TCFD Report

verizon

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About this report

Verizon knows that transparency regarding climate-related risks and opportunities is critical to maintaining the trust of our stakeholders and allows our investors to better understand the implications of climate change. This is why we are adopting the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and publishing our second report aligned to the TCFD's guidelines. This report is structured into four sections: **Governance, Risk management, Strategy**, and **Metrics & targets**. These topics align to the TCFD's recommended disclosures, and provide a comprehensive view into how we understand and manage the risks and opportunities associated with climate change at Verizon. This disclosure, published in September 2021, is the next step on our climate disclosure journey and reflects our progress across the TCFD's four pillars since our first report (see the TCFD-related progress since our 2019 report section for key developments).[1]

[1]The inclusion of information contained in this report should not be construed as a characterization regarding the materiality or financial impact of that information. For a discussion of information that is material to Verizon, please see our Annual Report on Form 10-K.

Given the inherent uncertainty in predicting and modeling future conditions, caution should be exercised when interpreting the information provided. In this report, we have made forward-looking statements. These statements are based on our estimates and assumptions and are subject to risks and uncertainties. Forward-looking statements include information about our possible or assumed future results of operations and include statements preceded or followed by words, such as "anticipates," "believes," "estimates," "expects," or similar expressions. For those statements, we claim the protection of the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995. We undertake no obligation to revise or publicly release the results of any revision to these forward-looking statements, except as required by law. Given these risks and uncertainties, readers are cautioned not to place undue reliance on such forward-looking statements. For a list of important factors that could affect future results and could cause those results to differ materially from those expressed in the forward-looking statements, please refer to Verizon's Annual Report on Form 10-K.

TCFD-related progress since our 2019 report

Verizon has made advancements in our climate-related practices across each of the four TCFD thematic areas. Highlights include:

TCFD pillar	Key developments
Governance	• We established an Executive Climate Oversight (ECO) Committee, consisting of C-suite officers, which meets quarterly and focuses on climate-related commitments and strategy. • In 2020, the Human Resources Committee of our Board of Directors increased the weighting of our Environmental, Social and Governance (ESG) performance measures for the annual short-term incentive award, which includes a target tied to carbon intensity reduction, from 5% to 10% of the total short-term incentive award for corporate employees. • We continue to place a heightened internal focus on ESG efforts. For example, during a recent senior leadership forum, our Chief ESG Officer and Treasurer led a spotlight discussion on Verizon's key ESG issues, including our strategy for climate-related risks, with a guest speaker from a large institutional investor who shared their expectations directly with the management team.
Risk management	• Continuing our commitment to environmental management and employee safety, Verizon's Environment, Health and Safety Department attained ISO 14001 and 45001 certifications. • We enhanced our existing physical risk assessment process by conducting a supplemental forward-looking analysis using leading climate change and reinsurance data sets, focused on five weather perils in two climate scenarios and two time horizons.
Strategy	• We joined The Climate Pledge, an initiative focused on achieving the Paris Agreement 10 years early by 2040. • We entered into 14 long-term virtual power purchase agreements (VPPAs), totaling nearly 1.9 gigawatts (GW) of renewable energy capacity. • Since 2019, we have allocated nearly $2 billion of green bond proceeds, primarily to finance these VPPAs for new renewable energy projects. • We committed $1 million to the We Mean Business coalition, a global coalition of nonprofit organizations working with the world's most influential businesses to take action on climate change. The funding will contribute to the coalition's goal to provide one million small- and medium-sized businesses with carbon footprint quantification tools and education. • Through our Forward for Good Accelerator, launched in 2021, we helped to fund innovative climate justice solutions by providing funding to seven startups that focus on products and services to address physical climate risks and community resilience. • Our 5G Home Internet, currently in 40 markets, continues to be made available throughout the country. With more efficient energy use per bit, as well as an enhanced customer ability to self-install that helps reduce our truck rolls, our offering is helping to provide a more sustainable service than traditional wired broadband.

Strategy (continued)

- Based on the results of our physical risk scenario analysis that studied the potential impacts of the Intergovernmental Panel on Climate Change's (IPCC) Representative Concentration Pathway (RCP) 2.6 and RCP 6.0 scenarios, we concluded that our management of weather impacts on our networks is currently sufficient and we should continue to review it on a regular basis to ensure future climate-related risks are adequately taken into account. See the Physical risk scenario analysis and resilience section for more details.

Metrics & targets

- In our ESG Report, we announced two science-based emissions reduction targets, approved in 2021 by the Science Based Targets initiative (SBTi):
  - To reduce absolute Scope 1 and 2 greenhouse gas emissions (GHG) emissions 53% by 2030 over a 2019 baseline
  - To reduce absolute Scope 3 emissions from our value chain 40% by 2035 over a 2019 baseline
- We announced a new carbon abatement goal for Verizon solutions to help avoid 20 million metric tons of CO_2e annually by 2030.
- We reported and received assurance for relevant Scope 3 emissions as defined by the Greenhouse Gas Protocol Corporate Value Chain and Reporting Standard across 10 categories, an increase compared to previous years.

Governance

Our Board of Directors actively oversees Verizon's core business strategy. At each Board meeting and at the annual strategy retreat, our Board engages our executives in robust discussions about strategic goals, and challenges them to execute on our strategic plan, address emerging challenges and disruptions, and promote innovation. At the same time, our Board works with management to develop a comprehensive view of Verizon's key short- and long-term business risks. In its oversight role, our Board emphasizes that risk management is not an impediment to the conduct of business, but is instead an integral component of strategy, culture, and business operations. Both our Board and executive leadership team recognize that operating responsibly, which includes minimizing the environmental impact of our operations, is fundamental to the long-term success of Verizon. We believe building a better future involves making climate awareness "business as usual" throughout our organization, starting at the top. This is why our Board's oversight role and management governance structures are evolving to include more regular assessment and discussion of climate-related risks and opportunities.

Section	Our governance
Board oversight	Our Board oversees the management of strategic and operational risks by using several different levels of review. Each of our Board's four standing committees oversees the management of specific climate-related risks and opportunities that fall within that committee's areas of responsibility. The committee chairs provide regular updates to our full Board on the activities of their committees. In addition, our Board reviews the risks associated with Verizon's strategic plan throughout the year, including our plans for meeting our climate-related commitments. **Audit Committee** The Audit Committee receives updates on climate-related operational and financial risks in connection with its oversight of Verizon's enterprise risk management program. At least annually, the executives in charge of Verizon's business groups and corporate functions review the primary risks associated with their particular business group or function with the Committee. Environmental and climate-related risks discussed in these reviews include operational and financial risks relating to energy management and our climate-related commitments, maintaining network reliability during catastrophic and weather-related events, and possible changes in carbon policy (i.e., laws or regulations that seek to mitigate climate change). **Corporate Governance and Policy Committee** The Corporate Governance and Policy Committee oversees Verizon's sustainability matters and Verizon's position and engagement on important public policy issues that may affect our business and reputation. Verizon's Chief ESG Officer briefs the Committee several times each year on Verizon's ESG priorities, commitments, and reporting, including our progress on meeting our environmental sustainability commitments. Verizon's Executive Vice President and Chief Administrative, Legal, and Public Policy Officer (CAO) provides the Committee with an annual update on the current policy issues facing the company and leads a discussion of Verizon's preparedness to manage potential risks, including climate-related events, that may impact corporate reputation. **Finance Committee** The Finance Committee monitors and oversees Verizon's capital allocation and financing activities, including our green finance program. The Committee also oversees the strategy for managing risk related to Verizon's renewable energy exposure through renewable energy purchase agreements.

Board oversight (continued)

Human Resources Committee

The Human Resources Committee is responsible for establishing the performance measures and targets for Verizon's incentive plans. Each year, the Committee evaluates and selects metrics for employees' incentive awards that align with Verizon's strategic goals. Since 2014, the annual short-term incentive awards for management employees have included ESG performance measures, including a carbon intensity reduction target. In 2020, the Committee increased the weighting of the ESG performance measures, including this target, from 5% to 10% of the total short-term incentive award for corporate employees, including our CEO and CFO. In connection with setting and monitoring performance, the Committee receives periodic briefings on Verizon's progress toward meeting this target.

Management's role

Verizon management councils

At Verizon, we drive our business forward through the management structures we have put in place and the planning and implementation processes we use for decision making and action planning. Our management team is organized into functional groups that have responsibilities for discrete businesses, operations, and corporate functions. Our primary business groups, which are organized based on our customer groups, are the Verizon Consumer Group and the Verizon Business Group. Our primary centralized functions are the Administrative, Legal, and Public Policy Group, the Finance Group, the Global Network & Technology Group, the Human Resources Group, the Marketing Group, and the Strategy Group. Each of these centralized groups has direct responsibility for their designated functions and provides support and oversight to the business groups. Each business group and centralized function plays a role in the assessment and management of climate-related risks and opportunities within their purview.

Frequently, there are topics that significantly impact multiple functional organizations. In order to make sure that decisions in these areas are made in the best interest of Verizon as a whole, members of our senior management team also serve on several cross-functional governance councils that are overseen by the CEO, and review and approve matters that cut across functional organizations.

Our management councils address a wide range of areas, including:

- Developing Verizon's strategy and ensuring that operations are running in accordance with the strategy
- Determining how resources will be allocated across the company
- Ensuring that Verizon conducts business consistent with its goal of being an environmentally and socially responsible company
- Overseeing and approving strategic technology initiatives across the company
- Overseeing the development of the company's portfolio of products and services
- Reviewing potential acquisitions, dispositions, and strategic investments and relationships across the company
- Overseeing brand strategy and customer experience

Management's role (continued)

Our councils and functional organizations operate using a year-round planning and implementation process. This process unites strategy development, financial planning and budgeting, talent management, and implementation to make sure that each organization is coordinated as they implement Verizon's strategy. Our councils apply a climate risk lens to decision making where appropriate.

As climate-related risks and opportunities are cross-functional in nature, they are also inherently considered in many of the councils' activities, including engaging in climate-related risk and opportunity decisions relating to product and service offerings, investing in renewable energy, and reviewing major capital allocations for improving resilience. We use scorecards to track the execution of individual initiatives, and then compile them into one corporate-wide scorecard to inform strategic decision making for the coming year. Achieving net zero operational emissions is one of the key measures used in the corporate-wide scorecard, highlighting the importance of this goal to our corporate strategy.

Executive Climate Oversight Committee

The ECO Committee, formed in 2020, is the highest level management committee with direct responsibility for assessing and managing Verizon's climate-related risk and opportunities. The Committee, composed of our Chief Financial, Chief Administrative, Chief ESG, and Chief Sustainability Officers, meets quarterly to monitor Verizon's progress on its climate-related commitments and recommends changes or enhancements to Verizon's climate-related strategy. Representatives from the Strategy, Network, Fleet, Global Real Estate, Treasury, Sustainability, and ESG organizations report to the Committee on climate-related issues and initiatives that fall within their responsibilities. The Chief ESG Officer periodically updates senior management and the Corporate Governance and Policy Committee of the Board of Directors on the issues considered by the ECO Committee, the company's progress in meeting its climate-related commitments, and any significant developments relating to the company's strategy for managing climate-related risks. The Chief ESG Officer and the Chief Sustainability Officer (CSO) also periodically update the Strategic Leadership and Responsible Business Councils on matters considered by the Committee, as those management governance councils are instrumental to coordinating the integration of sustainability considerations into our overall strategy and business operations.

Business Continuity Executive Steering Committee

An executive steering committee, composed of designated senior executives representing Global Network & Technology, Verizon Consumer Group, Verizon Business Group, and Verizon's centralized functions, oversees our Business Continuity and Event Management (BCEM) framework and programs. Designed to provide for the protection and support of Verizon personnel, critical operations, and infrastructure during emergencies and disasters, including man-made and weather-driven natural disasters, the BCEM framework and programs outline consistent processes, procedures, and templates for managing business continuity and disaster recovery. The BCEM team identifies high-priority, physical, climate-related risks, which are reviewed annually. See the Risk management section for more information about the framework and for how climate-related risks are identified and prioritized.

Verizon has adopted a Corporate Policy Statement regarding business continuity of operations and management under conditions ranging from local emergencies to widespread disasters, which the CAO is responsible for maintaining, communicating, and interpreting.

Management's role (continued)

Management responsibilities

Chief Administrative Officer

Climate-related issues are assessed and managed by Verizon's CAO. Directly reporting to the Chairman and CEO, the CAO is responsible for the company's supply chain, real estate, environmental sustainability, legal, and public policy functions. The CAO has ultimate responsibility for sustainability initiatives, including energy efficiency projects, renewable energy, waste reduction, recycling, water conservation, and supply chain management, among others.

The Real Estate and Supply Chain organizations reporting to the CAO have direct responsibility for monitoring climate-related issues associated with our day-to-day operations. The Real Estate organization is responsible for monitoring and managing energy use and efficiency efforts to reduce energy consumption. This team also oversees our renewable energy installations and purchases. The Supply Chain organization, which is responsible for procurement, sourcing, logistics, and inventory management, uses responsible sourcing practices and partners with our suppliers to minimize our environmental impact. We use EcoVadis and Avetta, third-party platforms, to assess our suppliers' corporate responsibility, including their environmental performance. Verizon's Senior Vice President of Supply Chain Operations is also our Chief Sustainability Officer reporting up to the CAO. The CSO oversees our environmental sustainability program, which has been in place since 2009. The CSO is responsible for environmental programs ranging from emissions management to waste reduction and recycling. Key objectives have been established to monitor results, including carbon intensity, renewable energy, water use, and our net zero operational emissions goal.

Chief ESG Officer

In 2019, we created a role dedicated to enhancing Verizon's sustainability reporting and stakeholder engagement on ESG factors that align with Verizon's core business strategy. The Senior Vice President of Corporate Governance and Chief ESG Officer heads a cross-functional team that focuses on strategic areas, including climate change and sustainability reporting, and oversees efforts to deliver on Verizon's ESG commitments. The Chief ESG Officer regularly provides our Board's Corporate Governance and Policy Committee with updates on the Company's ESG priorities, commitments, and reporting.

Treasurer

Verizon's Senior Vice President and Treasurer is responsible for Verizon's portfolio of renewable energy purchase agreements. This portfolio is managed on a cross-functional basis by the Treasury team, which is responsible for the company's financial exposure to energy prices, and by the Global Real Estate team, which is responsible for energy management. The Treasurer provides quarterly updates to our Board's Finance Committee on the renewable energy portfolio.

Chief Human Resources Officer

Verizon's Executive Vice President and Chief Human Resources Officer (CHRO) is responsible for the compensation and benefits provided to our employees. Since 2014, a portion of the short-term incentive compensation of Verizon's executives and all management employees (except those on sales compensation plans) has been tied to year-over-year improvement in reducing Verizon's carbon intensity. The CHRO provides updates at least twice each year to our Board's Human Resources Committee on the company's progress toward achieving this goal.

Management's role (continued)

Improving our governance

We recognize the importance of effectively managing climate-related risks and opportunities and have embedded them into Verizon's existing processes and decision making. That is why we are committed to strengthening our existing Board-level oversight and governance structures with regard to climate. This includes clarifying lines of communication between Verizon management and the Board on climate- and ESG-related issues, generally creating continuous and frequent lines of communication on sustainability issues, and continuing to elevate the transparency of our ESG disclosures. It also includes keeping Verizon leadership up to date on climate-related matters. For example, during a recent senior leadership forum, our Chief ESG Officer and Treasurer led a spotlight discussion on Verizon's key ESG issues, including our strategy for climate-related risks, with a guest speaker from a large institutional investor who shared their expectations directly with the management team.

Risk management

Verizon recognizes that climate change risk is a global issue that may impact how we run our business and network, both today and in the future. As such, we continue to look for ways to improve our understanding of climate-related risks. We are working to integrate climate risk variables into our overall risk management process and establish formal multi-disciplinary processes that engage both our Board and management team.

Section	Our risk management
Risk identification and assessment processes	Verizon recognizes that transition and physical climate risks can be both short- and long-term in nature. For this reason we have processes that allow us to proactively identify, assess, and prepare for transition and physical climate risks. For example, we have a formalized enterprise risk management program (see the Enterprise risk management section), a process to identify developing and emerging regulations (see the Monitoring policy and regulatory developments section), and a comprehensive business continuity planning approach called our BCEM framework. This framework focuses on business preparedness to identify and assess natural and man-made events around the globe that could adversely impact our business operations. **Short-term risk identification and assessment** Each year we conduct a formal Business Impact Analysis (BIA), an assessment that helps us determine the operational impact resulting from a major disruption of services. The BIA identifies, reviews, and prioritizes the biggest threats to our employees, network, and business operations based on known and predicted natural disasters that may impact the business. The assessment prioritizes risk based on the level of impact to our network and business operations. Priority risks are those with the most direct and immediate impact to our network and customers. We evaluate five climate-related events during the assessment: storm surge from hurricanes, flooding, wildfire, high straight-line wind, and tornadoes. We overlay short-term weather and environmental data from multiple sources onto our existing operational and network model in order to improve these risk assessments geographically, and to enhance planning activities. The BIA highlights necessary investments to harden infrastructure and helps inform network build decisions and the selection and design of future and current sites. High priority risks we identify are first discussed with management and then directly integrated into our annual planning, business continuity planning, and capital allocation decisions. The BIA process also helps inform the Business Continuity Executive Steering Committee on climate-related issues when it reviews and guides enterprise-wide risk management and business continuity plans.

Risk identification and assessment processes (continued)

Long-term risk identification and assessment

In addition to our inclement weather monitoring tools and processes, we are also integrating longer-term climate-related risks into our planning tools given that historical and current weather patterns are not always indicators of future conditions. Using geospatial analysis, we overlay long-term climate projections from third-party sources onto our current and future operational and network models. This analysis covers multi-year projections and probabilities over multiple climate scenarios. The models provide us with a view of the risk of the occurrence of climate-related events, including storm surge associated with hurricanes, flooding, wildfire, tornadoes and high straight-line winds. The models are periodically updated to account for changes in precipitation patterns, increasing temperatures, and sea level rise. In 2021, we also conducted a supplemental forward-looking physical risk analysis across a variety of acute climate-related perils to assess future impacts (see the Physical risk scenario analysis and resilience section).

Preparing for and responding to events

Our Global Event Management Center (GEMC) performs an information sharing and analysis center function as part of its day-to-day operations, which includes global incident monitoring and information gathering for Verizon operations. This team actively monitors and assesses any threat to Verizon operations around the world, covering both natural and man-made events.

When a potential threat or significant event has been identified, the GEMC performs a risk assessment by gathering event-related information, engaging with subject matter experts within the company and, when necessary, within government and non-government agencies, and disseminating situation information and intelligence to key response groups within Verizon. The GEMC uses Verizon's in-house weather monitoring platform that leverages multiple sources of weather data to identify potential impact areas and conduct automated pre-storm risk reduction activities. These pre-storm activities help prepare and protect Verizon facilities and personnel, with restoration teams and equipment staged effectively and ready to respond in the affected area prior to, or immediately after, the event.

Our business continuity and network operations teams are also involved in resilience planning. BCEM organizational responsibilities include, but are not limited to:

- **Business continuity and disaster recovery planning:** Includes risk identification and the coordination of plan development, preparation, and maintenance
- **Site emergency action planning:** Site plans developed for every facility with 10 or more employees to include oversight for plan development, training, and evacuation drills
- **Crisis management planning and response:** In addition to coordinating the development, exercise, and maintenance of crisis management plans, staff members communicate and coordinate the response and recovery efforts for all major disasters, whether from the Global Crisis Management Team or Area Crisis Management Teams in the United States (US), or Regional Crisis Management Teams located around the globe

Risk management processes and integration with overall risk management

We recognize that while climate-related risks and opportunities are inherently linked, each requires a tailored management approach (e.g., our approach for managing physical resilience will differ from that used to manage transition risk created by a carbon policy). We also know that one-off management of risks is not enough. We have established several enterprise-wide processes that help us review and manage risks from the top down.

Risk management processes and integration with overall risk management (continued)

We outline some of these overarching risk management processes below, in which climate change is considered. See the Strategy section for more about our approaches to managing specific risks and opportunities.

Enterprise risk management

We have a formalized enterprise risk management program that is embedded into the day-to-day culture of the company. This program is designed to provide visibility to our Board and management of critical risks and risk mitigation strategies. Incorporating both Board and management oversight into our risk management program helps to align our risk management policies and procedures with our strategy.

Our internal audit organization facilitates a biannual risk identification and assessment process that includes input from all business groups and centralized corporate functions through surveys and interviews. The survey results are used to help identify and prioritize risks and develop an enterprise-wide view. Results of the survey are discussed with our Board's Audit Committee, and the key risks identified by the survey inform Board and Committee discussion topics throughout the year. Results are also shared with the business units and corporate functions to help determine how the company can develop mitigation strategies. We continue to more formally integrate climate considerations directly into our existing risk assessment framework.

Corporate policy

We have several established formal processes for managing business continuity (see the Risk identification and assessment processes section), including our Corporate Policy on business resilience, which sets forth a policy regarding National Security Emergency Preparedness for establishing and maintaining a plan for the continuity of operations and management in the event of local emergency or widespread disaster.

Environment, health and safety management system

Verizon's environment, health and safety (EHS) management system provides a framework for effective EHS governance that supports our EHS policy, and helps to monitor compliance with EHS requirements, manage risks, and drive continual improvement. In addition to regularly assessing our EHS performance, the company annually undergoes internal and third-party EHS compliance audits and inspections at hundreds of our facilities worldwide. The goal of these assessments is to identify and correct site-specific issues, and to educate and empower employees to implement corrective actions in their areas of responsibility. These assessments also provide feedback about the effectiveness of the EHS management system used by leadership. Verizon's EHS efforts are directed and supported around the world by experienced experts who support our operations and facilities.

Our EHS department has earned the International Organization for Standardization (ISO) 14001 and 45001 Standard certifications. ISO certification includes considering environmental aspects such as air emissions and health and safety hazards. We also have facility ISO 14001 certifications in some markets and are evaluating expanding our dual ISO certification across the business.

Strategy

5G and emerging technologies create new opportunities for Verizon to address many of the world's most pressing social and environmental challenges. To take full advantage of these possibilities, we are taking a multi-faceted approach with teams across Verizon working on:

- Minimizing the environmental footprint of our own operations
- Improving the energy efficiency of the components and equipment that comprise our networks
- Continuing to upgrade and harden our infrastructure to be prepared for a changing climate
- Developing solutions that enable our customers to minimize their environmental footprint and transition smoothly to a low-carbon economy

We have adopted new goals and commitments and continue to take a fresh look at all of the ways our technology and our people can build a better, more responsible future. We believe there are opportunities to grow our business by applying our technologies to help solve important social issues. We can now solve problems in ways not possible before, bringing the transformational power of technology and innovation to the most fundamental needs of our customers and communities.

Section	Our strategy
Climate-related risks and opportunities and impact on the organization	Our corporate strategy is built around our world-class networks, which is the core and strength of our business, and organized around a customer-centric model to drive innovation and new growth. Due to the nature of our business and operations, we recognize the impact climate change could have on our operations and the importance of being transparent and proactive to identify, assess, and manage those risks and opportunities with direct impact to our business. Continuing to uphold the standards of our business and of our network performance and reliability is our top priority, and why our strategy and risk management approaches are inextricably linked. We identify risks through robust and comprehensive enterprise processes. See the Risk management section of this report for more information. In the tables that follow, we identify climate-related risks and opportunities with potential impact to our business over short- (0–3 years), medium- (3–6 years), and long-term (6–10 years) time horizons, as well as our strategies to manage and mitigate each. Risks are categorized into two categories as outlined by the TCFD: (1) transition risks, created by the world's transition to a low-carbon economy as a result of carbon policy changes, and (2) physical risks created from a changing climate, particularly in the absence of carbon policy measures.

Transition risks

Policy and legal risk, market risk

- Changing environmental policies and market
- Current and emerging regulations
- Market risk

Description

Due to the nature of our operations, we are subject to regulatory developments related to climate change and energy-specific regulations at the local, state, and federal level, as well as in foreign jurisdictions where we have operations. Examples include regulation of GHG emissions, carbon pricing, fuel mix, energy and fuel cost, and energy policy. Related to changes in regulations are changes in the market. This includes the supply and demand for certain commodities, products, and services.

Impact to business

Time horizon
Short- to medium-term

Policy-driven changes in fuel or energy prices
Increased fuel or energy prices in geographies where we operate (within the US and Europe in particular) could make it more expensive to purchase energy to power Verizon's networks.

Our large vehicle fleet includes hybrids as well as traditional fuel-powered automobiles. An increase in the tax on fuel could increase the cost associated with operating those vehicles dependent on traditional fuels.

Implementation of carbon policy could impact Verizon by directly putting a price on our emissions, which would impact our operational costs.

Increased electricity and traditional fleet fuel cost
We rely on electricity to power our networks and traditional fuel (e.g., gasoline and diesel) to power our fleet. Increasing the cost of electricity and traditional fuel could impact our operational expenses.

For further detail on the impact of carbon policy and low-carbon implications to our Scope 1 and Scope 2 emissions, please refer to the Transition risk scenario analysis section.

Management approach

Monitoring policy and regulatory developments
We monitor policy and regulatory developments related to climate change and the environment at the local, state and federal level and create a course of action specific to the area(s) affected, as appropriate. Our International Public Policy team also carefully monitors emerging related regulations looking at both the "Brussels effect" – i.e., promulgated European Union (EU) regulations that could influence or have already prompted changes to the legal frameworks in the markets where we operate outside the EU – and the potential impacts of these regulations on Verizon's international business.

Setting climate goals and committing to net zero emissions in our operations
Recognizing the impact climate change could have on current and emerging regulations and the market, we are working toward a low-carbon future and are committed to reducing our environmental footprint through a variety of climate-related goals. Most notably, we are committed to net zero emissions in our Scope 1 and Scope 2 emissions by 2035. In addition to our net zero goal, we have announced two science-based emissions reduction targets. See the Metrics & targets section for the full list. Correspondingly, in 2020, we joined The Climate Pledge, an initiative focused on achieving the Paris Agreement 10 years early by 2040.

Procuring and deploying renewable energy
As a first step on our net zero journey, we have committed to source or generate renewable energy equivalent to 50% of our annual electricity consumption by 2025. Because most of Verizon's emissions come from the electricity that we use to power our networks, our support of renewable energy and the transition to a greener grid is a key enabler to achieving this goal.

Our network operations are located across the country and require a constant supply of electricity to operate. It is not feasible to power our network operations directly from solar or wind generation facilities during every hour of every day, so we are dependent on sourcing power from our nation's electrical grids. Today, much of that power is "brown" power, produced from conventional fossil fuels such as coal and oil. To achieve our renewable energy goal, we are focusing our resources on accelerating the transition to greener electrical grids across the US.

We are working to bring additional renewable energy to the grids by entering into VPPAs for solar and wind power under development. These agreements are financially settled and can reduce Verizon's long-term exposure to energy price volatility.

By providing the developers of renewable energy facilities with long-term revenue certainty, these agreements enable them to obtain the capital they need to construct the new solar and wind energy facilities. We generally do not expect to take physical delivery of the power from a facility under these agreements. Rather, the facility operator sells the power into the wholesale market and we receive the renewable energy credits (RECs) associated with the power sold. We intend to retire these RECs against our actual energy consumption to track our progress in meeting our renewable energy goal.

In less than two years, Verizon has become one of the leading corporate buyers of renewable energy in the US, entering into fourteen VPPAs totaling nearly 1.9 GW of renewable energy capacity. The projects covered by these agreements are scheduled to commence commercial operations over the next three years. With these agreements, we are making significant progress toward our renewable energy goal.

We also invest in on-site green energy, such as solar and fuel cell technology, at our administrative offices and other facilities. We have installed approximately 31 megawatts (MW) of green power at Verizon locations since 2013.

Our current net zero plan assumes that our total annual electricity consumption will be 100% backed by renewable energy by 2035. Given the increasing regulatory, commercial, and technological focus on the transition to a low-carbon economy, there could be new innovations and technologies for eliminating Scope 2 emissions that are not yet commercially feasible, which we may choose to pursue as we proceed on our journey.

Reducing electricity usage and carbon emissions
We recognize there are many ways in which we can reduce our exposure to a carbon price (i.e., a cost we directly or indirectly incur as a result of a carbon policy mandate to reduce GHG emissions). Below are a few examples (see our ESG Report for more information).

Transition risks (continued)

We are reducing energy use by moving from older technologies to newer, more energy-efficient ones. This includes migrating copper-based services to fiber technologies, which allows us to decommission switches and migrate to our newer intelligent edge network platforms. Our fiber-delivered broadband services are at least 100 times more efficient on a kilowatt hour (kWh) per gigabyte basis than copper-delivered broadband services.[2]

We are installing energy-efficient systems and employing energy management best practices. Facility improvements include mechanical and whole-building control systems, LED lighting, high-efficiency motors, economizers, cable dehydrators, and high-efficiency, uninterruptible power supplies.

We are using better cooling technologies in our data centers to reduce our carbon intensity and improve power utilization effectiveness at these facilities. Extensive deployment of economizers, which bring outside air into the HVAC system when it is cooler outside than in, also reduces energy consumption.

Reducing fuel consumption
In the ordinary course, we continue to improve the fuel efficiency of our fleet. This includes replacing older service vans, switching from V8 engines to V6 engines because they are more fuel efficient, utilizing telematics and other technologies to reduce idling and improve routing for more efficient operations, and replacing aerial lifts with systems that run solely on electric power so a technician can turn off the vehicle's main engine.

Reputational risk	Description
	There is a reputational risk to businesses as climate change moves up the consumer agenda. Businesses that are seen as not doing enough or not actively contributing to climate change mitigation may fall out of favor.

Impact to business	Management approach
Time horizon Short- to medium-term Based on the nature of our operations and electricity required to run our networks, customers could perceive the Verizon brand as detracting from a transition to a lower-carbon economy, particularly if we fail to demonstrate efforts to reduce our environmental impact. Our customers, employees, and other stakeholders expect us to be environmentally responsible and take appropriate measures to minimize the impact of our operations on the environment. Our brand is essential to the maintenance and growth of our business. Loss of reputable brand recognition could cause our customers to switch to competitors.	Reputational risk is reviewed by both our Board and management. Specifically, our Corporate Governance and Policy Committee reviews issues that may affect our business and reputation, including sustainability. **Climate-related public commitments** To demonstrate our commitment to a low-carbon economy and climate-conscious, energy-efficient future, we have publicly committed to achieving renewable energy and operational net zero goals. This challenges us to focus on improving in areas where we have the largest environmental impact. See the Metrics & targets section for a full list of our climate-related goals. Continued clear and consistent public messaging about our goals helps us reaffirm our priorities and frame our future sustainability strategy. **Funding climate innovation** We committed $1 million to the We Mean Business coalition. The funding will contribute to the coalition's goal to provide one million small- and medium-sized businesses globally with tech-enabled carbon footprint quantification tools and the necessary education to enable a 50% reduction of their carbon emissions by 2030 – with the goal to become net zero before 2050. In June 2021, we launched the Forward for Good Accelerator, an initiative that supports early-stage startup companies that are working on solutions that leverage technology to advance climate justice. Our first cohort, consisting of seven startups, will work with subject matter experts and program mentors to refine their technology. Solutions from the seven startups range from crop monitoring, wildfire control and prevention, community impact tracking, industrial waste, and more. Additionally, we will also be providing a second phase of support to the startup cohort beginning in Q4, consisting of custom mentoring around business, technology, and management team development. **Building a brand that supports community resilience** Our actions in the community support our commitment to helping those impacted by climate-related disasters. Verizon and our employees have stepped forward in a variety of ways to help those who were victims of hurricanes, wildfires, and floods. Our employees have helped people impacted by disasters get back on their feet, and Verizon has made significant donations to disaster recovery and community projects throughout the US and around the globe. **Internal reputation** We also support a business culture where employees help employees. The VtoV Employee Relief Fund provides aid for Verizon employees displaced from their homes due to a natural or personal emergency, such as fire, flood, severe weather, or domestic violence. VtoV has provided grants to Verizon employees around the world to use toward food, clothing, shelter, and other necessities during life-changing disasters.

[2]This statement has been independently assured by ERM Certification Verification Services (please see Verizon's Externally assured ESG data for more information). Energy consumption and capacity are based on vendor equipment specifications, reflect 50% traffic load utilization to make a comparison across technologies, and are based on a kWh per gigabyte intensity. This analysis only considers copper-based networks, such as analog DSL, and fiber-based networks, such as Verizon Fios, where Verizon has operational control (i.e., pays utility bills, excluding content delivery networks and consumer premise equipment). Network equipment and associated configuration included in the analysis is based on the averages for the most commonly used equipment for copper-based and fiber-based networks. The analysis does not include ingress traffic, cooling or electrical/data transmission line losses.

Physical risks

Acute physical risk

Extreme weather, including tropical cyclones (hurricanes and typhoons), flooding, wildfire, drought, and heatwave

According to the IPCC, in a 4°C world where carbon policy fails to mitigate global average temperature increases, the frequency and severity of acute events will be more drastic than today. In a 2°C world, these changes will be felt to a lesser extent. Current and future physical risks from increased extreme and severe weather could disrupt our business. Our wireline and wireless communications services are the lifeline of the communities we serve. People rely on our networks to conduct virtually every facet of their personal and professional lives. Our customers and regulators expect our services to operate regardless of weather conditions.

Impact to business

Time horizon
Short- to long-term

There is a potential negative impact on market share/sales if Verizon is unable to respond adequately to adverse weather situations that could impact our services.

Further, the future of our business is dependent on the protection of our employees, critical business processes, and structural facilities. More frequent and severe weather could pose a threat to these assets.

For further detail on the potential impact of acute physical risks, please refer to the Physical risk scenario and resilience analysis section.

Management approach

Enterprise strategy
Our comprehensive business continuity planning strategy prepares our business to respond to natural and man-made events around the globe that could adversely impact our business operations.

This strategy includes:

- **24/7 monitoring** to gather information to assess any threats to operations around the world, covering both natural and man-made events.
- **Planning** a course of action in the event of an emergency. These programs and procedures are essential to the protection of our employees, critical business processes, and structural facilities located around the globe.
- **Responding** with control and coordination in all emergency situations. When damage occurs, the risk management team quickly communicates all loss assessments and recoveries. We also train and maintain a number of internal Emergency Response Teams to proactively prepare us for disasters and emergencies.

See the Risk management section for more information about our risk management efforts related to physical risks, including how we identify, assess, and prioritize these risks.

Managing weather impacts and bolstering network resilience
Tropical cyclones (hurricanes and typhoons) present a risk to our coastal and inland infrastructure, including our networks and facilities. These events may increase our capital and operating costs to maintain and/or repair our facilities following the event. Every year we make significant investments in real estate and network maintenance and upgrades to build resilience into our operational infrastructure. Based on the lessons learned during storms such as Superstorm Sandy, Hurricane Matthew, and Hurricane Michael, we have taken steps to increase the resilience of our network in affected areas and other at-risk areas. Depending on the area and risk, these steps to enhance infrastructure resilience have included adding stilts to raise equipment that powers cell sites, moving site generators from basements to a higher level or platforms, and installing new fiber solutions underground rather than using aerial fiber. We may also mitigate disruption to service from destruction of fiber during severe weather events by deploying satellite links and microwave links to serve as alternatives to the fiber until the damaged fiber connections are repaired or replaced. We also have ongoing efforts to improve backup facility power systems, including power capacity at facilities located in areas with greater storm and wildfire risk, by adding generators to at-risk sites where, historically, the site only had backup batteries. Federal, state, and local regulators may create requirements that change the type and timing of actions we take, which could result in higher operating costs than anticipated.

Preemptive power outages imposed by California utilities impact our networks, requiring us to maintain service for a minimum of 72 hours immediately following the outage. Verizon has invested significant amounts to build network resiliency. Verizon has backup batteries at all our macro cell sites (towers) and permanent generators at the majority of our macro cell sites in high fire threat areas and all of our switch locations (network nerve centers), which we're able to refuel during extended power outages. We also deploy portable generators to those macro cell sites that do not have permanent generators, where necessary and feasible. These backup energy sources help keep our network running when commercial power is lost. Due to their increasing frequency, we are monitoring and assessing how to improve resilience during these types of power outages.

We are also investing in employee technology to allow for a more mobile workforce so that certain employees can work remotely and call center functions can be routed to alternate locations in the event of a disaster that impacts one of our existing facilities.

Physical risks (continued)

Chronic physical risk Long-term changes in climate and weather patterns, including changing levels of precipitation, mean temperatures, and sea level rise	According to the IPCC, in a 4°C world where carbon policy fails to mitigate global average temperature increases, the severity of changes in overarching climate patterns will be much more intense than today, including an average rise in sea level of 11.81 inches by 2030 and a reduction in worldwide productivity and GDP growth. In a 2°C world, we expect the increase in chronic impacts to occur over a much longer timescale and to be more limited.
Impact to business	**Management approach**
Time horizon Medium- to long-term Our operational costs may increase as a result of shifts in climate patterns, and the threat of these issues may impact current and future business decisions related to our data centers, facilities, and networks. It could also impact our operational costs through increased energy usage and spend and costs to repair facilities. These impacts could also result in drops in productivity or increased operational costs for our suppliers that would be passed on to Verizon.	**Enterprise strategy** See the Risk management section of this report for information about how we identify and assess longer-term risks, as well as integration into our risk management framework. In short, we have tools and processes in place to monitor and manage longer-term climate-related risks. **Long-term temperature changes** • **Building operational systems:** Rising and extreme temperatures could cause our cooling infrastructure to run more frequently and, in turn, present an additional burden to local power and water resources. Efforts to reduce the energy required to run these units and boost efficiencies include programs to optimize energy use by upgrading to more efficient units, increasing temperature set points, leveraging green energy (including wind and solar), and using artificial intelligence in managing our cooling systems. In addition, our pursuit of ENERGY STAR and LEED certification has helped to reduce energy usage. • **Goals:** We also use a variety of climate-related goals to manage our resource use, for example, working toward net zero emissions in our operations (Scope 1 and Scope 2) by 2035. See the Metrics & targets section of this report. **Increased precipitation and drought** Increased risk of flooding to low-lying facilities and infrastructure due to longer-term increases in precipitation patterns could increase operating costs to maintain and/or repair facilities and network equipment. Decreased precipitation could generate drought conditions which increase the risk of wildfires that could damage our facilities or network equipment. It could also create an increased burden to local water resources, which are required to operate our cooling infrastructure. Many of the actions we've taken to manage weather impacts (e.g., raising equipment or transitioning to underground fiber) have contributed to our ability to manage chronic climate-related risks. See the Acute physical risk section on the previous page for more on how we manage these risks.

Climate-related opportunities

Products, services, and markets	We continue to develop low-carbon and climate resilience opportunities for our customers and communities, enabled by our networks, products, and services.
Impact to business	**Management approach**
Time horizon Short- to medium-term	**Product and service innovation** We believe new technologies such as our 5G network and multi-access edge compute service will provide critical solutions toward a sustainable future and low-carbon economy, including the roll out of our **5G Home Internet**. Our technology solutions are already achieving efficiencies not only in our own operations (e.g., telematics), but also for our customers. With products, such as our smart building, smart grid, and smart transport solutions, and through travel substitution facilitated by our services, we are enabling our customers to significantly reduce their energy consumption. Our 5G Home Internet offering is more efficient than 4G on an energy per bit basis and allows for customer self-installation of the service, reducing the need for a Verizon technician to drive to the customer. We partner with cities to design infrastructure, systems, and processes that elevate the way they provide services in new and cost-effective ways. Our smart city solutions include: • **Intelligent lighting:** Allows customers to program and remotely operate lights to both decrease energy costs and increase safety • **Intelligent traffic management:** Uses in-ground and micro-radar sensors to help customers manage day-to-day traffic, shorten travel times, and reduce fuel consumption • **Parking optimization:** Enables drivers to find spots faster, reducing congestion, emissions, and frustration Our smart grid solutions are also helping our customers deliver on their renewable energy commitments. For example, Hawaiian Electric partnered with Verizon in pursuit of its 100% renewable energy goal by 2045. **Grid Wide** will help Hawaiian Electric monitor and manage the solar energy on Hawaii's electric grid, directly supporting the state's transition to clean energy.

Climate-related opportunities (continued)

Verizon's network makes telecommuting possible for both our consumers and business customers. Whether they choose to work remotely on a regular basis or need to do so as a result of unexpected circumstances, our network and workplace solutions support continued productivity, in addition to emissions reductions from decreased transportation.

Our **Skyward drone management platform** is enabling new ways for companies to decrease the use of motor vehicles and helicopters that would otherwise be needed for activities such as surveying stockpiles and infrastructure inspection during a natural disaster. We also deploy this technology in our own operations. For instance, the 2020 Big Hollow wildfire burned more than 24,000 acres in Washington, causing mandatory evacuation orders in the area. A Verizon site hosting essential communications infrastructure was just blocks from a Level 1 evacuation order, and the air quality was unsafe for humans. In order to ensure our infrastructure wasn't impacted by the disaster, but not endanger any personnel onsite, we used a drone to inspect equipment.

Diversification of financing
In February 2019, we established our green bond program, issuing a $1 billion green bond, a first for our industry in the US. Since then we have allocated nearly $2 billion of green bond proceeds primarily to finance long-term VPPAs that support the construction of solar and wind facilities that will bring new renewable energy to the grids that power our networks.

In 2020, we formalized our green bond program with the publication of a Green Financing Framework. Our Green Financing Framework articulates our sustainable finance strategy and commitment to impact reporting, and explains how our intended use of proceeds, selection of projects, management of proceeds, and reporting for green financings will align with international green bond principles, support our environmental goals, and advance the United Nations (UN) Sustainable Development Goals (SDGs). We have been working to integrate sustainability throughout our operations, and our green bond program has proven to be an effective tool for integrating our sustainability initiatives into our corporate finance processes and diversifying our fixed income investor base. For information regarding our green bond program and the allocation of the proceeds, please see our Green Financing Framework and Green Bond reports.

Community and customer resilience
Our communications services are relied on by a large number of emergency response organizations across the country, including the Federal Emergency Management Agency (FEMA), while responding to disasters. We seek to serve these customers by offering plans specially tailored to their unique needs. We also support emergency response organizations by providing free loaner devices and network augmentation during emergencies. Verizon has trained hundreds of public sector workers to be liaisons at emergency centers, coordinating with first responders during emergencies.

To help public safety professionals respond to the impacts of physical risks, Verizon Frontline — the advanced network and technology built for first responders — recently unveiled the Tactical Humanitarian Operations Response (THOR) vehicle, a mobile, private Verizon 5G Ultra Wideband and mobile edge compute (MEC) rapid-response command center vehicle. Verizon Frontline's THOR was designed to address challenges with coverage and technology gaps often caused by extreme weather events by creating a vehicle that provides public safety agencies or the Department of Defense with high-quality communications and applications under nearly any conditions.

In addition, our Verizon Response Team (VRT) mobilizes itself to provide communications when a crisis strikes. This was most notably seen in our support of first responders battling wildfires throughout Arizona in 2021. Collaborating with interagency officials, the VRT delivered Verizon Frontline technology to provide mission-critical voice and data service to public safety professionals as they combated fires throughout the state.

We've also launched an Emergency Resource Center Hub which provides updates on our response to climate-related disasters, including wildfires and hurricanes. This hub allows news media, local officials, employees, and others to learn about our emergency response efforts.

Resource efficiency, energy source, and resilience	For several years we have worked to reduce the environmental impact of our operations, including GHG emissions, and we continue to make investments to make our operations, networks, and infrastructure more resilient. All of these activities not only help manage our risks, but also provide new opportunities to reduce operating costs, take advantage of cost-competitive renewable energy, and create potential competitive advantages from resilient operations.
Impact to business	**Management approach**
Time horizon Short- to medium-term	See the Risk management section for more information on how we identify and assess these related risks, as well as the Policy and legal risk, Acute physical risk, and Chronic physical risk sections above for more information on how we are managing these risks and opportunities.

Transition risk scenario analysis and resilience

We conducted a transition risk scenario analysis in 2019 to evaluate our company's resilience under a 1.5-2°C scenario in alignment with the guidance developed by the TCFD. This analysis contemplates how our operating costs are impacted by a range of Verizon-specific and low-carbon economy drivers, such as electricity growth, carbon prices, electricity prices, and electric vehicle (EV) adoption.

The TCFD and other proponents of climate impact scenario planning have highlighted the importance of using standardized third-party scenarios in order for investors to compare climate resilience across companies, including a scenario where the world is able to limit global temperature increase to 1.5-2°C above pre-industrial levels. Accordingly, we sought to use a third-party scenario developed by an independent, recognized organization.

Section	Our transition risk scenario analysis
Scenario selection and assumptions	We chose a scenario from the International Energy Agency's (IEA) 2019 World Energy Outlook (WEO) publication, the **Sustainable Development Scenario (SDS)**. The SDS maps out a path for the globe to hold the rise in global temperatures within 1.8°C by 2100,[3] while simultaneously achieving the SDGs of universal energy access and cleaner air. This scenario requires rapid and widespread changes across all parts of the energy system by 2040, and envisions a world characterized by strong carbon policy (government action to curb emissions) that thereby creates increased transition risks as businesses adapt to the pace of these policies needed to avoid an increase in global average temperature of no more than 1.8°C by 2100. SDS assumes a major drop off in total global carbon emissions of 38% from 2018 to 2030,[4] met through a combination of rising carbon prices, upscaling of renewable energy and phasing out of coal generation, and reliance on energy efficiency to reduce growing global energy demand, as well as carbon capture, utilization, and storage. While some assumptions contemplated by the IEA may not seem practical or contrary to current trends, they are modeled as presented for standardization purposes and best practices. Verizon has not developed an independent view as to the likelihood of the assumptions in the chosen scenario or the relative likelihood of this scenario as compared to other widely-used scenarios.
Scenario analysis methodology and overview	We modeled the impact of several pathways and assumptions from IEA on our business across two Verizon GHG scenarios – a **Low GHG** and a **High GHG Scenario**. Both scenarios leveraged IEA's outputs (such as carbon prices and changing carbon intensity of the US electricity grid), and within each, we flexed various Verizon-specific assumptions, such as electricity growth, effectiveness of our renewable energy procurement contracts, and ability to adopt EVs (based on IEA assumptions). See the Key drivers of the scenario analysis table on page 22 for a full list of drivers.

[3]IEA states: The SDS holds the temperature rise to below 1.8°C with a 66% probability without reliance on global net-negative CO_2 emissions. This is equivalent to limiting the temperature rise to 1.65°C with a 50% probability. The IPCC Special Report on Global Warming of 1.5°C, published in 2018, assessed a large number of scenarios that led to at least a 50% chance of limiting the temperature rise to 1.5°C. Almost all of these IPCC scenarios (88 out of 90) assume some level of net negative emissions. The SDS does not rely on net negative emissions, but if the requisite technologies became available at scale, warming could be further limited.

[4]All information about SDS as presented in this report is sourced as follows: Based on IEA data from the IEA (2018) World Energy Outlook. All rights reserved; as modified by Verizon.

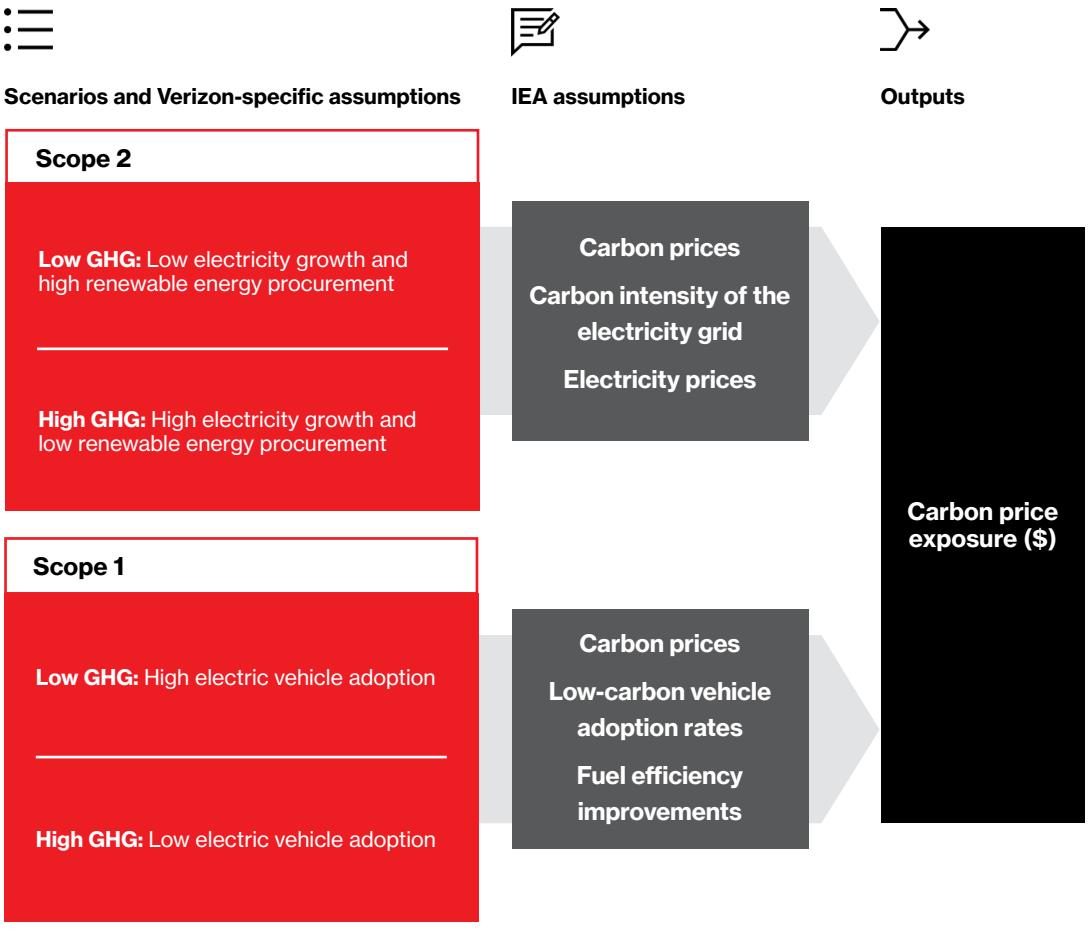
Scenario analysis methodology and overview (continued)

Both transition risk scenarios model the financial impact of carbon policy through the year 2030 on both our:

- **Scope 2 (indirect) emissions:** By evaluating the impact of a carbon price on our actual emissions, as well as the impact on electricity prices and the effect of the grid transitioning to low-carbon sources (in other words, increasing levels of renewable generation and less coal, by 2030).
- **Scope 1 (direct) emissions:** By evaluating the impact of a carbon price on varying levels of our fleet fuel consumption.

As a result, these scenarios simulate our **carbon price exposure**. We recognize that carbon policy can take many forms and for purposes of these scenarios, we have modeled both of the impacts on the business described above. Additionally, the analysis confirms the value of our plans to reduce our emissions to mitigate future climate-related risk to Verizon.

Conceptual overview of the scenario analysis



Key drivers of the scenario analysis

Major drivers	Description	Exposure impact **Low GHG**	Exposure impact **High GHG**
Carbon price	While not applicable today, IEA's carbon price is assumed to be $100/metric ton of CO_2 in developed countries by 2030, which impacts our Scope 1 and 2 emissions directly. As the electricity grid transitions to renewable sources over time, we would be less impacted by a direct cost of carbon on our Scope 2 emissions. See the carbon intensity of the electricity grid below.	↑	↑
Scope 2			
Electricity growth	As we grow our business through market share gains, acquisitions, and our 5G buildout, our electricity usage will rise over time, even with efficiency upgrades. We flex the amount of this increase in the analysis.	↑	↑ ↑
Ability to procure renewable energy	We are actively procuring renewable (zero-carbon) electricity. These offtake agreements reduce our exposure to a carbon price on our Scope 2 emissions. We flex the effectiveness of these agreements in the analysis.	↓ ↓	↓
Carbon intensity of the electricity grid	IEA assumes renewable electricity generation quickly outpaces fossil-fired generation by 2030, enabling a less carbon-intensive grid that we purchase electricity from, thereby decreasing our Scope 2 emissions. We calculate carbon intensity from IEA's projected generation mix and carbon emissions through 2030.	↓ ↓	↓ ↓
Electricity price	As the grid transitions from fossil-fired generation to predominantly renewable electricity generation, IEA assumes there will be increases in electricity prices aimed at covering transition costs such as infrastructure upgrades.	↑ ↑	↑ ↑
Scope 1			
Fuel efficiency	IEA assumes that vehicles increase fuel efficiency by 2030, bringing down our overall fuel usage.	↓	↓
Adoption of low-carbon fleet	Our ability to adopt EVs and use biofuels for our fleet would lower our carbon profile. We use assumptions from IEA on low-carbon adoption rates for cars and trucks. While the impact was simulated to be minimal, EVs also have the effect of raising our Scope 2 emissions.	↓	↓

↑/↓ **Indicates driver has minor impact on increasing/decreasing our carbon price exposure**

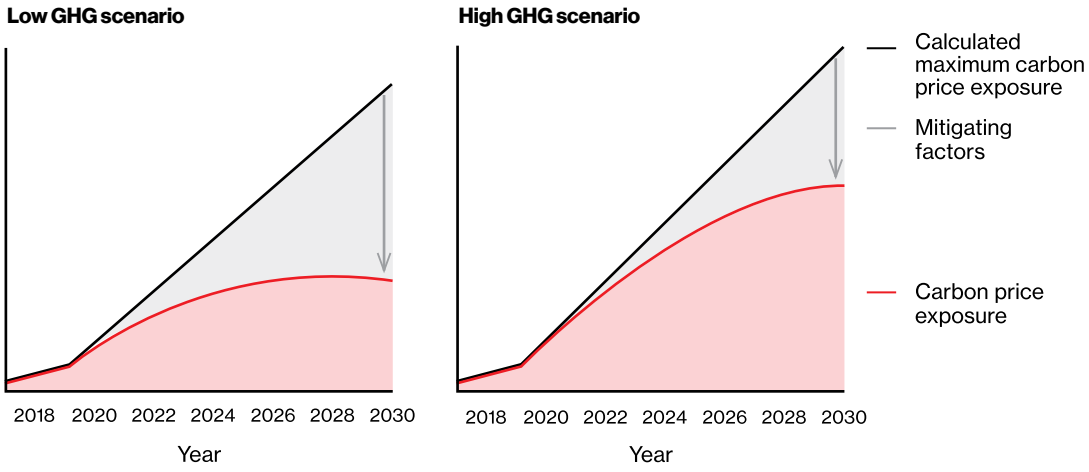
↑↑/↓↓ **Indicates driver has more significant impact on increasing/decreasing our carbon price exposure**

Scenario analysis and resilience

Scenario results and resilience

At a glance: As described on page 20, in order to provide a standardized way to look at our business under a carbon policy scenario, Verizon has chosen to use a scenario created by a third party for the analysis rather than developing an independent view on a carbon policy. Our simulation shows that even with growth in electricity usage, carbon prices, and electricity prices, **we are resilient** in a carbon policy environment that is aligned to 1.5-2°C. We believe that our strategy to reduce our energy and carbon emissions and procure renewable energy in order to mitigate our carbon price exposure will be effective.

Simulated financial exposure[5]



There are multiple reasons we believe we are resilient:

- **Transitioning of the electricity grid to renewable sources, as well as our renewable energy procurement strategy, helps avoid a large direct policy impact on the majority of our emissions by 2030:** Our simulation shows that, as a result of the implementation of a carbon price, our Scope 2 emissions fall as a result of procuring cleaner electricity from the grid. As carbon policies create an environment where renewable generation outpaces fossil-fired generation by 2030 (renewables make up nearly 40% of total US generation by 2030, up from 17% in 2018), the carbon intensity of the US grid begins to fall dramatically (a nearly 60% drop by 2030). Ultimately, the price of electricity we procure from the grid may increase, but a heavily renewables-based grid offsets a substantial portion of our potential exposure to a direct carbon price on our Scope 2 emissions. Moreover, our strategy to procure renewable energy further offsets our carbon-exposed electricity usage, as this portion of electricity use is considered fully renewable and not subject to a direct price of carbon.

[5]**Calculated maximum carbon price exposure:** Verizon's maximum financial exposure in a 1.5-2°C carbon policy environment, assuming growth in Verizon's energy use and associated emissions, but does not assume an orderly transition of the electricity grid to renewable sources, or effect of renewable energy purchase agreements.

Mitigating factors: Factors that reduce Verizon's financial exposure, including the transition of the electricity grid to renewable sources (enabling Verizon to purchase electricity from a less carbon-intensive grid) and Verizon's renewable energy purchase agreements.

Carbon price exposure: Remaining financial exposure after mitigating factors are considered; includes remaining exposure of a carbon price on our fleet fuel consumption, and the impact of a carbon price directly on our Scope 2 emissions, as well as the price of electricity.

Scenario analysis and resilience (continued)

- **Electricity prices drive our exposure, but we have mechanisms in place to control electricity growth:** Our simulated carbon price exposure is primarily driven not by a direct price on carbon to actual emissions, but by the resulting increase in electricity prices from the grid transitioning to renewable sources through 2030. As renewables capacity grows nearly 140% by 2030, there is assumed to be a large associated cost with the build out of new plants and supporting infrastructure, such as transmission lines and other technology innovation. IEA estimates investments in the global power sector will total $77 billion per year on average through 2040 (around 60% higher than recent spending levels), and that areas that are fossil-fuel intensive today will see the highest increases in electricity prices. In managing our exposure to electricity price increases, we are actively managing our energy use through a variety of ways (see the Strategy section). In fact, from just four years of investments we've made to reduce our energy use and emissions, and assuming IEA's $100/metric ton of CO_2 by 2030, these reductions will have avoided tens of millions of dollars in carbon price exposure each year. In addition, we are entering into fixed, long-term contracts with low-carbon generators, helping to further reduce our exposure to power price increases over the long term.
- **Our analysis covers the majority of our operational emissions:** As Verizon's primary source of emissions (>90%) are Scope 2 (from electricity consumption), our carbon price exposure is also mostly driven by Scope 2 rather than by Scope 1, which is largely concentrated in our fleet and would be assumed to be exposed to a direct carbon price.
- **Our Scope 1 carbon price exposure is negligible:** We evaluated how IEA's assumptions about fuel efficiency and low-carbon vehicle adoption rates would impact our fleet. We found that fuel efficiency in particular helps reduce our fuel consumption, and that carbon price exposure from remaining fuel consumption is negligible. We conservatively applied IEA's EV adoption rates, as the majority of our fleet comprises trucks, including heavy-duty trucks, for which we do not currently believe electric technology will be sufficient to meet the demands of the activities undertaken by these vehicles.
- **The scenario analysis found our carbon price exposure to be negligible:** For comparison purposes, the combined Scope 1 and 2 carbon price exposure does not make up a significant portion of FY19 operating expenses in either the Low GHG or High GHG scenario.

We will continue to revisit the appropriateness of additional and/or updated transition risk analyses in the future.

Physical risk scenario analysis and resilience

As a vital provider of critical network infrastructure, Verizon's primary goal has always been to keep our employees, customers, and society connected to the people and resources that are important to them. Our customers and regulators expect our services to operate regardless of weather conditions, so evaluating weather and climate-related impacts is part of our regular operational procedures for our networks. In our network planning, we assess the implications of short- and long-term weather impacts on our networks and response capabilities.

In 2021, we conducted a pilot scenario assessment of potential future climate risks. This pilot assessment studied a sample of assets identified to be of high risk and criticality to our operations across the US.

Section	Our physical risk scenario analysis
Scenario selection and assumptions	As with our transition risk analysis, we used third-party scenarios developed by an independent, recognized organization, which are in alignment with the guidance developed by the TCFD. We selected two scenarios for our analysis that are representative of possible global GHG emissions trajectories and resulting changes in the climate. These scenarios align with two of the IPCC RCPs. Our understanding of the potential climate-related implications of the scenarios was informed by scientific literature such as the IPCC's Fifth Assessment Report (AR5).[6] The first scenario, RCP 2.6, is characterized by a drastic drop in global total carbon emissions that become net negative by the year 2100. It assumes countries successfully implement carbon policies, resulting in generally less than 2°C warming, and a global mean sea level rise of 0.40 meters by 2100. The second scenario, RCP 6.0, is characterized by a global temperature rise of approximately 2.8°C from pre-industrial levels, and a global mean sea level rise of 0.48 meters by 2100. This scenario assumes a moderate global effort to reduce emissions, with a significant increase in emissions projected through 2060, followed by a sharp decline and stabilization after 2100. The IPCC states that warming will result in a high to very high risk of pervasive, irreversible, and acute global impacts by the end of the 21st century, including extreme weather events. These risks are exacerbated under higher emissions scenarios, causing increasingly worse physical risk impacts in RCP 6.0 compared to RCP 2.6. We chose these two scenarios to illustrate a range of emissions and global warming scenarios that could impact our networks, with RCP 2.6 closely aligned with our transition risk analysis.[7] We modeled two scenarios across two time horizons, 2030 and 2050, which we selected in the context of Verizon's operational net-zero strategy. Verizon has not developed an independent view as to the likelihood of the assumptions in the chosen scenario or the relative likelihood of this scenario as compared to other widely-used scenarios.

[6]Scientists have recently published an update to AR5. We will continue to enhance our understanding of climate-related risks as new data becomes available.

[7]This RCP is broadly aligned with the IEA's Sustainable Development Scenario utilized in our transition scenario analysis.

Scenario analysis methodology and overview

In 2021, we completed a pilot physical risk analysis of projected changes in climate perils. This analysis examined a strategic sample of nearly 11,000 specific infrastructure asset locations considered to be of high risk and criticality to Verizon's network and business operations, such as cell sites and office locations. We assessed how climate-related perils may intensify at those locations over time and under the two selected future climate scenarios. We also examined the impact of five climate perils (hurricane, wildfire, flood, hail, and storm) on these locations. To assess the change in the intensity and frequency of climate perils, we developed multiple risk scores for each location in the asset sample:

- **A baseline (current) risk score:** Based on historical weather data
- **Two projected future risk scores:** Based on the selected future climate scenarios (i.e., RCPs 2.6 and 6.0)

Each of these risk scores were calculated on a scale of 1–10 and then calibrated to a narrative scale of seven categories ranging from "Very Low" to "Extreme," as shown in the Scenario results and resilience section below. It is important to note that these risk levels represent simulated possibilities of future risk and are not forecasts of expected risks.

For the purposes of summarizing the results of the pilot analysis in this report, we have grouped the sample of specific asset locations into clusters. Each cluster represents assets within a 30-mile radius, and the risk scores represent average scores for those assets based on frequency and severity of the relevant perils.

To determine the current and future risk scores for the locations included in our analysis, we worked with a third-party vendor and leveraged their proprietary risk scoring algorithm and external datasets. These projection datasets included those obtained from the National Oceanic and Atmospheric Administration (NOAA), the World Resources Institute (WRI), reinsurance databases, and data from the World Bank's Climate Change Knowledge Portal. The table below provides some information on the current and future scoring methodology.

Peril	Current (historical) scoring methodology	Projection methodology
Hurricane	**Severity:** Average wind speed translates to severity category (H1-H5) **Frequency:** Average number of occurrences of the corresponding severity category in 40 years within 100 miles of the location	Projection based on a function of two variables: • Maximum one-day precipitation level • Maximum wind speed
Wildfire	**Severity:** Area burned in acres **Frequency:** Average number of times in 35 years when the corresponding number of acres burned were within 10 miles of the location	Projection based on a function of three variables: • Consecutive dry days • Average temperature • Maximum wind speed

Scenario analysis methodology and overview (continued)

Peril	Current (historical) scoring methodology	Projection methodology
Flood	**Severity:** Flood depth in feet **Frequency:** Flood return period in years	Projections calculated based on adjusted return period variables
Hail	**Severity:** The diameter of the hail particle in inches **Frequency:** The average number of occurrences in 40 years within a 25 mile radius	Projection based on a function of four variables: • Average days where rain exceeds 50 millimeters (mm) • Concentration of cloud top icy particles • Concentration of cloud top particles • Cloud top particles radius
Storm	**Severity:** Average wind speed translates to severity category **Frequency:** The average number of occurrences of the corresponding severity category in 40 years within a 25 miles radius	Projection based on a function of the maximum wind speed

The physical risk modeling analysis helped us further ascertain our acute risk exposure at the individual asset level and identify locations and perils that contribute the most risk to our overall portfolio in order to plan mitigation strategies to increase resilience in the future.

Scenario results and resilience

At a glance: Overall, our pilot analysis found that the geographic distribution of our networks and business operations across the US limits the concentration of risk from any single climate peril. Predictably, risk levels generally increase in future time periods under the climate scenarios we modeled. These results, coupled with our risk mitigation strategies (see the Risk management and Acute physical risk sections) help support the conclusion that **our management of weather impacts on our networks is currently sufficient and we should continue to review it on a regular basis to ensure future climate-related risks are adequately taken into account**. This pilot also identified ways we can expand our analysis in the future (see the Future considerations for our analysis section).

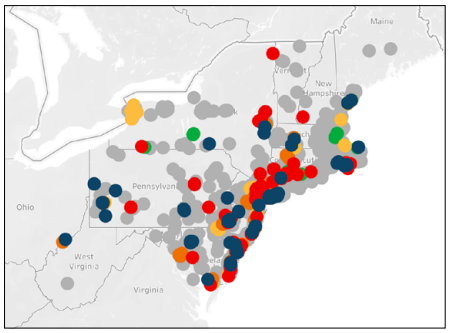
As anticipated, the largest changes in risk scores occur in RCP 6.0 in 2050. While risk score changes also occur in RCP 2.6, the impact is much smaller because the IPCC assumes that global climate policies are somewhat more successful in lowering global emissions, which mitigates the most extreme changes in the climate in this scenario. As such, we have chosen to depict a comparison of the baseline current state risk scores to the projected RCP 6.0 risk scores in the results below. Additionally, the results only portray the climate peril with the greatest risk to each region, and the regions shown are areas of the country with the largest concentrations of assets.

Scenario results and resilience (continued)

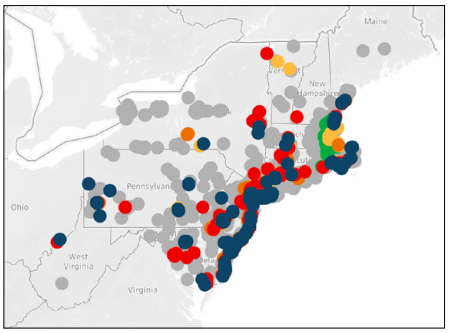
Northeast

Within the Northeast region, flooding is the most prominent risk due to the nature of flooding along coastal regions. The analysis shows that flooding is already classified as an 'Extreme' risk for many of the assets located on or near the coast, but the risk level is expected to increase, with additional locations expected to be upgraded to an 'Extreme' risk level by 2050. Under RCP 6.0, the analysis shows that by 2050, average flood risk scores are expected to increase by 37% for the sample asset locations in the Northeast region.

Flood Risk



Current flood risk in the Northeast

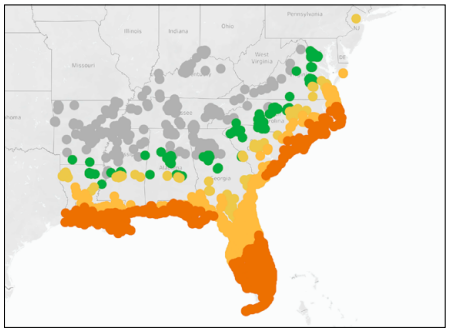


Flood risk in the Northeast in 2050 in RCP 6.0

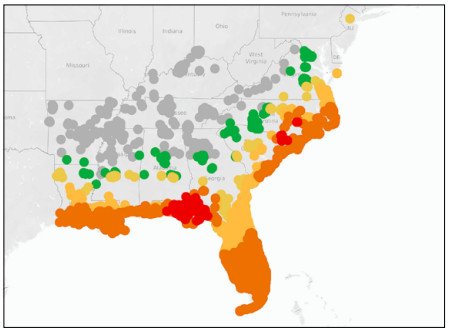
Southeast

Of the climate perils studied, assets in the Southeast region are most exposed to hurricanes. Based on the analysis results, certain areas of the region are expected to have their risk levels increase by 2050 in RCP 6.0. This transition begins to emerge in 2030 and intensifies over time. By 2050, the analysis shows that average hurricane risk scores are expected to increase by 2.6%, in aggregate, for the sample asset locations we examined in the Southeast region (note the average risk score is offset by inland assets, which generally tend to have lower risk scores; the risk scores for the coastal assets are higher in comparison).

Hurricane Risk



Current hurricane risk in the Southeast



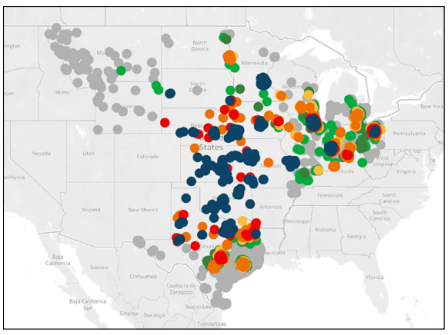
Hurricane risk in the Southeast in 2050 in RCP 6.0

Scenario results and resilience (continued)

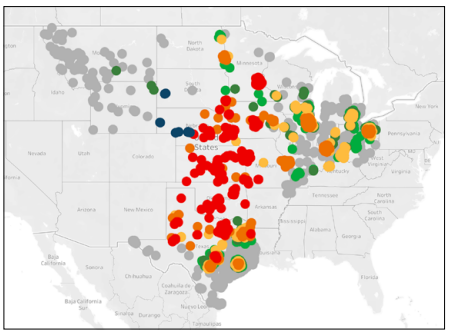
Great Plains and Midwest

The main risks facing asset locations in the Great Plains and Midwest regions are hail and storms. Based on the average current risk scores for the locations we examined, hail is the most significant risk. However, average hail risk scores are projected to decrease by 11% for the combined Great Plains and Midwest region by 2050 in RCP 6.0 due to an expected decrease in the ice levels within clouds. As hail risk diminishes along major bodies of water in the Midwest – such as the Great Lakes and the Mississippi, Missouri, and Ohio Rivers – the analysis projects that storms may overtake hail as a larger risk in this region by 2050 in RCP 6.0. Average storm risk scores for the asset locations we examined in the Midwest region are expected to increase by 8%.

Hail Risk

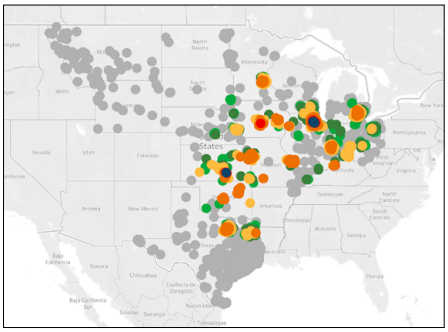


Current hail risk in the Great Plans and Midwest

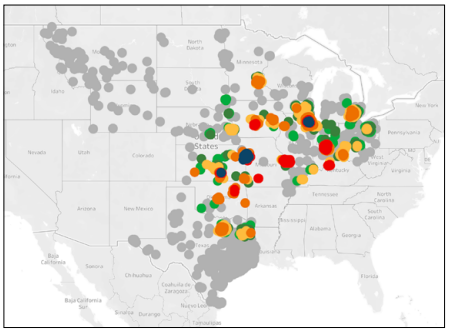


Hail risk in the Great Plains and Midwest in 2050 in RCP 6.0

Storm Risk



Current storm risk in the Great Plans and Midwest



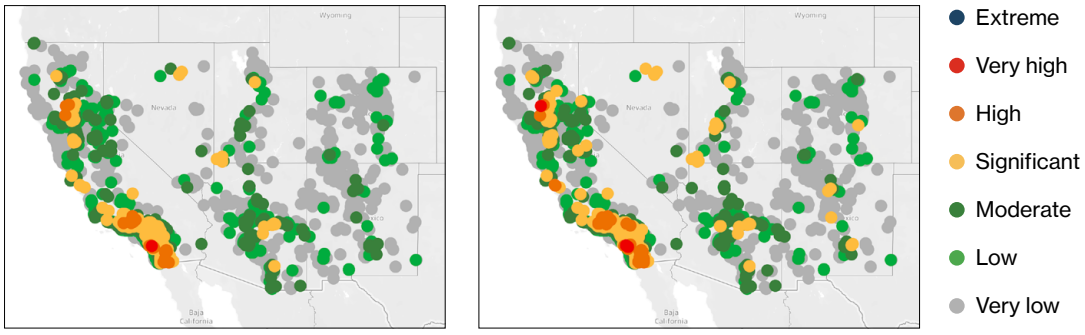
Storm risk in the Great Plains and Midwest in 2050 in RCP 6.0

Scenario results and resilience (continued)

Southwest

Although flooding is classified as an 'Extreme' risk in some areas of Northern California, wildfires represent the greatest risk for assets located in the Southwest region. This is expected to intensify, as the analysis projects an increase of over 7% in average wildfire risk scores by 2050 for the asset locations we examined in the Southwest region in RCP 6.0. Due to the nature of wildfires, a region that has recently burned is less likely to burn again in the near future. This means that the risk scores of individual assets may change in the short term, but the risk to the region as a whole remains similar.

Wildfire Risk



Current wildfire risk in the Southwest

Wildfire risk in the Southwest in 2050 in RCP 6.0

Based on the totality of our pilot analysis, there are multiple reasons we believe we are well-positioned to respond to the challenges we may face from climate change:

- The analysis shows increases in risk scores across multiple climate perils, which is consistent with overall expectations of the effects that climate change will have on our physical environment. Across the sample of asset locations in the analysis, each region is exposed to various types of perils differently, which contributes to the diversification of our risk exposure across our networks. Recognizing that our overall exposure, as reflected in the analysis, is rising due to climate changes, we will continue to analyze our exposure to weather perils.
- The analysis also projected that the most significant risks to our networks in 2050 are expected to be flood and wildfire, with a projected increase in average risk scores for the asset locations we examined of nearly 12% and 6%, respectively. The wildfire scores are calculated based on expected wildfires within close proximity of the sample asset locations (around a 10 mile radius). The overall incidence of wildfires could potentially be very different but the scores shown here are calculated based on our sample asset locations. While specific impacts will vary significantly by asset location and type, our analysis indicates that the potential impact to our portfolio of assets could be substantial.
- Though physical climate risks as reflected in the analysis are expected to accelerate, the projected risk scores associated with these perils are similar to the baseline current risk scores for the sample of locations we examined. This means that the types of perils we already prepare for and manage today will likely be similar in the future, and we expect to continue to evolve our mitigation strategies for these perils. For example, we have ongoing efforts to improve backup facility power systems, including power capacity at facilities located in areas with greater storm and wildfire risk, by adding generators to at-risk sites where, historically, the site only had backup batteries.

Scenario results and resilience (continued)

- Due to the gradual increase in simulated risk and our robust risk management and risk mitigation strategies in place (see the Risk Management and Strategy sections), we believe that our management of weather perils within our planning horizon is sufficient for network resilience. We will continue to monitor our risk profile and continue to invest in network resilience to ensure reliability for our customers.

Future considerations for our analysis

We will continue to revisit the appropriateness of additional and/or updated physical risk analyses in the future, including how specific types of assets may be impacted depending on the type of peril (e.g., cell towers and building may be impacted differently by hail and wind) or the effect of the occurrence of multiple perils at the same time across our network (e.g., simultaneous hurricane and wildfire activity across our networks).

Metrics & targets

We track a variety of climate-related metrics across our operations and value chain. We use these metrics to manage performance against our goals and to monitor current and future climate-related risks.

Section	Our metrics and targets
Metrics and targets	We believe our goals demonstrate to our stakeholders that we are committed to reducing our environmental impact, while also reducing our exposure to a carbon price. Our commitment to be net zero in our operations by 2035 involves a combination of approaches, including reducing our emissions, migrating energy procurement in favor of renewable and clean energy, and purchasing carbon offsets. By doing so, we are finding ways to reduce the potential effect of future carbon prices on our business. We will continue to measure and disclose our performance against our goals. In addition to our operational net zero goal, we have announced two science-based emissions reduction targets. We have committed to reduce absolute Scope 1 and 2 GHG emissions 53% by 2030 over a 2019 baseline and to reduce absolute Scope 3 emissions from our value chain 40% by 2035 over a 2019 baseline. The target covering emissions from our operations (Scope 1 and 2) is consistent with reductions required to keep warming to 1.5°C. Our value chain target is consistent with reductions required to keep warming to well-below 2°C. These targets were calculated using methodologies approved by the SBTi that are in line with a level of emissions reduction that science suggests is necessary to avoid the most significant impacts of climate change. An overview of our climate-related metrics and targets are available below. For historical and most recent performance, please see our ESG Report. For more information about select metric methodologies, please see the Independent Accountants' Review Report for Scope 1 and 2 emissions, and relevant Scope 3 emissions,[8] which shows emissions calculation approaches and discloses how they are aligned with the GHG Protocol Corporate Accounting and Reporting Standard.

[8]Scope 3 emissions are indirect upstream and downstream emissions.

Climate-related targets			
Metric	**Goal**	**Target type** (Absolute/intensity)	**Time frame** (and baseline)
Carbon indicators			
Scope 1 and 2 emissions[9]	Achieve net zero operational emissions by 2035	Absolute	By 2035
	Achieve a 53% reduction in our Scope 1 and 2 operational emissions by 2030 (over a 2019 baseline) to limit global warming to a 1.5°C scenario	Absolute – Science Based Target[10]	By 2030
Scope 3 emissions[11]	Achieve a 40% reduction in our Scope 3 emissions from our value chain by 2035 (over a 2019 baseline) to limit global warming to well-below 2°C	Absolute – Science Based Target[10]	By 2035
Reduction in CO_2e our customers are achieving through the use of our products and services	By 2030 Verizon solutions will help avoid 20 million metric tons of CO_2e annually	Absolute	By 2030
Energy indicators			
MW of renewable energy	Source or generate renewable energy equivalent to 50% of our total annual electricity consumption by 2025	Absolute	By 2025

[9]Scope 1 and 2 emissions are assured.

[10]These targets were calculated using methodologies approved by the SBTi that are in line with a level of emissions reduction that science suggests is necessary to avoid the most significant impacts of climate change. An annual target related to carbon intensity is also incorporated into remuneration policies (see the Governance section).

[11]Scope 3 emissions are also assured. Relevant categories, as reported in our 2021 CDP Climate Change Response (C6.5), are purchased goods and services, capital goods, fuel- and energy-related activities (not included in Scope 1 or 2), upstream transportation and distribution, waste generated in operations, business travel, employee commuting, downstream transportation and distribution, use of sold products, and end-of-life treatment of sold products.