

TCFD Report



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Introduction

About this report

Verizon knows that transparency regarding climate-related risks and opportunities is critical to maintaining our stakeholders' trust and allows our investors to better understand the implications of climate change on our business. This is why we have adopted the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and are publishing our third report aligned to the TCFD's guidelines. This report is structured into four sections: Governance, Risk management, Strategy and Metrics & targets. This report, published in November 2023, provides a comprehensive view into how Verizon understands and manages the risks and opportunities associated with climate change.

The inclusion of information 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, see our [Annual Report on Form 10-K](#).

Forward-looking statements

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," "forecasts," "plans" 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, refer to Verizon's Annual Report on Form 10-K.

Progress since our 2021 TCFD Report

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

Governance

- Our Board continued to expand its oversight of climate-related risks with more frequent briefings on compliance with U.S. and global regulatory initiatives related to climate.
- We further integrated climate considerations into decision-making processes across the business. For example, our Global Networks & Technology Group created an energy-focused workstream within the Network & Technology Transformation Office Forum to drive energy efficiency across our networks.
- We created an Environmental, Social and Governance (ESG) Center of Excellence, composed of teams from Enterprise Risk Management, Legal and Accounting Policy, to implement an expanded internal control framework and facilitate our compliance with climate change-related laws and regulations.

Risk management

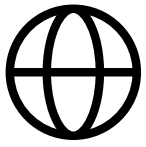
- To enhance our existing risk management processes, we launched an annual enterprise-wide survey of senior leaders and subject matter experts specifically focused on climate-related risk over the short, medium and long term.
- In connection with this new climate risk survey, we changed the time horizons that we use to evaluate climate-related risk to align with the time horizons we utilize in our financial planning and reporting.

Strategy

- We implemented a supply chain resilience management program to more formally manage supply chain risks, including disruptions caused by natural and human-induced events, related to our products and services. The program is guided by our new corporate policy statement on supply chain resilience and is overseen by a cross-functional Global Supply Chain Resilience Governance Council.
- We continued to bring additional renewable energy to the U.S. electrical grid by entering into long-term virtual power purchase agreements (VPPAs) for solar and wind power under development.
- We issued our fifth \$1 billion green bond in 2023. Since 2019, we have allocated nearly \$4 billion of green bond proceeds, primarily to finance the VPPAs.
- We refreshed and extended the time horizon of our transition risk analysis to utilize a more recent third-party 1.5°C model and to incorporate Verizon's updated planning assumptions related to our net-zero commitment.
- We continued to consolidate our domestic and global real estate portfolio to co-locate people and equipment more efficiently, thus eliminating unnecessary building emissions.
- We shut down our 3G wireless network in January 2023 and powered off all 3G wireless cell sites. We are implementing a variety of initiatives to effectively manage energy consumption throughout our active 4G and 5G networks.
- We utilized AI and machine learning capabilities to drive energy efficiency initiatives across Verizon.

Metrics & targets

- We set a new interim target to source renewable energy equivalent to 100% of our total annual electricity consumption by 2030 to drive progress on our operational net-zero goal.



Governance

Verizon's Board of Directors and executive leadership team recognize that operating responsibly, which includes managing climate-related risk and minimizing our environmental impact, is fundamental to our long-term success. We believe that building a better future involves making climate considerations "business as usual" throughout our organization. Our Board's oversight role and our management governance structures continue to include regular assessment and discussion of climate-related risks and opportunities. Dedicated teams of experts with visibility across our business operations are essential to our efforts to integrate climate considerations into our strategic and operational decision-making processes, encourage effective communication between Verizon management and the Board and elevate the transparency of our ESG disclosures.

Board oversight

Our Board reviews the risks associated with Verizon's strategic plan throughout the year, including our plans for meeting our climate-related commitments. Each committee of the Board oversees the management of the specific risks and opportunities related to our environmental sustainability strategy and the transition to a low-carbon economy that fall under that committee's area of responsibility, routinely receiving updates from management on these matters. The committee chairs provide regular updates to our full Board on the activities of their committees. Several of our Directors have experience with climate-related issues, including renewable energy, network resilience, technological solutions and emissions management.

- The **Audit Committee**, which met 11 times in 2022, oversees Verizon's enterprise risk management program. Climate-related risks discussed during in-depth business risk reviews throughout the year include operational and financial risks relating to energy management, network reliability and resilience and the impacts of current and emerging environmental and ESG reporting regulations.
- The **Corporate Governance and Policy Committee**, which met five times in 2022, oversees Verizon's sustainability strategy and our public policy engagement. At least annually, the Committee reviews the company's progress and engagement on carbon reduction and other sustainability initiatives.

- The **Finance Committee**, which met seven times in 2022, monitors and oversees Verizon's capital allocation and financing activities, including our green finance and renewable energy programs.
- The **Human Resources Committee**, which met five times in 2022, is responsible for establishing the performance measures and targets for Verizon's incentive plans. The Committee has included a performance measure related to carbon intensity reduction in the short-term incentive compensation plan for management employees since 2014.

Management's role

Management councils

Verizon has established several cross-functional management councils to assess risks and opportunities when making important decisions for the business. Composed of members of our executive leadership team, these councils meet regularly and address a wide range of critical matters, including business and technology strategies, product development, capital allocation, emergency preparedness and responsible business initiatives. The Strategic Leadership Council oversees our progress toward our climate-related goals as well as the integration of sustainability considerations into our overall strategy and business operations.

Our management councils operate using a year-round planning and execution process. This process unites strategy development, financial planning and budgeting, talent management and execution to make sure that each organization is coordinated as it implements Verizon's strategy.

We use scorecards to track key performance indicators in the execution of individual initiatives and compile them into one corporate-wide scorecard to inform strategic decision-making for the coming year. The corporate-wide scorecard includes key performance measures for our operational net-zero goal (see [Metrics & targets](#)).

Management sub-councils and committees

The work of the councils is supported and informed by cross-functional management sub-councils, committees and working groups, including the following:

- The **Executive Climate Oversight Committee**, composed of the leaders of our Finance, Legal, ESG, Sustainability and Centralized Operations functions, has direct responsibility for assessing the company's management of climate-related risks and opportunities. Representatives from Fleet, Global Real Estate, Network, Strategy and Treasury report into the Committee on climate-related issues and initiatives that fall within their purview. A member of the Committee briefs the Strategic Leadership and Responsible Business Councils and the Board of Directors on these matters.
- The **Business Continuity Executive Steering Committee**, composed of designated senior executives representing Global Network & Technology, Verizon Consumer Group, Verizon Business Group and Verizon Global Services, oversees our Business Continuity and Event Management (BCEM) function. See [Risk management](#) for more information about the BCEM organization and how climate-related risks are identified, prioritized and addressed in emergency preparation plans.
- The **Global Supply Chain Resilience Governance Council**, composed of representatives from our Sourcing, Supplier Risk and Global Network & Technology organizations, among others, focuses on supply chain continuity, compliance and reputation.
- The **Global Network & Technology Transformation Office** is responsible for delivering operational savings through cross-functional ideation and partnership. The Energy Transformation Office Forum, one of four subsets of the broader office, focuses on energy usage and cost reduction throughout our wireless and wireline networks. The Forum is composed of representatives from Network Planning, Technology & Product Development, Engineering, Sourcing and Artificial Intelligence & Data.

Management responsibilities

The following functions are responsible for the assessment and management of climate-related matters:

- **Centralized Operations.** The Executive Vice President and President – Verizon Global Services has primary responsibility for a number of climate-related issues, such as energy efficiency projects; energy and emissions management; fleet transformation; renewable energy development and procurement; natural resources management and supply chain resilience, circularity and engagement. The Senior Vice President of Supply Chain Operations & Chief Sustainability Officer and the Senior Vice President – Corporate Assets and EHS have day-to-day responsibility for the management of these issues.
- **ESG.** The Senior Vice President, Deputy General Counsel and Corporate Secretary, as the head of ESG, has primary responsibility for assessing Verizon's climate-related risks and opportunities and promoting the integration of climate-related issues into corporate strategy and operations. The ESG function is responsible for monitoring and reporting progress against our climate-related targets.
- **Finance.** The Chief Financial Officer has primary responsibility for managing the company's budget and green financing strategies, including expenditures for climate mitigation activities, such as network resilience, renewable energy and fleet transformation initiatives.
- **Legal.** The Chief Legal Officer has primary responsibility for managing the company's compliance with applicable climate-related regulatory and reporting requirements. As such, the legal team has an integral role in the assessment, management and monitoring of climate-related issues and transition risks that may affect the company's strategy and operations.
- **Global Network & Technology.** The Executive Vice President & President – Global Network & Technology has primary responsibility for incorporating climate considerations into Verizon's strategic network planning function, ranging from energy usage to infrastructure resilience.
- **Human Resources.** The Chief Human Resources Officer has primary responsibility for recommending to the Board's Human Resources Committee performance measures for Verizon's incentive compensation plans that align with the company's short- and long-term strategic goals, including those related to climate.



Risk management

Verizon recognizes that climate change may impact how we operate our business and networks. As such, we have processes that allow us to proactively identify, assess and prepare for transition and physical climate risks. We also continue to integrate climate risk variables into our overall risk management process and establish formal, cross-functional processes that engage both our Board and management team.

Risk identification and assessment processes

We identify climate-specific risks and assess their importance relative to other business risks through four key processes.

Annual climate-related risk assessment

Our annual enterprise-wide climate-related risk assessment asks senior leaders and subject matter experts to identify and evaluate the impact of climate-related risk on our business, strategy and financial planning over the short, medium and long term. The assessment leverages a comprehensive inventory of transition and physical climate risks, informed by the TCFD risk taxonomy, that could impact Verizon. Participants are asked to assess the likelihood and impact of, and most relevant timeframe for, a broad range of these risks and to identify any other relevant climate-related risks. We share the results of the assessment with senior leaders who have primary responsibility for addressing risks related to the operations within their purview. Decisions on whether and how to prioritize, mitigate, accept or adapt to a particular identified climate risk are made at the business unit level and reviewed with the [Executive Climate Oversight Committee](#). This assessment supports the integration of climate risk into our overall risk management approach.

Semiannual business risk identification and assessment

Our semiannual enterprise-wide business risk identification and assessment process, which includes a question on climate-related risk, elicits input from all senior leaders on strategic and operational business risks via surveys and interviews. Through this assessment process, we are able to evaluate the potential impact of climate-related risks in relation to other potential business risks. Key risks identified by the assessment are shared with senior leaders to support the

development of mitigation strategies, which are discussed with the Audit Committee of the Board during business risk reviews held throughout the year.

Annual business impact analysis

Our annual business impact analysis (BIA) assesses the potential operational impact resulting from a major disruption of services based on known and predicted events, including climate-related events. The assessment prioritizes risk based on the level of impact to our network, customers, employees and business operations.

Network planning

We leverage information from third-party sources, as well as lessons learned from severe weather and other natural events, to integrate climate-related risks into planning for Verizon's network operations. We use geospatial analysis to evaluate the potential impact of climate-related events, including storm surge from hurricanes, flooding, wildfire, high straight-line wind and tornadoes, on our current and future operational and network models. In 2021, we conducted a supplemental long-term physical risk analysis across a variety of acute climate-related perils to assess future impacts (see [Physical risk analysis and resilience](#)).

This analysis highlights necessary investments to increase infrastructure resilience and helps inform network build decisions relating to current and future facility locations. Key risks are discussed with management and directly integrated into our annual business continuity and network build planning.

Risk management processes and integration

Our overall risk management approach includes processes designed to prioritize, mitigate, accept or control key business risks, including climate-related risks. See [Strategy](#) for more information about our management of specific climate-related risks and opportunities.

Business risk management

Our enterprise-wide business risk management program utilizes the [semiannual business risk identification and assessment](#) process, which evaluates climate-related risk in relation to other potential business risks, to provide management and the Board with visibility into the key risks to our business and Verizon's overall control environment. Senior management teams from across the business meet with the Audit Committee of the Board to discuss identified risks and related mitigation activities. See [Governance](#) for more information on the climate-related topics covered in these reviews.

Business continuity and event management

Our Business Continuity and Event Management (BCEM) organization uses the [BIA](#) to develop action plans and coordinate response and recovery efforts for local emergencies and widespread disasters. The BCEM framework, which follows Verizon's corporate policy statement on national security emergency preparedness, is designed to protect and support Verizon personnel, critical operations and infrastructure during emergencies and disasters, including human-induced and weather-driven events. The framework supports operational preparedness, mitigation, response and recovery by weaving BCEM into Verizon decision-making; focusing on internal and external partnerships; optimizing BCEM tools and technology and developing a comprehensive training program for the BCEM team, strategic partners and employees.

The BCEM organization operates our Global Event Management Center (GEMC), which actively monitors and assesses potential threats to Verizon's operations around the world. When a potential threat or significant event is identified, the GEMC performs a risk assessment, consulting with internal and external subject matter experts, and

disseminates situation information and intelligence to key response groups within the company. The GEMC leverages Verizon's in-house weather-monitoring platform that uses multiple sources of weather data to identify potential impact areas and conduct automated pre-storm risk reduction activities. Restoration teams and equipment are then stationed in those areas to protect our facilities and personnel. The GEMC also leads our event response efforts, including our crisis management teams.

Supply chain resilience and risk management

Our supply chain resilience management program identifies, assesses, monitors and manages supply chain risks, including disruptions caused by natural and human-induced events, related to our products and services. The program is guided by our corporate policy statement on supply chain resilience and is overseen by a cross-functional [Global Supply Chain Resilience Governance Council](#).

Verizon also maintains a supplier risk management program that supports the company's implementation of responsible social and environmental sourcing. A dedicated team in our Supplier Risk Office works closely with organizations across the company to implement a risk management framework and make recommendations regarding future supplier engagement.

Environmental, health and safety (EHS) management

Verizon maintains a robust EHS management system to identify, control and reduce the EHS risks associated with our operations. Verizon's EHS department maintains International Organization for Standardization (ISO) 14001 (environmental) and ISO 45001 (occupational health and safety) certifications for our EHS management system. This program is guided by our corporate policy statement on EHS. For more information about our EHS program, see our most recent [ESG report](#).



Strategy

Management approach to climate-related risks and opportunities

Our corporate strategy is built around our world-class networks and a customer-centric model to drive innovation and growth. We recognize the importance of proactively identifying, assessing and managing climate-related risks and opportunities that may impact our business. See [Risk management](#) for more information on our climate risk identification strategies.

In this section, we identify climate-related risks and opportunities with potential impact to our business over short (zero to one years), medium (one to five years) and long (more than five years) time horizons. We use the TCFD's two major risk categories: (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 stemming from a changing climate, particularly in the absence of carbon policy measures. While our internal processes determined that these risks are not likely to have a material impact on our business over these time horizons, we nonetheless maintain robust mitigation strategies to improve our climate resilience.

Transition risks

Regulatory and legal

Description

Impact to business

New or additional laws, regulations or contractual commitments related to climate change (e.g., those related to energy usage or greenhouse gas emissions), or climate change-related litigation filed against Verizon or parts of our supply chain, may result in increased compliance costs, taxes on emissions, penalties or operational restrictions.

For further detail on the impact of carbon policy and low-carbon implications to our scope 1 and scope 2 emissions, refer to [Transition risk analysis and resilience](#).

Time horizon

Medium term

Management approach

Monitoring policy and regulatory developments

We monitor policy and regulatory developments related to climate change and the environment (e.g., carbon tax incentives and penalties, mandatory reporting) at the local, state, federal and international levels and create a course of action specific to the areas affected, as appropriate. If enacted, regulatory developments in these areas may require a significant investment of time and/or capital to support Verizon's compliance.

Setting climate goals and committing to net-zero emissions in our operations

We are reducing our environmental footprint and planning for a low-carbon future. We are committed to net-zero scope 1 and scope 2 emissions by 2035 and have set science-based emissions reduction targets. See [Metrics & targets](#) for more information on our carbon reduction goals and renewable energy targets.

Procuring and deploying renewable energy

Because most of our operational carbon footprint comes from the electricity we use to power our networks, our path to operational net zero relies heavily on our transition to renewable energy. We have set interim targets to source renewable energy equivalent to 50% of our annual electricity usage by 2025 and 100% by 2030.

Transition risks

Regulatory and legal (continued)

Management approach

We are working to bring additional renewable energy to the U.S. electricity grid by entering into long-term power purchase agreements for solar and wind power under development. These virtual power purchase agreements (VPPAs) are financially settled and can help reduce Verizon's long-term exposure to energy price volatility. VPPAs provide the developers of renewable energy facilities with long-term revenue certainty, enabling them to obtain the capital they need to construct new solar and wind energy facilities. For more information on our renewable energy strategy, see our most recent [ESG report](#) and [Green Bond Impact report](#).

ESG Center of Excellence

We created an ESG Center of Excellence, composed of teams from Enterprise Risk Management, Legal and Accounting Policy, to implement an expanded internal control framework and facilitate our compliance with climate change-related laws and regulations.

Market and technology

Description

Impact to business

Market-driven shortages or increases in the price of fuel, energy, raw materials or components used in our products and services as a result of the transition to a low-carbon economy may limit our ability to offer certain products and services or affect our ability to achieve our climate-related goals. Increased energy or fuel prices in geographies where we operate (within the U.S. and Europe, in particular) could make it more expensive to operate Verizon's networks, buildings or the vehicles in our fleet that are dependent on traditional fuels.

Our ability to transition to a low-carbon economy depends, in part, on the development and adoption of new or alternative low-carbon technologies, products and services in our operations and supply chain. The lack of, or delay in, the development of such technologies, products and services may prevent us from maintaining competitive offerings or achieving our climate-related goals.

For further detail on the impact of market-driven increases in the price of fuel as a result of carbon policy, see [Transition risk analysis and resilience](#).

Time horizon

Medium term

Management approach

Enterprise-wide energy management strategy

We are committed to reducing energy use across our networks, building portfolio and fleet. Effective energy management is not only necessary for the transition to a low-carbon economy but also lowers operating costs now and into the future. We describe key network, building and fleet energy management initiatives below. For more information on our energy efficiency initiatives, see our most recent [ESG report](#).

Network energy management

The decommissioning (i.e., powering down) of legacy network equipment that no longer serves business or customer needs continues to result in significant energy savings. As part of a wireline network transformation initiative, we have been migrating copper-based services to fiber technologies, which enables us to decommission energy-intensive switches and utilize 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.¹

Transition risks**Market and technology (continued)****Management approach**

We shut down our 3G wireless network in January 2023 and powered off all 3G wireless cell sites. We are also implementing a variety of initiatives to effectively manage energy consumption throughout our active 4G and 5G networks, including:

- Powering down radios when they are not in active use
- Relocating heat-generating network equipment from indoor locations to outdoor locations
- Upgrading cell site HVAC systems
- Auditing sites to understand where improvements are needed to meet our high standards of energy efficiency.

We continue to seek out opportunities to transition our networks to clean energy sources. For example, we are partnering with the National Renewable Energy Laboratory to study the feasibility of solar power installation at remote off-grid sites that rely on fuel-powered generators.

Building energy management

We are installing energy-efficient systems and employing energy management best practices at our buildings. Facility improvements include mechanical and whole-building control systems, LED lighting, high-efficiency motors, steam and water leakage reduction, on-site solar and HVAC system overhauls that replace aging equipment with heat pumps and adiabatic coolers. We also utilize an Internet of Things (IoT) sensor network to more intelligently manage building controls, optimizing for set temperatures and equipment energy consumption.

Both domestically and globally, we are consolidating our real estate portfolio to more efficiently co-locate people and equipment, thus eliminating unnecessary building emissions. For example, we are currently moving a large technical facility in New York City into an existing office space. The project is utilizing cutting-edge energy technologies, including heat recovery chillers and submetering, which enables us to use meter-level data to understand operational efficiency on a micro level (e.g., lighting, HVAC, telecom equipment, etc.).

We design and operate our data centers for optimal energy efficiency. Our data centers leverage the full range of environmental tolerances allowed by most server, storage and network hardware suppliers, enabling us to implement energy-saving practices such as free cooling, waterside economizers, evaporative cooling, aisle containment and passive exhaust. We also leverage the full limits of our power and cooling infrastructure by monitoring and managing the power demand profile at each layer of distribution. In some locations, we use AI and machine learning algorithms to support energy conservation.

Fleet fuel management

We are taking a multifaceted approach to reducing our fleet emissions. We have replaced aging bucket trucks, other than those outfitted for special uses, with trucks with hybrid drive systems. These vehicles utilize a battery system to power the aerial lift, eliminating the need for the truck's engine to be on to perform work on Verizon infrastructure. We are pioneering technology to replace gas-powered generators in fiber splicing vans with an electric battery system capable of powering equipment for days at a time. In 2021, we conducted an engine calibration on nearly 100% of legacy Fios vans not yet at end-of-life to decrease the vehicles' emissions without compromising their functional abilities. We are also reducing fleet emissions by utilizing optimized vehicle dispatching technology to minimize the miles driven to service our networks.

Transition risks**Market and technology (continued)****Management approach**

The lack of electric vehicle (EV) models suitable for our commercial operations poses a challenge to our fleet electrification efforts. While production of light-duty EVs is increasing to meet a variety of consumer uses, there are few – if any – EV options for the larger, specialized commercial vehicles on which our operations depend. Despite these challenges, we are in the process of transforming our fleet from relying on internal combustion engines to using clean energy technologies. We are planning to electrify a substantial portion of our customer-facing fleet by replacing our oldest light-duty vehicles with EVs. We are purchasing these EVs at a rate aligned with available products and charging infrastructure suitable for our operations.

In addition, we are closely collaborating with manufacturers and actively participating in industry organizations to spur the manufacture of special-use-case commercial EVs to electrify our non-customer-facing light-duty vehicles, as well as our medium- and heavy-duty operational vehicles, to the greatest extent practicable. We are also collaborating with manufacturers, utilities and fellow fleet operators to discuss opportunities to more rapidly transition our fleet to low- or zero-carbon alternatives, as well as develop and implement best practices in making such a transition.

Reputational**Description****Impact to business**

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 growth and success of our business. Damage to our reputation from poor environmental performance, including the failure to meet our climate-related goals, could impact customer or investor demand or result in a loss of existing talent or the inability to attract new talent.

Time horizon

Medium term

Management approach**Climate-related oversight and accountability**

Reputational risk is regularly reviewed by management and overseen by the Board. Specifically, our Corporate Governance and Policy Committee reviews issues, including sustainability, that may affect our business and reputation. To earn trust with our stakeholders, we regularly report our progress on our climate-related goals and key environmental indicators. See [Metrics & targets](#) for a description of our climate-related goals.

Funding climate innovation

Verizon recognizes that climate change does not impact everyone equally. Inequities related to race, gender, age, disability, income and other factors put certain populations at increased risk. We established the Climate Resilience Prize to help scale proven, in-market solutions that are focused on mitigating the disproportionate impacts of climate change on vulnerable communities. The Climate Resilience Prize supports startups and technology solutions that enhance community resilience. In 2022, we awarded a total of \$500,000 to winners across three categories: next-generation tech, frontline community-led and nature-based solutions. In addition to prize money, our 2023 winners will receive six months of consulting services and some may have the opportunity to pilot their product in partnership with Verizon.

Building a brand that supports community resilience

Our actions in the community support our commitment to helping those impacted by climate-related disasters. During times of crisis, we deploy a range of emergency measures to keep our customers, public safety professionals and broader communities connected.

Transition risks

Reputational (continued)

- Management approach**
- **Supporting our communities.** The Verizon Frontline Crisis Response Team provides on-demand emergency assistance to government agencies and first responders nationwide – at no cost to the agencies – to help maintain essential communications when they're needed most.
 - **Supporting our customers.** After major natural disasters, such as wildfires, tornadoes and hurricanes, the Verizon Response Team is on-site and available at all times to provide our customers with critical connectivity.
 - **Supporting our employees.** In times of crisis, the VtoV Employee Relief Fund, supported by employee donations and the Verizon Foundation Matching Gifts Program, 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.

For more information about our disaster response efforts, see [Physical risks: Acute](#) below.

Physical risks

Acute

Description **Impact to business**

Extreme weather events (e.g., hurricanes, heavy rain, high wind, wildfires, blizzards and heatwaves) may disrupt our direct or value chain operations and result in negative financial, operational or reputational impacts. The future of our business is dependent on the protection of our employees, infrastructure and business processes. More frequent and severe weather events could pose a threat to these critical assets.

For more information on the potential impact of acute physical risks, see [Physical risk analysis and resilience](#).

Time horizon

Short and medium term

Management approach **Risk management strategy**

Our risk management strategy prepares our business to respond to natural and human-induced events around the globe that could adversely impact our business operations. See [Risk management](#) for more information about our identification, assessment and prioritization of physical risks and related business continuity, supply chain resilience and network planning processes.

Network reliability

Verizon is an industry leader in operating reliable and resilient networks that support our customers' needs and keep them connected. Our networks in the U.S. include various design elements, technologies and business processes that work together to enhance the reliability of our services.

Verizon's network design includes redundancy on critical paths and for critical network components to mitigate the impact of network events on customers. We use forward-looking risk assessments to plan and maintain our fiber backhaul configuration for critical network sites. We have also implemented a "meshed" core network architecture, which enables network equipment to switch traffic almost instantly across multiple available transmission paths between two endpoints. When available, this enables the network to self-recover promptly from outages to physical facilities.

To mitigate the impact of power disruptions on our operations, we have battery backup at every switch and every macro cell. We also utilize backup generators at a majority of our macro cells and at every switch location. In addition, we have a fleet of portable backup generators that can be deployed as needed.

Physical risks

Acute (continued)

Management approach

Infrastructure resilience

The resilience of our networks reflects many years of significant investment that enables us to keep our customers connected during extreme weather events. We make enhancements to our facilities and networks based on assessments of the relevant geographic area and corresponding types of risks, including:

- **Fire.** In fire-prone areas, our network teams work year-round to proactively eliminate brush and waste that could fuel fires.
- **Hurricanes.** In Florida, we have built “super switch” facilities that can withstand Category 5 hurricane winds to serve as our emergency operation centers.
- **Tornadoes.** In Missouri, where tornadoes can strike often and unpredictably, we have built an underground storage unit to protect emergency vehicles and network equipment.
- **Blizzards.** Housed in a fully insulated building, with angled roofing and a flood protection barrier, our sub-zero switch in North Dakota can withstand extreme snow, ice and flooding.
- **Rising sea levels and flooding.** Along the coast, where heavy rains and tropical storms cause frequent flooding, we have constructed our cell towers on stilts and elevated platforms. Our base stations, which hold critical cell tower equipment, are also elevated to effectively shield our power supply, generators, cooling systems and transport interface from rapidly rising waters.

In the case of fiber damage resulting from severe weather events, we deploy satellite and microwave links to serve as alternative paths while the original infrastructure is repaired or replaced.

Disaster response

Verizon Frontline provides on-demand emergency assistance to government agencies, first responders and public safety officials nationwide during crisis situations. We have a collection of deployable assets to assist public safety teams, including mobile emergency calling centers, mobile cell sites, generators and repeaters, tethered drones and satellite communication capabilities. Our Tactical Humanitarian Operations Response vehicle serves as a mobile command center capable of deploying Verizon Frontline technology under nearly any condition. For more information on our disaster response, see [Transition risks: Reputational](#).

Chronic

Description

Impact to business

Long-term changes in climate and weather patterns (e.g., changing precipitation levels, mean temperatures and sea levels) may disrupt our direct or value chain operations and result in negative financial, operational or reputational impacts.

For more information on the potential impact of chronic physical risks, see [Physical risk analysis and resilience](#).

Time horizon

Long term

Management approach

We utilize analysis and modeling to identify vulnerabilities and plan future network resiliency.

Long-term temperature changes

Rising and extreme temperatures could cause our cooling infrastructure to be engaged more frequently, presenting an additional burden to local power and water resources. See [Transition risks: Market and technology](#) for how we are optimizing energy use in our networks and buildings.

Physical risks

Chronic (continued)

Management approach

Increased precipitation and drought

Changing levels of precipitation could increase the risk of flooding in low-lying areas, as well as risk of drought and related wildfires. Many of the actions we have taken to manage weather impacts (e.g., raising or relocating equipment) have bolstered our ability to manage chronic climate-related risks. For more information, see [Infrastructure resilience](#).

Climate-related opportunities

Products, services and markets

Description

Impact to business

We continue to develop low-carbon and climate resilience opportunities for our customers and communities enabled by our networks, products and services.

Time horizon

Short, medium and long term

Management approach

Product and service innovation

We believe that IoT technologies will be a major enabler of carbon reduction as we transition to a low-carbon economy, and we are working in our 5G and innovation labs to develop new low-carbon and climate-resilient solutions for our customers and communities.

Verizon's technology solutions are already achieving efficiencies not only in our own operations but also for our customers. Our products, such as our smart building and smart transport solutions, enable our business customers to significantly reduce their energy consumption. We partner with cities to design infrastructure and systems that elevate the way they provide services in new and cost-effective ways. Our smart city solutions include intelligent lighting, intelligent traffic management and parking optimization. Verizon Connect's solutions for managing fleet EVs and plug-in hybrid EVs help our customers improve fleet operations and reduce fuel consumption. Verizon's networks also enable emissions reductions for our business and consumer customers through virtual connection solutions, including telecommuting and telehealth. 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.

AI innovation

We are utilizing AI and machine learning capabilities to drive energy efficiency initiatives across Verizon. Projects under development include:

- Optimizing cell tower placement to maximize coverage and minimize infrastructure
- Developing an algorithm to enable solar panel battery storage systems to discharge energy during peak periods when energy prices are highest
- Creating a model to identify cell sites with anomalous energy consumption
- Utilizing automation to reduce the number of truck rolls needed for Fios dispatches.

Diversification of financing

Verizon is one of the largest corporate green bond issuers in the U.S. Since we established our green bond program in 2019, we have issued five green bonds totaling \$5 billion. We are allocating the net proceeds primarily to finance VPPAs for new renewable energy projects. For more information on the allocation of green bond proceeds and related impacts, see our most recent [Green Bond Impact report](#).

Climate-related opportunities

Resource efficiency, sourcing and resilience

Description
Impact to business

We continually invest in the resilience of our operations, networks and infrastructure. These investments not only help to manage our risks but also provide new opportunities to reduce operating costs and create potential competitive advantages from resilient operations.

Time horizon

Short, medium and long term

Management approach
Supply chain resilience

Verizon's Supply Chain Resilience Management Program identifies, assesses, monitors and manages supply chain risks, including disruptions caused by natural and human-induced events, to better coordinate our supply chain activities and aid the effectiveness of our controls. The program monitors how Verizon stakeholders manage the life cycle phases of our physical products, software, firmware and services. The program also assesses whether stakeholders need to improve their procedures to more effectively mitigate supply chain risks as they relate to four key categories: security, integrity, resilience and quality. This work is guided by our corporate policy statement on supply chain resilience and is overseen by our cross-functional [Global Supply Chain Resilience Governance Council](#).

For example, the Supply Chain Resilience Management team built a multi-tiered intelligence tool that uses supply chain information to map out Verizon's macro supply chain environment. The tool produces a visual, data-driven representation of expenditures, materials and products by location and supplier. It enables us to identify risks, such as exposure to natural or human-induced disasters, that may result from clustered suppliers or geographies. The tool also guides new supply chain decisions based on our supply chain landscape. This technology allows us to plan for supply chain resilience in the face of increasing climate events.

Teardown lab

Verizon maintains a teardown lab in which a team of engineers and cost modeling experts systematically deconstructs network equipment and devices to assess the efficacy and efficiency of their design. The lab's core objective is to support Verizon's Network, Sourcing and Circular Supply Chain organizations by offering insights on design optimization to enhance product sustainability from production to disposal.

Transition risk analysis and resilience

We updated our 2019 transition risk analysis to evaluate our resilience in alignment with TCFD recommendations. This analysis contemplates how our operating costs are impacted by a range of Verizon-specific and low-carbon economy drivers, such as electricity usage and prices, carbon prices and EV adoption. The TCFD and other proponents of climate impact planning have highlighted the importance of using standardized third-party models in order for investors to compare climate resilience across companies. Accordingly, we used a third-party model developed by the International Energy Agency (IEA).

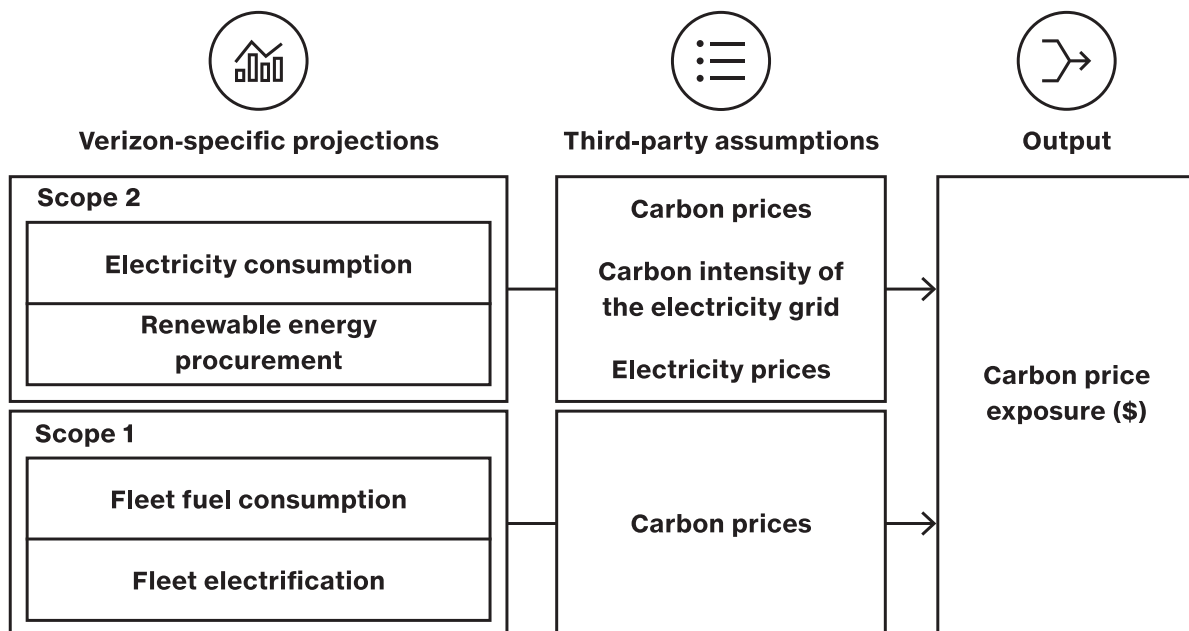
Assumptions

We chose the Net Zero Emissions by 2050 (NZE) model from the IEA's 2022 World Energy Outlook publication. The NZE outlines a path toward achieving global net-zero CO₂ emissions by 2050 and limiting the global temperature rise to 1.5°C without a temperature overshoot (with a 50% probability),² while simultaneously achieving key energy-related United Nations Sustainable Development Goals (UN SDGs), such as universal energy access by 2030. This model requires rapid and widespread changes across all parts of the energy

system by 2035 and envisions a world characterized by strong carbon policy across governments that may create increased transition risks as businesses adapt to the pace of these policies. NZE assumes a substantial decline in total global carbon emissions of nearly 34% from 2020 to 2030,³ with advanced economies leading the way, met through a combination of rapid deployment of clean energy technologies, energy efficiency and demand reduction. While some assumptions contemplated by the IEA may seem impractical or contrary to current trends, they are assessed 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 model or the relative likelihood of this model as compared to other widely used models.

Carbon policy analysis methodology and overview

We assessed the impact of several pathways and assumptions from the IEA on our business from 2019 to 2035. Our assessment leverages the IEA's outputs (such as carbon prices, change in electricity prices and changing carbon intensity of the electricity grid) and various Verizon-specific assumptions, such as projections of electricity and fuel usage, renewable energy procurement and fleet electrification. See the [Key analysis drivers](#) table for a full list of drivers.



We recognize that carbon policy can take many forms. Our transition risk model analyzes the financial impact of a potential carbon price environment through 2035 based on the following factors:

- **Electricity consumption and scope 2 emissions.** More than 90% of Verizon’s emissions are scope 2. This analysis evaluates how our operating costs could be affected by a carbon price applied directly to our scope 2 emissions and by increasing electricity prices as the grid transitions

to lower carbon sources. The analysis also considers how Verizon’s renewable energy procurement strategy, coupled with the expected decreasing carbon intensity of the electricity grid overall, helps to reduce these impacts.

- **Fleet fuel use and scope 1 emissions.** This analysis evaluates how our compliance and operating costs could be affected by a carbon price applied directly to our scope 1 emissions. The analysis also considers how Verizon’s fleet transformation strategy helps to reduce these risks.

Key analysis drivers

Major drivers	Description	Exposure impact
Price of carbon	While not applicable today, the IEA’s price of carbon is assumed to be \$140/metric ton CO ₂ by 2030 and assumed to apply directly to our scope 1 and 2 emissions. As the electricity grid becomes greener over time and as we transition to renewable energy and EVs, we expect that the direct cost of carbon on our emissions will be reduced.	↑
Scope 2		
Electricity usage	As we grow our business through market share, acquisitions and our 5G buildout, our electricity use is expected to rise over time, even with efficiency upgrades.	↑
Renewable energy procurement	Our renewable energy procurement strategy, consisting primarily of our VPPA program, helps to reduce our exposure to carbon prices applied directly to our emissions and our exposure to increasing electricity prices because we can purchase electricity at fixed prices.	↓ ↓
Carbon intensity of the electricity grid	In the IEA’s model, the electricity sector reaches net-zero emissions in advanced economies by 2035. This significant change in the carbon intensity of the grid from which we purchase (uncontracted) electricity helps reduce our scope 2 emissions. We calculate carbon intensity using the IEA’s projected generation mix and carbon emissions through 2035.	↓
Electricity price	As the grid transitions from fossil fuel-based generation to predominantly renewables, the IEA projects that electricity prices may increase as a result of transition costs such as infrastructure upgrades. In particular, the IEA estimates that energy investments will total almost 4% of global GDP annually by 2030 (approximately double the rate from 2017 to 2021), with spending on electricity generation from renewables totaling \$1.3 trillion by 2030. Our analysis considers how increased electricity prices could drive exposure in our contracted and uncontracted electricity purchases.	↑ ↑
Scope 1		
Transition to low-carbon fleet	Verizon is implementing a variety of fleet fuel reduction and efficiency initiatives that we expect will reduce our scope 1 emissions and our potential exposure to a direct carbon price. Initiatives include fleet electrification, fleet fuel efficiency improvements, engine downsizing, fleet rightsizing and hybrid systems.	↓

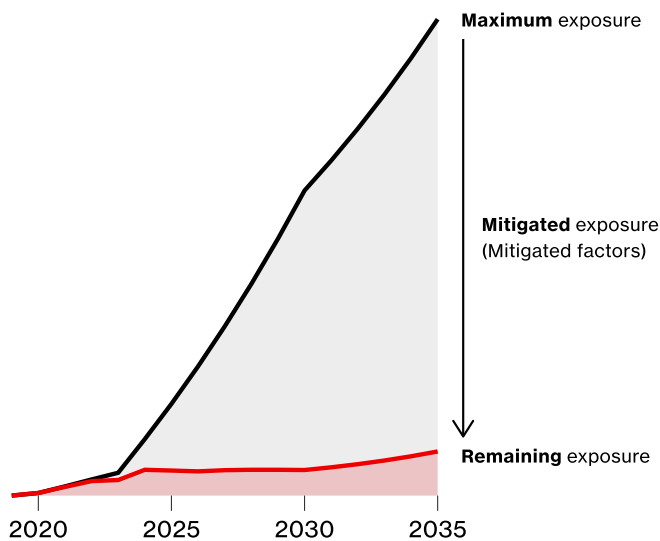
↑ / ↓ Indicates driver has a minor impact on increasing/decreasing our carbon price exposure

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

Carbon policy analysis results and resilience

Using the IEA's NZE model and energy use projections from our operational plan, our analysis shows that even with assumed growth in electricity usage, carbon prices and electricity prices, we are resilient in a carbon policy environment. We believe that our strategy to reduce our energy and carbon emissions and procure renewable energy to mitigate our carbon price exposure will be effective.

Carbon price exposure



We believe that we are resilient for the following reasons:

- Consistent with our prior analysis, our remaining exposure, after taking into account our renewable energy procurement strategy and our active management of total enterprise-wide energy use (see [Transition risks: Market and technology](#)), is financially insignificant.
- While our previous analysis found that the greening electricity grid was a significant mitigating factor, our updated VPPA projections and 2030 renewable energy target are now the primary mitigating factors. These results underscore the effectiveness of our strategy to bring new renewable energy to the electricity grid and reduce our exposure to increasing electricity prices.

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

Physical risk analysis and resilience

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

In 2021, we conducted a pilot assessment of potential future climate risks. This pilot studied a sample of assets identified as critical to our operations across the U.S.

Assessment selection and assumptions

As with our transition risk analysis, we used third-party models developed by an independent, recognized organization that are in alignment with the guidance developed by the TCFD. We selected two models for our analysis – both of which align with two of the Intergovernmental Panel on Climate Change's (IPCC) Representative Concentration Pathways (RCP) from the IPCC's Fifth Assessment Report (AR5) – that are representative of possible global greenhouse gas emissions trajectories and resulting changes in the climate.

The first model, RCP 2.6, is characterized by a drastic drop in global total carbon emissions, which become net negative by the year 2100. It assumes countries successfully implement carbon policies, resulting in generally less than 2.0°C warming. The second model, RCP 6.0, is characterized by a global temperature rise of approximately 2.8°C from preindustrial levels. This model 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 models, causing increasingly worse physical risk impacts in RCP 6.0 compared to RCP 2.6.

We chose these two models to illustrate a range of emissions and global warming possibilities that could impact our networks. We conducted an analysis 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 models or the relative likelihood of these models as compared to other widely used models.

The pilot physical risk 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 models. 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 models (i.e., RCPs 2.6 and 6.0).

Each of these risk scores was calculated on a scale of one to 10 and then calibrated to a narrative scale of seven categories ranging from "Very low" to "Extreme," as shown in [Assessment results and resilience](#). 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, including those obtained from the National Oceanic and Atmospheric Administration, the World Resources Institute, reinsurance databases and the World Bank's Climate Change Knowledge Portal. The table on the next page provides information on the current and future scoring methodology.

Peril	Current (historical) scoring methodology	Projection methodology
Hurricane	<p>Severity: Average wind speed translates to severity category (H1-H5)</p> <p>Frequency: Average number of occurrences of the corresponding severity category in 40 years within 100 miles of the location</p>	<p>Projection based on a function of two variables:</p> <ul style="list-style-type: none"> • Maximum one-day precipitation level • Maximum wind speed
Wildfire	<p>Severity: Area burned in acres</p> <p>Frequency: Average number of times in 35 years when the corresponding number of acres burned were within 10 miles of the location</p>	<p>Projection based on a function of three variables:</p> <ul style="list-style-type: none"> • Consecutive dry days • Average temperature • Maximum wind speed
Flood	<p>Severity: Flood depth in feet</p> <p>Frequency: Flood return period in years</p>	<p>Projections calculated based on adjusted return period variables</p>
Hail	<p>Severity: The diameter of the hail particle in inches</p> <p>Frequency: The average number of occurrences in 40 years within a 25-mile radius</p>	<p>Projection based on a function of four variables:</p> <ul style="list-style-type: none"> • Average number of days on which rainfall exceeds 50 millimeters (mm) • Concentration of cloud top icy particles • Concentration of cloud top particles • Cloud top particles' radius
Storm	<p>Severity: Average wind speed translates to severity category</p> <p>Frequency: The average number of occurrences of the corresponding severity category in 40 years within a 25-mile radius</p>	<p>Projection based on a function of the maximum wind speed</p>

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

Assessment results and resilience

Overall, our pilot analysis found that the geographic distribution of our networks and business operations across the U.S. limits the concentration of risk from any single climate peril. Predictably, risk levels generally increase in future time periods under the climate models we analyzed. These results, coupled with our risk mitigation strategies (see [Risk management](#) and [Physical risks: Acute](#)), help to support the conclusion that our

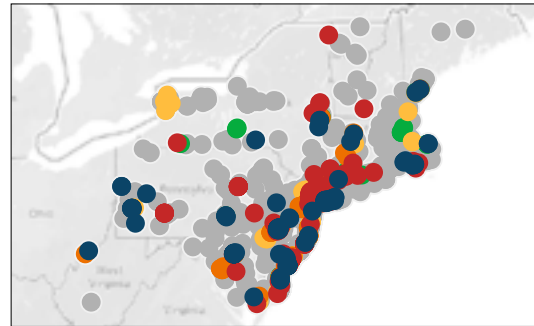
management of weather impacts on our networks is currently sufficient and that we should continue to review it on a regular basis to adequately account for future climate-related risks.

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 model. 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. The results only portray the climate peril with the greatest risk to each region. The regions shown are areas of the country with the largest concentrations of assets.

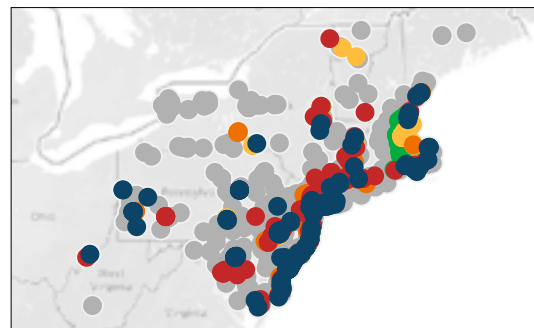
Northeast. Flooding is the most prominent acute physical risk within the Northeast region due to the nature of weather patterns along coastal regions. The analysis showed that flooding is already classified as an “Extreme” risk for many of the assets located on or near the coast, with additional locations 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.

- Extreme
- Very high
- High
- Significant
- Moderate
- Low
- Very low

Flood risk



Current flood risk in the Northeast

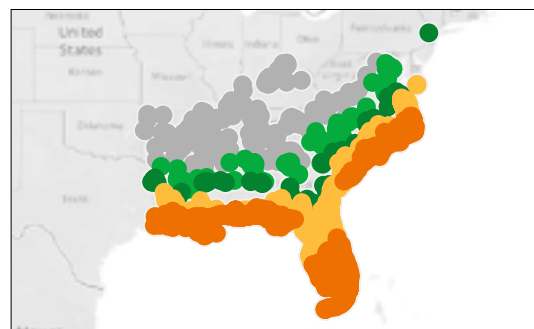


Flood risk in the Northeast in 2050 in RCP 6.0

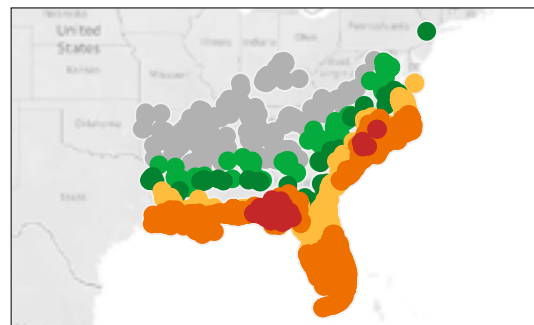
Southeast. Of the climate perils studied, assets in the Southeast region are most exposed to hurricanes. Based on the analysis results, certain areas of the region are expected to have risk levels increase by 2050 in RCP 6.0. This transition begins to emerge in 2030 and intensifies over time. By 2050, the analysis shows that average hurricane risk scores are expected to increase by 2.6%, in the aggregate, for the sample asset locations we examined in the Southeast region. (Note that 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.)

- Extreme
- Very high
- High
- Significant
- Moderate
- Low
- Very low

Hurricane risk



Current hurricane risk in the Southeast

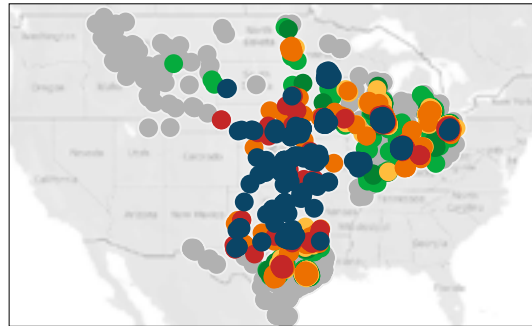


Hurricane risk in the Southeast in 2050 in RCP 6.0

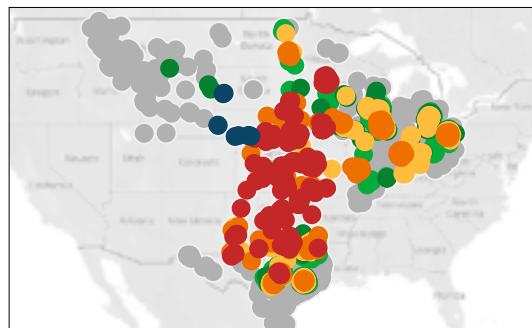
Great Plains and Midwest. The main risks facing asset locations in the Great Plains and Midwest regions are hail and storms. Based on the average current risk scores for the locations we examined, hail is the most significant risk. However, average hail risk scores are projected to decrease by 11% for the combined Great Plains and Midwest regions 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%.

- Extreme
- Very high
- High
- Significant
- Moderate
- Low
- Very low

Hail risk

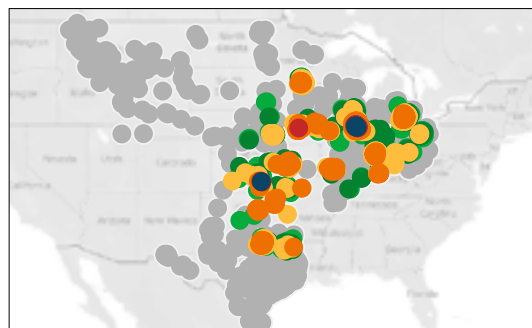


Current hail risk in the Great Plains and Midwest

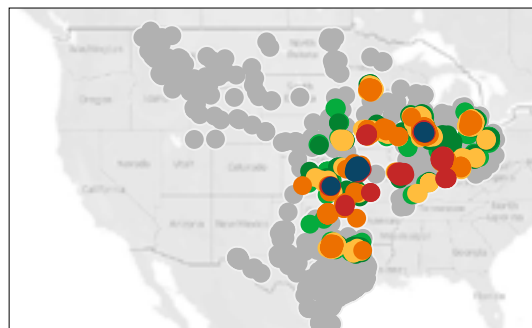


Hail risk in the Great Plains and Midwest in 2050 in RCP 6.0

Storm risk



Current storm risk in the Great Plains and Midwest



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

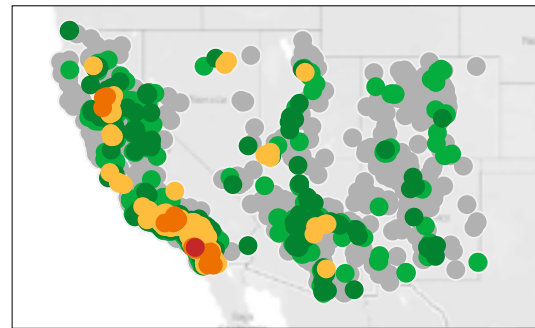
Southwest. Although flooding is classified as an “Extreme” risk in some areas of Northern California, wildfires represent the greatest risk for assets located in the Southwest region. This is expected to intensify, with the analysis projecting an increase of more than 7% in average wildfire risk scores 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.

- Extreme
- Very high
- High
- Significant
- Moderate
- Low
- Very low

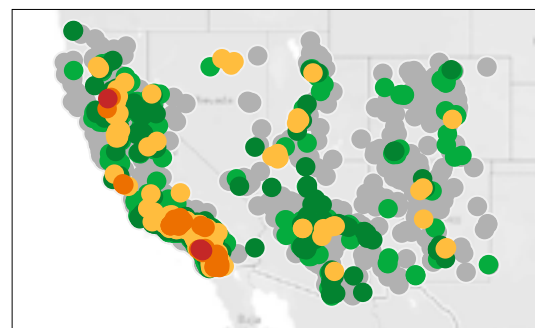
Based on the totality of our pilot analysis, there are several reasons we believe we are well-positioned to respond to the challenges we may face from climate change:

- 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 change, 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

Wildfire risk



Current wildfire risk in the Southwest



Wildfire risk in the Southwest in 2050 in RCP 6.0

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.
- Due to the gradual increase in simulated risk and our robust risk management and mitigation strategies (see [Risk management](#) and [Strategy](#)), 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 reliably serve our customers.

Future considerations for our analysis

We will revisit the appropriateness of additional and/or updated physical risk analyses in the future as climate data continues to mature.



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 long-term climate goals and to monitor current and future climate-related risks. We have set interim targets to support the achievement of our long-term operational net-zero goal: an absolute operational emissions reduction target, as well as two renewable energy targets.

For information on our emissions data and progress toward meeting our goals and targets, see our [Emissions Reporting webpage](#). For information about the emissions calculation approaches, see the [Independent Accountants' Review Report](#).

Metric	Goal/interim target	Time frame
Carbon indicators		
Scope 1 and 2 emissions*	Goal: Expect to achieve net-zero operational emissions	By 2035
	Target: Expect to achieve a 53% reduction in our scope 1 and 2 operational emissions to limit global warming to 1.5°C (over a 2019 baseline)**	By 2030
Scope 3 emissions***	Goal: Expect to achieve a 40% reduction in our scope 3 emissions from our value chain to limit global warming to well below 2.0°C (over a 2019 baseline)**	By 2035
Energy indicators		
Renewable energy sourced	Target: Expect to source renewable energy equivalent to 50% of our annual electricity usage	By 2025
	Target: Expect to source renewable energy equivalent to 100% of our annual electricity usage	By 2030

* Scope 1 and 2 emissions are independently assured.

** Approved by the Science Based Targets initiative (SBTi).

*** Scope 3 emissions are also independently assured. Relevant categories included 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.

Endnotes

Endnotes

- 1 This statement has been independently assured by ERM Certification Verification Services (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 customer on-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.
- 2 The IEA states: The NZE model does not rely on emissions reductions from outside the energy sector to achieve its goals but assumes that non-energy emissions will be reduced in the same proportion as energy emissions. The global temperature rise in the NZE model peaks under 1.6°C around 2040 before dropping to around 1.4°C in 2100.
- 3 All information about NZE as presented in this report is based on IEA data from IEA 2022; World Energy Outlook 2022, <https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf> and IEA 2021; Net Zero by 2050: A Roadmap for the Global Energy Sector, https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.