# TCFD REPORT 2019

verizon

# About this report

Verizon knows that transparency regarding climate-related risks and opportunities is critical to maintaining the trust of our stake-holders 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 first 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 is an initial step on our journey and will continue to evolve in the future.[1]

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[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.

# ⊕ Governance

## Overview

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 |
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| **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 risks and opportunities, including 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.

**Audit Committee**
The Audit Committee, which met eleven times in 2019, oversees Verizon's enterprise risk management program which identifies the primary risks to Verizon's business. At least annually, the executives in charge of Verizon's business groups and corporate functions review with the Committee the primary risks associated with their particular business group or function. Environmental and climate-related risks discussed in these reviews include operational and financial risks relating to energy management and our renewable energy and carbon neutral 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, which met six times in 2019, 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 Environmental, Social, and Governance (ESG) Officer, who heads a cross-functional team that focuses on stakeholder engagement and reporting on ESG factors that align with Verizon's core business strategy, 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, which met four times in 2019, monitors and oversees major capital expenditures under the annual capital plan approved by the Board and related financing transactions, such as Verizon's recent green bond. The Committee also oversees the strategy for managing risk related to Verizon's renewable energy exposure through renewable energy purchase agreements. |

# ⊕ Governance

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| 👥 | **Board oversight (continued)** | **Human Resources Committee**<br>The Human Resources Committee, which met seven times in 2019, is responsible for establishing the performance measures 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, to motivate management to be good stewards of our planet and reduce the environmental impact of our operations, the Committee has included a carbon intensity reduction target as one of the performance measures for their annual short-term bonus. In connection with setting and monitoring performance, the Committee receives periodic briefings on Verizon's progress toward meeting its carbon intensity goal. |
| ⚙ | **Management's role** | **Verizon management councils**<br>At Verizon, we drive our business forward through the management structures we have put in place and the planning and implementation processes we use to think through decisions and put them into action. 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, the Verizon Business Group, and the Verizon Media 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

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.

# ⊕ Governance

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| **Management's role (continued)** | 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. |

**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, carbon intensity reduction, 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 Vice President of Supply Chain Operations is also our Chief Sustainability Officer (CSO) 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 reduction, and carbon neutrality.

**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 and Chief ESG Officer heads a newly formed 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.

# ⊕ Governance

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| **⚙ Management's role (continued)** | | **Chief Human Resources Officer** |

**Management's role (continued)**

**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.

**Business Continuity Executive Steering Committee**
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.

An executive steering committee, composed of designated senior executives representing Global Network & Technology, Verizon Consumer Group, Verizon Business Group, Verizon Media 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.

**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.

# ⚠ Risk management

## Overview

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 physical climate impacts can be both short- and long-term in nature. For this reason we have a comprehensive business continuity planning approach, our BCEM framework, that 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 are in the process of formally overlaying 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.

**Longer-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.

**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.

# ⚠ Risk management

## 🔍 Risk identification and assessment processes (continued)

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, 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.

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 are currently working on more formally integrating climate considerations directly into our existing risk assessment framework.

# ⚠ Risk management

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

**Corporate Policy**

We have several established formal processes for managing business continuity (see the Risk identification and assessment 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.

**Environmental, Health and Safety Management System**

Verizon has an integrated environmental, health and safety management system, which provides guidance, instruction, and best management practices that exceed regulatory requirements while striving for continuous improvement.

We maintain the International Organization for Standardization (ISO) 14001 Standard certification in some markets, which includes considering the primary environmental aspects at a site level that need to be managed (e.g., energy use, climate considerations). We are evaluating further ISO certification across the business.

Verizon's environmental, health and safety management system provides a framework for identifying, controlling, and reducing the risks associated with the environments in which we operate. Besides regular management system assessments, internal and third-party compliance audits and inspections are performed annually at hundreds of facilities worldwide. The goal of these assessments is to identify and correct site-specific issues, and to educate and empower facility managers and supervisors to implement corrective actions. Verizon's environment, health and safety efforts are directed and supported by experienced experts around the world that support our operations and facilities.

# Strategy

## Overview

5G and the advent of the Fourth Industrial Revolution 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 network

- 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 are adopting new goals and commitments and taking 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 network, 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 (4–6 years), and long-term (7–10 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. |

# 🎯 Strategy

| Transition risks |
| --- |

| Policy and legal risk, market risk | Description |
| --- | --- |
| • Changing environmental policies and market<br>• Current and emerging regulations<br>• Market risk | Due to the nature of our operations, we are subject to regulatory developments related to climate change and energy-specific regulations globally. Examples include regulation of greenhouse gas (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 | Management approach |
| --- | --- |

**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 United States and Europe in particular) could make it more expensive to purchase energy to power Verizon's networks and data centers.

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 data centers, 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 scenario analysis.*

**Management approach**

**Monitoring policy and regulatory developments**
We monitor policy and regulatory developments related to climate change and the environment. We also work with strategic partners to monitor energy-specific regulation globally and to create a course of action specific to the area(s) affected, as appropriate.

**Setting climate goals and committing to carbon neutrality**
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. See the Metrics & targets section for the full list. Most notably, we are committed to carbon neutrality in our Scope 1 and Scope 2 emissions by 2035.

**Deploying and procuring renewable energy**
We are committed to sourcing renewable energy equivalent to 50% of our total electricity usage by 2025. We will achieve this by continuing to invest in green energy at our own operations and by sourcing renewable energy from external sources. Over the course of the past seven years, Verizon has made it a priority to deploy more green energy resources – such as solar and fuel cell technology – at our facilities. In 2016, we set a goal to add an additional 24 megawatts of green energy in our operations by 2025.

In February 2019, we issued a $1 billion green bond, a first for our industry in the US, with proceeds to be used to fund key environmental priorities like renewable energy, energy efficiency, green buildings, and biodiversity.

**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). Here are a few examples:

• We are reducing energy 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, decommission 3G, and migrate to our newer intelligent edge network platforms.

• We are installing energy-efficient systems and employing energy management best practices that contribute to our carbon intensity goal. 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, and replacing aerial lifts with systems that run solely on electric power so a technician can turn off the vehicle's main engine.

# Strategy

## Transition risks (continued)

| 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 network, 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 carbon neutral 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.

**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. We 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.

Our communications services are relied on by a large number of emergency response organizations across the country, including 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.

**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.

# 🎯 Strategy

| Physical risks | |
| --- | --- |
| **Acute physical risk**<br><br>Extreme weather, including tropical cyclones (hurricanes and typhoons), flooding, wildfire, drought, and heatwave | According to the Intergovernmental Panel on Climate Change (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 | Management approach |
| --- | --- |
| **Time horizon:**<br>Short- to long-term<br><br>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.<br><br>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. | **Enterprise strategy**<br>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.<br><br>This strategy includes:<br><br>• **24/7 monitoring** to gather information to assess any threats to operations around the world, covering both natural and man-made events.<br><br>• **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.<br><br>• **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.<br><br>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.<br><br>**Managing weather impacts**<br>Tropical cyclones (hurricanes and typhoons) present a risk to our coastal and inland infrastructure, including our network 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 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.<br><br>Preemptive power outages imposed by the California utilities impact our network, requiring us to expend additional effort and resources to operate our network until power is restored. Due to their increasing frequency, we are assessing how to improve resilience during these types of power outages.<br><br>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. |

# 🎯 Strategy

| Physical risks (continued) | |
|---|---|
| **Chronic physical risk**<br><br>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 network. 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 carbon neutrality in our Scope 1 and Scope 2 emissions. 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.

# 🎯 Strategy

| Climate-related opportunities | |
| --- | --- |
| **Products, services and markets** | We continue to develop many new low-carbon opportunities enabled by our networks for our customers. |

| Impact to business | Management approach |
| --- | --- |
| **Time horizon:**<br>Short- to medium-term | **Product and service innovation**<br>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. 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.<br><br>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:<br><br>• **Intelligent lighting:** Allows customers to program and remotely operate lights to both decrease energy costs and increase safety<br><br>• **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<br><br>• **Parking optimization:** Enables drivers to find spots faster, reducing congestion, emissions, and frustration<br><br>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.<br><br>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.<br><br>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 vegetation management and scaffolding inspections.<br><br>**Diversification of financing**<br>In February 2019, we launched the US telecommunications industry's first green bond. An amount equal to the net proceeds of the $1 billion offering will be used to fund a variety of new and existing green investments made during the period from two years prior to the issuance of the bond through the maturity of the bond. A majority of the funds are anticipated to be allocated within three years, supporting our long-term commitment to minimize our environmental impact, drive operating efficiencies, and benefit the communities we serve. The eligible categories for the use of the net proceeds are renewable energy, energy efficiency, green buildings, and biodiversity. For information regarding the allocation of proceeds, please see our Green Bond Report. |
| **Resource efficiency, energy source, and resilience**<br><br>**Time horizon:**<br>Short- to medium-term | 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.<br><br>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. |

# ⊙ Strategy

| | |
|---|---|
| ⚙ **Scenario analysis and resilience** | We conducted a scenario analysis 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. Our scenario analysis focuses on transition risks, an approach we discussed with certain large investors. We believe our existing enterprise risk management and business continuity efforts already contemplate physical risks from climate change in the short- and medium-term. |

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.

**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,[2] while simultaneously achieving the Sustainable Development Goals 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,[3] 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 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 18 for a full list of drivers.

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[2]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.

[3]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.
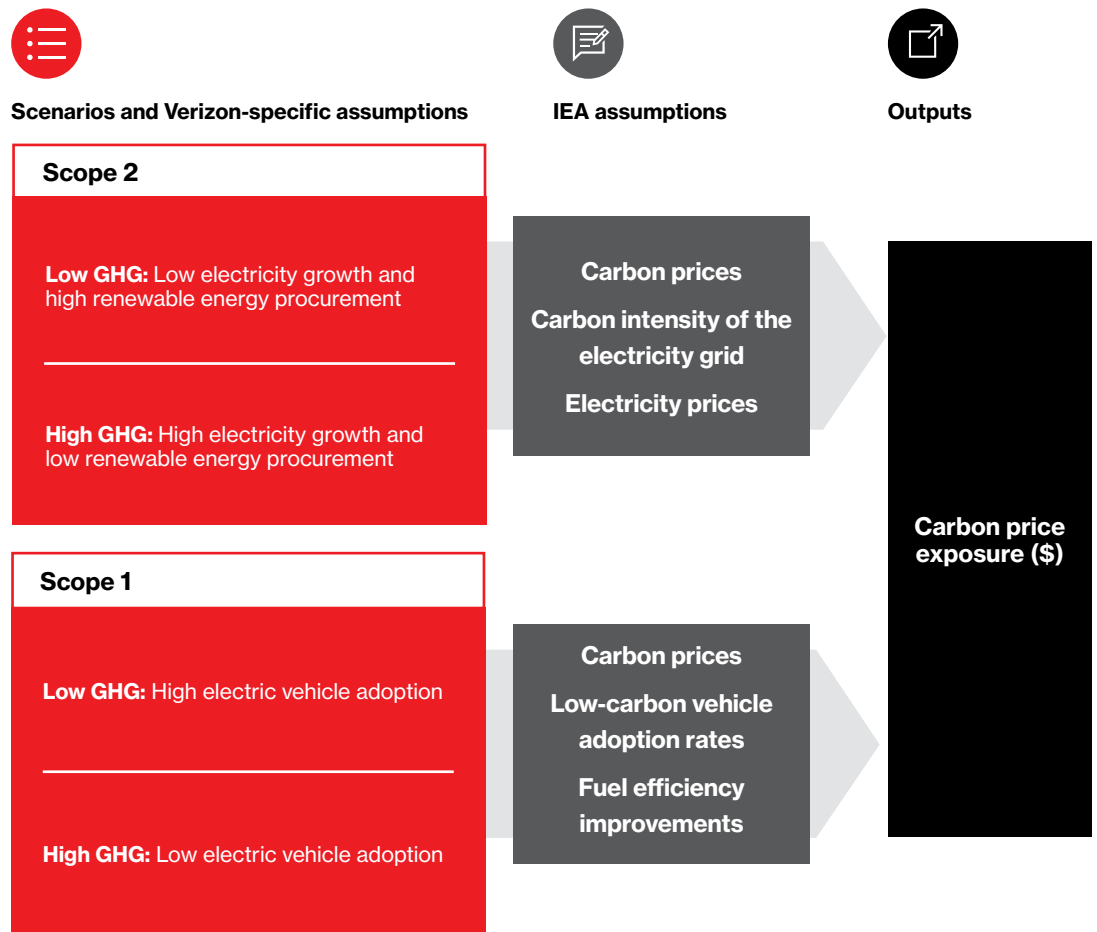
# Strategy

**Scenario analysis and resilience (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**



**Scenarios and Verizon-specific assumptions**

**IEA assumptions**

**Outputs**

**Scope 2**

**Low GHG:** Low electricity growth and high renewable energy procurement

**High GHG:** High electricity growth and low renewable energy procurement

Carbon prices
Carbon intensity of the electricity grid
Electricity prices

**Scope 1**

**Low GHG:** High electric vehicle adoption

**High GHG:** Low electric vehicle adoption

Carbon prices
Low-carbon vehicle adoption rates
Fuel efficiency improvements

**Carbon price exposure ($)**

# Strategy

## 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/mt $CO_2$ 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 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 off-take 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**
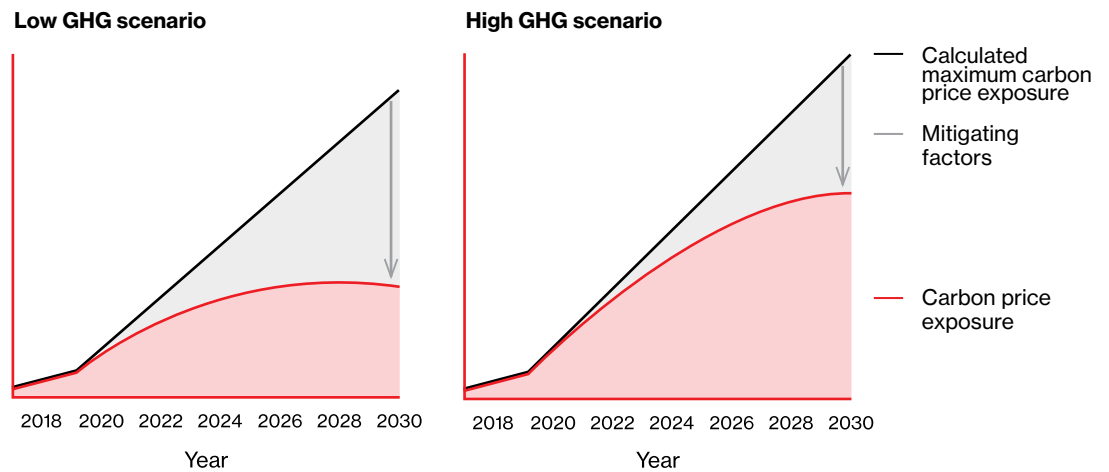
# ◎ Strategy

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**⚙ Scenario analysis and resilience (continued)**

**Scenario results and resilience**

**At a glance:** As described on page 16, 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[4]**



**Low GHG scenario**

**High GHG scenario**

Legend:
— Calculated maximum carbon price exposure
— Mitigating factors
— Carbon price exposure

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.

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[4]**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.

# Strategy

**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 tonne of carbon 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.

# ⊕ Metrics & targets

## Overview

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 & 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 carbon neutrality 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.<br><br>An overview of our climate-related metrics and targets are available below. For historical and most recent performance, please see our ESG Report.<br><br>For more information about select metric methodologies, please see the following:<br><br>• The independent auditor statement for carbon intensity, Scope 1 and 2 emissions, and Scope 3[5] business travel, which shows calculation approaches and discloses how they are aligned with the GHG Protocol Corporate Accounting and Reporting Standard and generally accepted GHG efficiency ratios<br><br>• Our most recent ESG Report or CDP response for more information about how we calculate additional Scope 3 emission categories aside from business travel |

| Climate-related targets | | | |
|---|---|---|---|
| **Metric** | **Goal** | **Target type** (Absolute/intensity) | **Time frame** (and baseline) |
| **Carbon indicators** | | | |
| **Scope 1 and 2 emissions**[6] | Achieve carbon neutrality by 2035 | Absolute | By 2035 |
| **Carbon intensity** (a measure of the carbon our business emits divided by the terabytes of data carried by our networks)[7] | Reduce our carbon intensity by 50% by 2025 (measured against 2016 baseline) | Intensity | 2016-2025 (2016 baseline) |
| **Reduction in CO$_2$e our customers are achieving through the use of our products and services** | By 2022, Verizon's networks and connected solutions will save more than double the amount of global emissions that our operations create | Absolute | By 2022 |
| **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 |
| **MW of on-site green energy** | 24 MW of additional on-site green energy | Absolute | By 2025 (2016 baseline) |

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

[6]Scope 1 and 2 emissions are assured. Scope 3 emissions (business travel) are also assured.

[7]Carbon intensity is assured. An annual target related to carbon intensity is also incorporated into remuneration policies (see Governance section).