

# WEATHERING THE STORM: BUILDING BUSINESS RESILIENCE TO CLIMATE CHANGE



CENTER FOR CLIMATE  
AND ENERGY SOLUTIONS

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The rise in costly extreme weather events highlights the growing risks to business from global climate change. C2ES recently took an in-depth look at the ways multinational companies are beginning to assess and address the risks of extreme weather and other climate change impacts. The resulting report, *Weathering the Storm: Building Business Resilience to Climate Change*, provides a detailed snapshot of the state of resilience planning among a cross-section of global companies: how they perceive their climate-related risks, the steps they are taking, and the barriers that stand in their way. Following is the report's executive summary. The full report is available at: <http://www.c2es.org/initiatives/business-resilience>.

## INTRODUCTION

Economic damages from weather-related disasters climbed to near-record levels in 2012, with over 800 major events worldwide causing an estimated \$130 billion in losses. Munich Re reported that it was the third-costliest year on record behind 2011 and 2005. Many of the most costly events occurred in the United States, including the devastation caused by Superstorm Sandy and the widespread, prolonged drought in the Midwest.<sup>1</sup>

Companies and their stakeholders—governments, employees, communities and customers—are increasingly concerned about the costs associated with more frequent and intense floods, droughts, hurricanes and wildfires. Many companies are taking steps to begin to enhance their resilience to these growing risks. However, companies traditionally have planned based on past weather events, and few have attempted to integrate the increasing risks associated with the changing climate into their planning and operations. Initial efforts to do so suggest that barriers and uncertainties often stand in the way, preventing companies from achieving resilience against the rising risks of climate change impacts.

*Weathering the Storm* provides an in-depth look at the ways multinational companies are beginning to assess and address the risks of extreme weather and other climate change impacts. The companies examined play strategic roles in the global economy in a wide range of sectors including banking and financial services, consumer goods, healthcare, information communications, manufacturing, and materials. The report is based on two complementary lines of research:

- A comprehensive review of the perspectives and activities of companies listed in the Standard and Poor's (S&P) Global 100 Index, based on their reporting to the Carbon Disclosure Project and in their corporate sustainability reports and annual financial filings; and
- In-depth case studies of the practices and experiences of six companies in diverse sectors: American Water, Bayer, The Hartford Group, National Grid, Rio Tinto and Weyerhaeuser.

Together, these sources provide a detailed snapshot of the state of resilience planning among a cross-section of global companies: how they perceive and talk publicly about their climate-related risks, the steps they are taking or planning to take, and the barriers that stand in their way. The research also establishes a baseline that can be used to monitor risk management activities related to climate impacts over time.

Broadly speaking, the research reveals that while the vast majority of companies recognize risks from extreme weather and climate change, and many see these risks in the present or near term, uncertainty about the precise nature, timing and severity of climate impacts often inhibits investment in resilience beyond “business as usual.” A few leading companies are taking steps to address climate risks where they see significant opportunities to become more efficient, reduce costs, or provide greater value to customers—in other words, where there

is a clear business case to do so. By and large, however, the business response thus far is largely a continuation of existing practices based on a historical picture of past risks, and often fails to adequately consider changing climate and weather conditions. Thus, the most common strategy for addressing climate-related risks leaves most companies without the resilience they need to weather future physical impacts of climate change.

Beyond these broad conclusions, *Weathering the Storm* outlines a set of more detailed findings on prevailing attitudes and practices among S&P Global 100 companies. And, to help encourage and inform stronger resilience efforts, it lays out a four-step framework for managing climate risks that incorporates the emerging best practices from case-study companies already working to prepare for the very likely prospect of increasing extreme weather and climate change impacts.

## KEY FINDINGS

### ***Companies widely acknowledge risks from extreme weather and climate change, but estimates of significance vary***

Ninety percent of the S&P Global 100 Index companies identify extreme weather and climate change (such as warmer temperatures, more extreme weather, or greater water scarcity) as current or future risks to their business, across all industry sectors. Most of the S&P Global 100 companies (82), and all of the case-study companies, discussed these concerns in their response to the Carbon Disclosure Project (which specifically includes questions on this topic). Substantially fewer addressed extreme weather and climate change in either their financial filings (36 companies) or their annual sustainability reports (35 companies). The limited mention of climate change impacts outside of the Carbon Disclosure Project responses suggests that this issue has not yet risen to the level of financial materiality or public significance for the vast majority of companies included in the research.

Of the ten S&P Global 100 companies that do not acknowledge risks from extreme weather and climate change in any of the three sources of public disclosure reviewed, six are in the manufacturing & industrials sector, three are consumer goods companies, and one was in the healthcare sector. Among these ten companies, five have assessed the risks of extreme weather and climate change and concluded that such risks would not

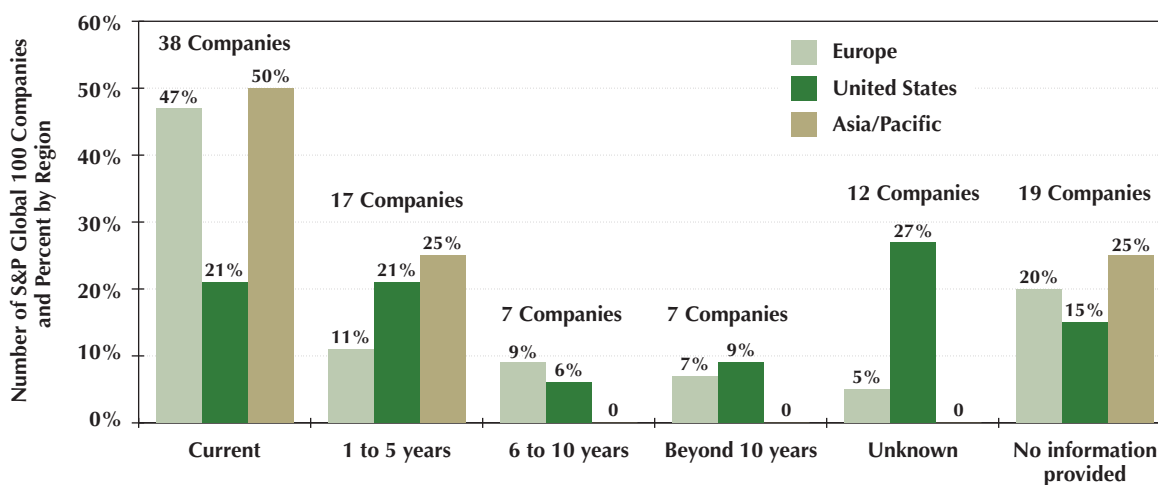
generate a substantive change in expenses or revenues. The remaining five companies are silent on the subject.

Yet while the vast majority of companies acknowledge risks from extreme weather and climate change, they also describe challenges with adequately understanding the risks and their implications for the business. Several, for example, describe the risks as relatively minimal, too distant in time to be of concern, too difficult to quantify, or too uncertain to support business decisions directed specifically at improving their resilience. Several case-study companies describe challenges with communicating internally with decision-makers about climate-related risks that are inherently volatile and uncertain.

### ***Most companies have experienced extreme weather and climate change impacts or expect to within five years***

Many companies are already experiencing climate change impacts or expect to in the near future. Nearly all case-study companies say that they are experiencing a greater intensity and variability of extreme weather than they did in the past. Over one-third (38) of S&P Global 100 companies report that they have already experienced the adverse effects of extreme weather and climate change, and an additional 17 companies believe that such impacts will affect them in the next five years (**Figure 1**). Fewer companies—fourteen—believe that such impacts are at least five or ten years away. Given the

**FIGURE 1: Earliest Estimates for When Impacts Will Occur**



Source: C2ES research based on Carbon Disclosure Project and other information sources (2012).

recent extreme weather events in Thailand (extensive flooding in 2011), Australia (heatwaves, floods, drought and wildfires in 2010–2013) and Europe (heatwaves and droughts in 2010–2011), a relatively greater percentage of S&P Global 100 companies headquartered in the Asia/Pacific (50 percent) and Europe (47 percent) regions reported that they have already experienced the effects of such events. Only 21 percent of U.S. companies indicated they had similar experiences.

While climate change is often characterized as a long-term, multi-generational problem, its potential to increase the near-term risks of some types of extreme weather events (e.g., droughts, wildfires, extreme precipitation, coastal flooding) is shifting forward the timeframe of concern for business. Companies are wondering whether they have entered a “new normal” of increasing frequency and magnitude of extreme weather events. Most case-study companies say that the recent increase in costly extreme weather events has provided a clear signal of the near-term risks associated with climate change. While relatively few companies are concerned about the possible impacts from the gradual, long-term rise in temperatures or sea level, more are concerned about increased near-term risks to operations, logistics, or supply chains from increasingly damaging extreme weather events.

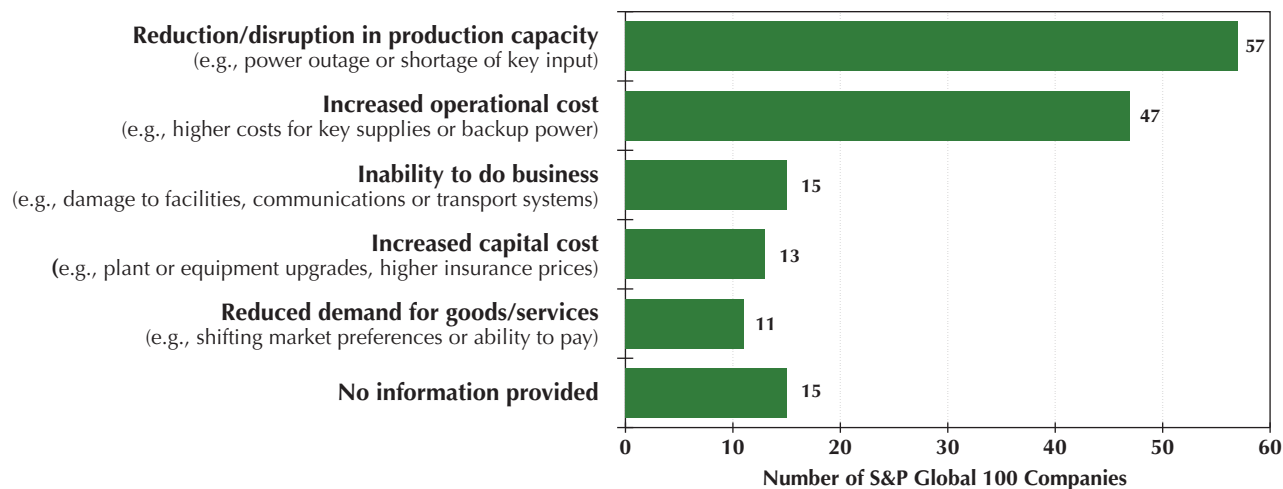
Yet scientific assessments have only recently begun to take a close look at the changes in extreme weather that

would accompany climate change. In 2012, for example, the Intergovernmental Panel on Climate Change (IPCC) released a special report focusing on extreme weather events.<sup>3</sup> In the United States, the National Climate Assessment is working toward issuing its final report in 2013, which will include extensive discussion related to extreme events and their impacts across the country.<sup>3</sup>

***Disruptions to operations and production capacity are of greatest concern***

The top two areas of concern identified by S&P Global 100 companies are direct impacts on production capacity such as property damage or supply interruptions (mentioned by 57 companies) and impacts on operational costs such as higher commodity prices or maintenance costs (47 companies) (Figure 2). Examples include concerns about the availability of water for manufacturing processes or potential impacts on critical inputs and supply chains. Concerns about disruption to production or increases to operational costs are cited by a majority of all sectors, except banking & financial services. Far fewer companies express concerns about indirect impacts on their business, such as increased capital costs (13 companies) or the effects on customers (11 companies). Several case-study companies also note how climate change can amplify the effects of other stresses caused by increasing populations, migration, urbanization, or coastal development.

**FIGURE 2: Top Five Current or Expected Impacts from a Changing Climate**



Source: C2ES research based on Carbon Disclosure Project and other information sources (2012).

Companies also have experienced a number of important external risks that they cannot directly manage but that can significantly affect the bottom line. For example, extreme weather events can impact the ability of employees to get to work, disrupt transportation and communication systems, and threaten the availability of energy or other raw materials. Because many of these hazards fall squarely within the control of other entities such as local governments or utilities, companies cannot take direct action to enhance their resilience to these risks, but can seek to indirectly mitigate their impacts by updating their business continuity or emergency preparedness plans so that they specify, for example, the provision of back-up power or arrangements for alternative modes of transportation.

#### ***Supply chains may be a particular source of business vulnerability***

Companies are learning first-hand that even when their own risk assessments take climate change impacts into account, their operations can still be severely damaged if their suppliers have not taken the same steps. A significant number—40 percent—of S&P Global 100 companies highlight current or potential future risks to their supply chains from extreme weather and climate change. Over half (25) of these 40 companies, primarily in the consumer goods, healthcare, and information and communications technologies (ICT) & services sectors, are concerned about interruptions across their global value chain, specifically, damage to suppliers of key inputs, transport difficulty for intermediate goods, or

supply disruptions for getting final products to market. Eighteen companies are also particularly concerned about the availability and quality of water supply. To address these risks, some companies have taken steps to work with their suppliers to ensure they have their own plans to minimize the adverse impacts from extreme weather events. Other companies look to further geographically diversify their sources of supply or bring more of their supply chain closer to home operations.

#### ***Companies see potential market opportunities resulting from a changing climate***

For most companies, climate change impacts do not only mean increasing risks. Businesses across all sectors are identifying a wide range of products and services that meet new and expanding market demand in a world faced with increased risks and impacts of extreme weather. Most of S&P Global 100 companies (75 percent) identified potential market opportunities resulting from a changing climate. Drought- and salinity-resistant crops, technologies that enhance water use efficiency, weather-related insurance products, enhanced land management techniques, and storm-resistant building materials are just a few examples of the market opportunities that companies have identified. The largest number of companies (37) identified expanding markets for existing products and services as the most promising opportunities for business and revenue growth. Twenty-seven companies (mostly in the banking & financial services sector) identified opportunities for new products

and 16 companies described opportunities to reduce operational costs (e.g., energy or insurance costs) associated with extreme weather impacts. Companies in the manufacturing & industrials and consumer goods sectors were the least likely to identify new opportunities.

***Companies rely heavily on existing enterprise risk management approaches that may underestimate climate risks***

For most companies, physical climate impacts are managed as a conventional business continuity or enterprise risk management issue. Most companies already have well-established business continuity and emergency management plans to minimize damage from extreme weather and speed recovery from such events. The majority of S&P Global 100 companies (77) report that changes in extreme weather risks due to climate change are incorporated into their existing business continuity plans and processes (Figure 3). Case-study companies explain that extreme weather impacts—power outages, property damage, or water shortages—are types of risks that they are already prepared to mitigate through plans that ensure safety, provide for operational continuity, and meet obligations to customers, and which can be readily adapted if weather extremes were to increase in the future. But while business continuity and risk management plans can be effective corporate planning tools for dealing with extreme weather events, most companies

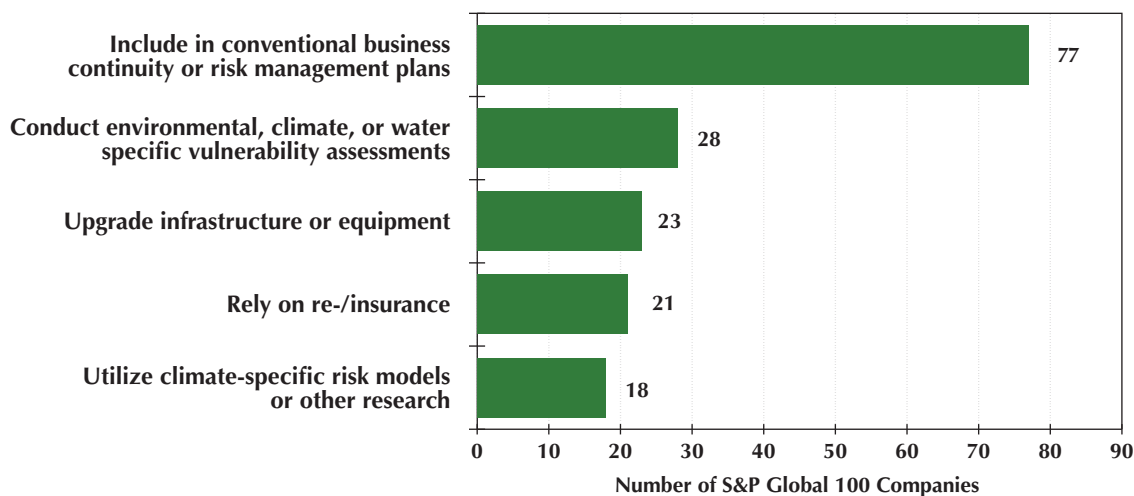
will need to adjust how they use these tools to reflect the changing profile of climate-related risks. Future events are likely to be similar in type (e.g., droughts, storms, etc.), but occur more frequently or be more intense.

In developing or updating their business continuity and emergency preparedness plans, companies struggle with what to assume about the changing risk profile of extreme weather. Some underestimate future risks by simply assuming that past events will be repeated in the future, or use historical trends and factor in a “margin of safety” (e.g., a 100-year event will become a 50-year event). Others look to climate assessments (e.g., typically scenarios contained in the Intergovernmental Panel on Climate Change assessments), but the scale of these assessments tends to be too large to be useful for companies evaluating individual facilities and they are only undertaken every five to seven years. Companies need more user-friendly, more readily accessible, and finer-grained information on future climate risks.

***Relatively few companies have undertaken comprehensive climate vulnerability assessments***

A small number of S&P Global 100 companies have undertaken climate-related vulnerability assessments (28 percent) or used climate-specific tools or models (18 percent) to more comprehensively assess risks. Those companies that have undertaken more detailed vulnerability assessments of operations or supply chains are

**FIGURE 3: Top Five Climate Risk Management Activities**



Source: C2ES Research (2012).



generally those that have the most at risk: companies most dependent on the long-term availability of a key commodity or natural resource, those with operations in high-risk locations such as drought- or flood-prone locations, those with direct financial interests (e.g., banking and insurance), and those with operations in rapidly changing environments (e.g., Alaska and the Arctic). All of the case-study companies have worked directly with scientists and researchers from government agencies or universities in order to supplement their enterprise risk management strategies with data that informs sensitivity analyses and guidance for decision-making. While companies have found these detailed assessments extremely useful in building resilience, they also acknowledge the substantial costs and challenges in finding accessible, user-friendly data and the lack of appropriate analytical tools. For help in better understanding their vulnerabilities, companies have reached out to universities or government experts, worked with their insurance companies, or enlisted consultants.

***Uncertainty about climate change impacts and the limited availability of high-quality risk data are significant barriers to action***

The uncertainty associated with the nature, timing, location, and/or severity of climate change poses a challenge for deciding how and when to invest in resilience beyond “business as usual.” This uncertainty is cited as a critical issue by nearly one-quarter (24) of S&P Global 100 companies and by all of the case-study companies. Many companies often also lack in-house knowledge or expertise about extreme weather and climate change; lack accessible, user-friendly localized projections of future changes in climate; need models and tools that

link projected changes in climate to impacts germane to company operations; and have a lingering perception that climate change is too uncertain and long-term an issue to require near-term action. Some types of changes, like average annual temperature or sea level rise, may be more readily accessible on a global scale but may mask less transparent but potentially more damaging changes from episodic heat waves or floods. Companies identified the need for a centralized information clearinghouse to provide a single go-to place for reliable, up-to-date data and analytical tools in order to reduce their uncertainty and support their efforts to enhance their resilience. Case-study companies emphasized that, absent sufficient certainty about the nature and timing of expected impacts, decisions related to building resilience ultimately balance a variety of business factors, such as equipment condition and age, the company’s ability to meet future regulations, or opportunities to improve efficiencies.

***Governments play an important role in facilitating resilience efforts***

Companies face significant barriers when making decisions about how and when to invest in enhancing their resilience to climate change. While overcoming these barriers is largely an internal challenge, case-study companies note that there are a number of steps that governments can take to facilitate these corporate efforts. They can support and coordinate efforts around climate change research, enhance the resilience to weather extremes of critical public infrastructure, and advance and approve resilience planning in regulated sectors such as water, electricity, and insurance.

## **A FRAMEWORK FOR MANAGING CLIMATE RISKS**

Based on the experiences of case-study companies that are working proactively to better understand and manage climate change risks, it is possible to identify a set of emerging best practices. Generally, these companies follow a four-step process (**Figure 4**): they collect information and build knowledge about the growing risks; assess and prioritize them using corporate risk management frameworks; develop plans and guidance that inform management decisions; and incorporate risk factors into an ongoing, iterative review process.

In many ways, building resilience is doing what companies have always done—strategic planning, risk assessment, investing in infrastructure, diversifying the

supply chain, safeguarding employees—using the best information available about potential risks. Leading companies are preparing to capture the competitive advantages that accrue from more effectively managing these risks, specifically by expanding their risk management practices to include the fairly new, very real, very serious risks that accompany climate change. They are starting now to collect information and build platforms for increased awareness. They are building adaptive capacity—developing skills, collecting information, and evaluating management options—that will position them to learn and adapt in the long term, and to thrive in a world beset by the unpredictability of a changing climate.

**FIGURE 4: Four Steps for Managing Climate Risks**

**1**

**BUILD AWARENESS**

**A critical foundation for companies taking concrete steps to enhance their resilience is building a clear understanding of the risks associated with extreme weather and climate change.**

This effort should reach out broadly across the company to include all people who must be part of an effective response, including senior managers at headquarters, facility managers in the field, enterprise risk managers, and supply chain planners. It should engage all employees and communities that play an important part of planning and response strategies. This outreach effort should address the common misperception that future conditions will be similar to those experienced in the past, and should make clear that climate change is increasing the risks of certain types of extreme weather events and these risks may have significant impacts on the company's bottom line.

**2**

**ASSESS VULNERABILITIES**

**Companies can build on existing business risks assessment activities to identify the impacts that future changes in the likelihood or magnitude of extreme weather events could have on their operations and facilities.**

There is no one single best approach for undertaking such a vulnerability assessment; the research identified a variety of ways of analyzing these changing risks based on the degree of internal expertise and the magnitude of risks. Whatever the particular approach selected, a vulnerability assessment would benefit from including the following considerations:

- A high-level initial screening of potential climate risks across the company, with more in-depth vulnerability assessments of high-risk facilities and operations;
- Forward-looking assumptions about changes in the risk profile of extreme weather and climate change; and
- Information about changes in related factors (e.g., land use, population growth, competition for scarce resources) that could also amplify or alter risks.

**3**

**MANAGE RISKS AND PURSUE OPPORTUNITIES**

**Once potential impacts are identified, companies must develop plans to prioritize actions to manage these risks and maximize opportunities.**

It is critical that companies work across their value chain, and with local governments and stakeholders, to ensure that actions taken will build in an appropriate level of resilience. Specific risk mitigation actions could include:

- Modifying planning and operations;
- Fortifying or relocating infrastructure and facilities;
- Addressing volatility or changes in the supply of key commodities such as water;
- Managing risks within supply chains; and
- Expanding or adjusting insurance coverage.

In better managing the risks of future extreme weather, leading companies have also identified a range opportunities to offer new services or products better suited to a world experiencing more frequent or intense extreme weather.

**4**

**ASSESSMENT AND REVIEW**

**Leading companies, recognizing that the risks of extreme weather and climate change will evolve over time, are beginning today to develop adaptive risk management planning.**

They periodically update their understanding of risks and their responses as new information becomes available and they are fine tuning their resilience strategies and capacities over time.

## ENDNOTES

1 Munich Re, “2012 Natural Catastrophe Year In Review,” January 2013, [http://www.munichreamerica.com/webinars/2013\\_01\\_natcatreview/MunichRe\\_III\\_NatCat01032013.pdf](http://www.munichreamerica.com/webinars/2013_01_natcatreview/MunichRe_III_NatCat01032013.pdf). AON Benfield, “Annual Global Climate and Catastrophe Report: Impact Forecasting—2012,” January 2013, [http://thoughtleadership.aonbenfield.com/Documents/20130124\\_if\\_annual\\_global\\_climate\\_catastrophe\\_report.pdf](http://thoughtleadership.aonbenfield.com/Documents/20130124_if_annual_global_climate_catastrophe_report.pdf). Evan Lehmann, “U.S. Hit with 90% of the World’s Disaster Costs in 2012,” *ClimateWire*, January 4, 2013, <http://www.eenews.net/climatewire/2013/01/04/1>.

2 Intergovernmental Panel on Climate Change (IPCC), “Special Report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX),” 2012, available at [http://ipcc-wg2.gov/SREX/images/uploads/SREX-All\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf).

3 U.S. Global Change Research Program, “National Climate Assessment: Overview,” <http://www.globalchange.gov/what-we-do/assessment/nca-overview>.

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The Center for Climate and Energy Solutions (C2ES) is an independent nonprofit organization working to promote practical, effective policies and actions to address the twin challenges of energy and climate change.