberly-Clark Corporation	Consumer Durables, Household and Personal Products	Yes	Yes	
Lennox International Inc	Building Products	Yes		
LyondellBasell Industries N.V.	Chemicals	Yes		Applying
Noble Energy, Inc.	Oil & Gas			
Occidental Petroleum Corporation	Oil & Gas			Applying
Southwest Airlines Co.	Air Transportation—Airlines	Yes		
Sysco Corporation	Food & Staples Retailing	Yes		
Tenet Healthcare Corporation	Healthcare Providers & Services, and Healthcare Technology			
Texas Instruments Incorporated	Semiconductors & Semiconductors Equipment	Yes		
Trans-Expedite Inc.	Air Freight transportation and Logistics	Yes	Yes	
Waste Management, Inc.	Trading Companies & Distributors and Commercial Services & Supplies	Yes	Yes	Applying
2 companies submitted a private response and are not listed.				

Texas cities

City	Emissions reduction target	City	Emissions reduction target
City of Austin	Yes	City of Fort Worth	
City of Brownsville		City of Houston	
City of Dallas		City of San Antonio	
City of Denton		2 cities submitted a private response and are not listed.	

Report Authors**Sara Law**

Vice President, Global Initiatives

Zoya Abdullah

Project Officer, Global Initiatives

Christina Copeland

Senior Manager, Water Security

Hannah Cushing

Manager, Carbon Pricing

Stefany Gutu

Senior Technical Officer, Carbon Pricing

Media Inquiries**Camilla Lynsby**

Senior Executive,
Media & Communications
camilla.lynsgsby@cdp.net

CDP Contacts**Paul Simpson**

CEO

Paula DiPerna

Special Advisor

Ateli Iyalla

Head of Corporations and Supply
Chains, North America

Emily Kreps

Head of Investor Initiatives,
North America

Sara Law

Vice President, Global Initiatives

Teresa Yung

Chief Operating Officer, North America

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