VMware’s CDP Climate Change Questionnaire 2019

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

VMware, Inc. ("VMware") originally pioneered the development and application of virtualization technologies with x86 server-based computing, separating application software from the underlying hardware. Information technology ("IT") driven innovation continues to disrupt markets and industries. Technologies emerge faster than organizations can absorb, creating increasingly complex environments. IT is working at an accelerated pace to harness new technologies, platforms and cloud models, ultimately guiding their business through a digital transformation. To take on these challenges, we are working with customers in the areas of hybrid cloud, multi-cloud, modern applications, networking and security, and digital workspaces. Our software provides a flexible digital foundation to help enable customers in their digital transformation.

We help customers manage their IT resources across private clouds and complex multi-cloud, multi-device environments by offering solutions across three categories: Software-Defined Data Center ("SDDC"), Hybrid Cloud Computing and End-User Computing ("EUC"). This portfolio supports and addresses the key IT priorities of our customers: accelerating their cloud journey, empowering digital workspaces and transforming networking and security. These VMware solutions enable the digital transformation our customers need as they ready their applications, infrastructure and devices for their future business needs.

We incorporated in Delaware in 1998, were acquired by EMC Corporation ("EMC") in 2004 and conducted our initial public offering of our Class A common stock in August 2007. Effective September 7, 2016, Dell Technologies Inc. ("Dell") acquired EMC. As a result, EMC became a wholly-owned subsidiary of Dell, and VMware became an indirectly-held, majority-owned subsidiary of Dell. We are considered a “controlled company” under the rules of the New York Stock Exchange. As of February 1, 2019, Dell controlled approximately 80.5% of our outstanding common stock, including 31 million shares of our Class A common stock and all of our Class B common stock.
Effective January 1, 2017, our fiscal year changed from a fiscal year ending on December 31 of each calendar year to a fiscal year consisting of a 52- or 53-week period ending on the Friday nearest to January 31 of each year. The period that began on January 1, 2017 and ended on February 3, 2017 is reflected as a transition period (the “Transition Period”). Our first full fiscal year under the revised fiscal calendar began on February 4, 2017 and ended on February 2, 2018. We refer to our fiscal years ended February 1, 2019, February 2, 2018 and December 31, 2016 as “fiscal 2019,” “fiscal 2018” and “fiscal 2016,” respectively.

Total revenue in fiscal 2019 increased 14% to $8,974 million. Total revenue is comprised of license revenue of $3,788 million and services revenue of $5,186 million. While sales of our VMware vSphere (“vSphere”) product have remained strong, the majority of our license sales originate from solutions across our broad portfolio beyond our compute products. Our corporate headquarters are located at 3401 Hillview Avenue, Palo Alto, California, and we have 125 offices worldwide.


C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

<table>
<thead>
<tr>
<th>Start date</th>
<th>End date</th>
<th>Indicate if you are providing emissions data for past reporting years</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1, 2018</td>
<td>January 31, 2019</td>
<td>No</td>
</tr>
</tbody>
</table>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

- Argentina
- Armenia
- Australia
- Austria
- Brazil
Bulgaria
Canada
Chile
China
Colombia
Costa Rica
Czechia
Denmark
France
Germany
India
Indonesia
Ireland
Israel
Italy
Japan
Malaysia
Mexico
Netherlands
New Zealand
Pakistan
Peru
Philippines
Poland
Portugal
Republic of Korea
Saudi Arabia
Singapore
South Africa
Spain
Sweden
Switzerland
Taiwan, Greater China
Thailand
Turkey
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United States of America
Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Operational control

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

No
### C1.1c

(C1.1c) Why is there no board-level oversight of climate-related issues and what are your plans to change this in the future?

<table>
<thead>
<tr>
<th>Primary reason</th>
<th>Board-level oversight of climate-related issues will be introduced within the next two years</th>
<th>Please explain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row 1</td>
<td>Currently, our highest level of oversight for climate-related issues is our Vice President of Sustainability Strategy who reports to our Chief Technology Officer.</td>
<td>Yes, we plan to do so within the next two years</td>
</tr>
</tbody>
</table>

### C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

<table>
<thead>
<tr>
<th>Name of the position(s) and/or committee(s)</th>
<th>Responsibility</th>
<th>Frequency of reporting to the board on climate-related issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business unit manager</td>
<td>Both assessing and managing climate-related risks and opportunities</td>
<td>Not reported to the board</td>
</tr>
<tr>
<td>Sustainability committee</td>
<td>Assessing climate-related risks and opportunities</td>
<td>Not reported to the board</td>
</tr>
<tr>
<td>VMware’s Executive Sustainability Advisory Group</td>
<td>Assessing climate-related risks and opportunities</td>
<td>Not reported to the board</td>
</tr>
</tbody>
</table>

1. See C1.2a for details on the role of the Vice President of Sustainability Strategy.
2. See C1.2a for details on the role of the Executive Sustainability Advisory Group.
See C1.2a for details on the role of the Sustainability Technical Council.

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

**Vice President of Sustainability Strategy:** Our Vice President of Sustainability Strategy oversees the development and implementation of VMware's sustainability strategy across our three sustainability pillars: product, planet and people. This is a full-time role and the VP's daily activities are dedicated to engaging stakeholders across the organization and directing the sustainability team to drive our corporate sustainability initiatives and targets, including but not limited to: 100% renewable energy, carbon neutrality, technology innovation, waste diversion and supply chain.

This VP reports directly to, and meets regularly with, our Executive Vice President and Chief Technology Officer who reports directly to the CEO and is on the Executive staff. The placement of our VP in the Office of the CTO was a strategic move that was made in 2016 to deeply align the corporate sustainability objectives with the business strategy of the company. At VMware, our largest impact - by orders of magnitude - is through our products, which is why our most senior role related to climate issues reports directly to our CTO.

**Executive Sustainability Advisory Group:** The Executive Sustainability Advisory Group is part of our tiered governance structure for assessing and monitoring climate-related issues. The Group includes key internal stakeholders whose role it is to review and guide our sustainability strategy, reporting, and corporate sustainability goals. The Executive Sustainability Advisory Group includes the following stakeholders:

- **Chief People Officer (CPO)** - The CPO's role is to consider the impact of sustainability on employee experience, culture, and talent acquisition, retention and development.
- **Chief Technology Officer (CTO)** - The CTO's role is to consider the impact of sustainability on the long-term technical agenda for the company.
- **Chief Communications Officer (CCO)** - The CCO's role is to guide the communication of our sustainability strategy internally and externally.
- **VP, Global Government Relations and Public Policy** - This VP's role is to communicate relevant policy information, as well as to share VMware's perspective on sustainability-related issues to the relevant public policy forums.
- VP, Deputy Counsel - This VP's role is to provide guidance in understanding and navigating any legal issues that arise.
- VP, Internal Audit - This VP's role is to advise on assurance and risk as it relates to our sustainability strategy.
- VP, Real Estate and Workplace - This VP's role is to operationalize processes within the real estate organization concerning our corporate sustainability strategy.

**Sustainability Technical Council:** The Sustainability Technical Council comprises the remaining part of our tiered governance structure for assessing and monitoring climate-related issues and opportunities. The Technical Council includes various representation within the Office of the CTO and Products and Cloud Services Business Unit including VP of R&D Operations, VP & CTO of Global Field Operations, VP & CTO EMEA, Senior Director of Programs and Operations in the Office of the CTO, SVP Chief Research Officer, VP R&D, two R&D Fellows, and Principal Engineer. This Technical Council meets quarterly with the VP of Sustainability Strategy and Director of Sustainability Innovation to provide insights, share ideas, and drive cross-company sustainability initiatives. The goal of the Council is to integrate sustainability into our engineering processes through training, policy, and goal setting, and provide examples of where sustainability has improved operations, productivity and costs. The Council also collaborates on assessing product environmental impacts, including energy consumption and carbon emissions, and overseeing R&D operations and mechanisms to reduce these. The Council helps to identify innovations in our products and services that can reduce the energy and carbon impacts of our customers’ data center operations, and where our products and services can play a role to enable and accelerate solutions that drive energy efficiency and decarbonization. Finally, the Council monitors trends among our customer base related to climate change in terms of supply chain requirements for decarbonization that might predict risks or opportunities for VMware.

**C1.3**

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

**C1.3a**

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).
Who is entitled to benefit from these incentives?
Chief Executive Officer (CEO)

Types of incentives
Recognition (non-monetary)

Activity incentivized
Behavior change related indicator

Comment
In 2017, our CEO added sustainability goals to the Executive MBOs. An internal CEO dashboard was created to track progress against our 2020 goals (which include two specific climate-related targets). The progress against goals was regularly reported internally and externally through our company meetings. For example, achieving carbon neutrality two years ahead of time was reported in Q3, 2018.

Who is entitled to benefit from these incentives?
Business unit manager

Types of incentives
Monetary reward

Activity incentivized
Emissions reduction target

Comment
Vice President of Sustainability Strategy has part of individual performance measurement in annual bonus calculation tied to attainment of targets and plans.

Who is entitled to benefit from these incentives?
Environment/Sustainability manager
Types of incentives
Monetary reward

Activity incentivized
Emissions reduction target

Comment
Sustainability Managers have part of their individual performance measurements in their annual bonus calculation tied to attainment of targets and plans.

Who is entitled to benefit from these incentives?
Facilities manager

Types of incentives
Monetary reward

Activity incentivized
Energy reduction project

Comment
Facility Managers have part of their individual performance measurements in their annual bonus calculation tied to attainment of targets and plans.

Who is entitled to benefit from these incentives?
All employees

Types of incentives
Recognition (non-monetary)
Activity incentivized
   Behavior change related indicator

Comment
In 2017, all employees were asked to align their individual goals with the company’s strategic initiatives (MBOs). The company’s strategic initiatives range from reputation to specific business unit targets. In 2018, we’ve included on the list of executive MBOs to "Be a Force For Good." While qualitative, this is the first time our global employees are formally encouraged to consider sustainability as part of their personal goals. In 2019, the CTO organization that leads our sustainability function continues to have “Force for Good / Engineering for Good” as an MBO.

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

<table>
<thead>
<tr>
<th></th>
<th>From (years)</th>
<th>To (years)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Medium-term</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Long-term</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

C2.2

(C2.2) Select the option that best describes how your organization’s processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.

   Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
**C2.2a**

**(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.**

<table>
<thead>
<tr>
<th>Frequency of monitoring</th>
<th>How far into the future are risks considered?</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six-monthly or more frequently</td>
<td>3 to 6 years</td>
<td>VMware’s Internal Audit team assesses risk in all geographic regions in which VMware operates: APJ, EMEA and the Americas. We perform an annual risk assessment that is updated quarterly. The assessment is reviewed by our Executive Staff and the Audit Committee of the Board. Additionally, we have various dashboards that track key issues and trends.</td>
</tr>
</tbody>
</table>

**C2.2b**

**(C2.2b) Provide further details on your organization’s process(es) for identifying and assessing climate-related risks.**

**Company Level:** VMware's Audit Committee consists of a subset of Board members and is supported by senior company executives. The Audit Committee reports to the Board quarterly and reviews the Company’s top risks. The Audit Committee aligns with the Executive Staff, Internal Audit and key corporate risk owners on the evaluation and management of top corporate risks. Our Vice President of Sustainability Strategy develops and communicates our sustainability strategy & collaborates with our VP of Internal Audit to integrate climate risk into the annual risk assessment process.

Each year, our Internal Audit team reviews the company's major initiatives and then supports the Business Units in determining where to focus their efforts. Our Internal Audit team - responsible for assurance and risk advisory services (maturity assessments, risk profiling and raising awareness) - performs annual compliance risk assessments for both identified & emerging risks.

Our Internal Audit team has developed a multi-dimensional model to evaluate and prioritize risks, and climate-related issues are among those that would be considered for review. This model allows us to assess our impacts and vulnerabilities from numerous angles and then to determine where we should focus. Our impacts include strategic, customer, legal, and regulatory; and our vulnerabilities include rate of change, scale, experience, and concern. We assess the level of impact, as well as the level of vulnerability to determine where to focus.
Asset Level: Asset-level risks associated with climate change are assessed and mitigated by the Real Estate & Workplace team in conjunction with the Risk Management & Enterprise Resiliency teams, through the implementation of disaster recovery, crisis management, and business continuity planning. VMware undertakes risk assessments for capital projects, which include energy assessments of alternative locations. As an example, our data center is intentionally located in Wenatchee, Washington due to the fact that we can secure 100% clean power in that location.

At the asset level, our annual budget cycle provides for the assessment of opportunities for energy and water conservation improvements at each of our sites. The budgets are the responsibility of our Regional Directors who manage the sites within their regions (APJ, EMEA, and the Americas). In 2018, this effort enabled savings of more than 695 MT CO2e representing 4.6% of scope 2 market-based emissions. Additionally, we are using VMware's Sustainable Design Guidelines to support our teams in achieving LEED certification for both existing retrofits/remodels and new construction.

For internal IT and R&D operations, our teams find opportunities to increase efficiency (cost, energy, and carbon) through hardware refresh cycles. As part of our 2017/2018 hardware technology refresh, the IT/R&D operations team migrated 80% of production workloads to a new, more efficient data center using multiple VMware products to facilitate the migration. In the process, they conducted review of all applications, validated ownership of all workloads, and decommissioned unused VMs (virtual machines), thereby reducing rack count, generating a power savings of more than 40%, and reducing emissions by 410 MT CO2e. While most of the savings have accrued in our colocation spaces, we believe in sharing this example as a best practice both internally and externally. VMware is now looking at ways to help customers more easily identify idle VM’s and hardware to save money, energy, and carbon. This year we are also reporting colocation Scope 2 emissions attributable to VMware owned IT equipment for the first time.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

<table>
<thead>
<tr>
<th>Relevance &amp; inclusion</th>
<th>Please explain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current regulation</td>
<td>Relevant, always included</td>
</tr>
<tr>
<td></td>
<td>Current regulation risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.</td>
</tr>
<tr>
<td></td>
<td>As VMware operates in several regions and has expanded our global presence, we must stay aware of climate-related local, state or national governmental regulations in various markets.</td>
</tr>
</tbody>
</table>
As one example, VMware operates in the EU and is subject to stricter environmental regulations at our offices located in the European Union. As a software organization, we do not consider this to be a substantive risk.

| Emerging regulation | Relevant, always included | Current regulation risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.  

All of our policy engagement activities are coordinated through our VP of Global Government Relations and Public Policy. As an example of how VMware integrates emerging regulation into our risk assessment process, VMware's VP of Global Government Relations sits on the Executive Committee of The Information Technology Industry Council (ITI). In this capacity, VMware is able to assess emerging regulation risks, as well as to weigh in on ITI's policy positions.  

An example of an emerging regulation is a carbon tax. The likelihood of a carbon tax in the US is reviewed annually and the impact on our operations is assessed. At this point in time, we do not consider this to be a substantive risk. |
| Technology | Relevant, always included | Technological risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.  

We consider the risks presented by technology and the rapid developments within the field from a business strategy perspective, as well as a competitive one.  

For example, one of our competitive advantages is the energy efficiency benefits we offer customers through our virtualization technology. This enables customers to reduce their energy expenditures and minimize their carbon footprints. If a competitor develops technology to surpass our current energy efficiency benefits, we risk falling behind in this fast-moving field. |
| Legal | Relevant, always included | Legal risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team. |
From time to time, we are involved in various legal, administrative and regulatory proceedings, claims, demands and investigations relating to our business, which may include claims with respect to commercial, product liability, intellectual property, breach of contract, employment, class action, whistleblower and other matters. In the ordinary course of business, we also receive inquiries from and have discussions with government entities regarding the compliance of our contracting and sales practices with laws and regulations.

Non-compliance with climate change laws and regulations is captured in the Current Regulation risk category.

<table>
<thead>
<tr>
<th>Market</th>
<th>Relevant, always included</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Market risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.</td>
</tr>
<tr>
<td></td>
<td>We face intense competition across all markets for our products and services. We believe that the key factors in our ability to successfully compete include the quality, price, and adaptability of our product and service offerings, along with energy efficiency benefits.</td>
</tr>
<tr>
<td></td>
<td>While we are a technology leader in virtualization and cloud infrastructure solutions and have a favorable image with our customers, many of our current or potential competitors have longer operating histories, greater name recognition, larger customer bases and significantly greater financial, technical, sales, marketing and other resources than we do. If these resources were to be put towards developing a product that could compete with our virtualization software in terms of energy efficiency, then we would risk losing a part of our market share that values our products’ environmental benefits.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reputation</th>
<th>Relevant, always included</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reputational risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.</td>
</tr>
<tr>
<td></td>
<td>For VMware, given that we have led the virtualization of IT with our virtualization products - vSphere, vCloudNFV, Horizon - and that our products are known for energy efficiency, it would negatively impact our business if our reputation was damaged due to a lack of performance around the environment and climate change.</td>
</tr>
<tr>
<td></td>
<td>VMware is also aware of the growing trend of its market to require suppliers to have climate change strategies in place, with public goals and a demonstration of progress towards those goals, such as science-based targets, renewable energy commitments, and responsible supply chains.</td>
</tr>
</tbody>
</table>
### Acute physical

**Relevant, always included**

Acute physical risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.

We evaluate the impacts of potential climate-driven weather events that are severe or frequent such as drought, acute air pollution, floods, water crisis, or increase in temperature. In 2018, VMware’s Security Operations Center reported that 56% of all global incidents were weather or climate-related.

In major locations where our R&D product development, operations and support are conducted, the prevention of employees getting to work would disrupt our ability to operate. For example, in February 2018, several countries of Europe were affected by continuous snow. VMware had 17 sites in the affected area and more than 4000 employees.

### Chronic physical

**Relevant, always included**

Chronic physical risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.

For example, climate-driven changes in precipitation extremes have the potential to disrupt VMware’s internal operations. Given that two of our largest populations of employees live in drought-prone areas - California in the US and Bangalore and Chennai in India – we monitor this risk closely.

### Upstream

**Relevant, always included**

Upstream risks, which may be influenced by climate issues, include risks to our supply chain and are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.

For example, we obtain products and services from over 7,000 suppliers and consider 600 of these preferred suppliers. A number of climate-related risks - such as extreme weather events - could impair the production capabilities of our suppliers or disrupt transportation networks, potentially limiting our ability to fulfill obligations to our customers. We consistently evaluate potential impacts on our supply chain to ensure consistent product quality and delivery to our customers.

### Downstream

**Relevant, always included**

Downstream risks, which may be influenced by climate issues, are included in our enterprise risk management identification and assessment processes conducted annually by our Internal Audit team.

Previously described risks, such as technology, market, reputation, and physical risks, may have an impact on our
downstream stakeholders.

For example, our customers are increasingly integrating carbon footprints into their supplier selection criteria. One of our customers recently sent us a letter requesting us to have a plan in place for reaching zero carbon emissions for our operations and our own suppliers by 2020 and requiring us to achieve zero carbon emissions by 2030. If we are not proactive about climate change and maintaining energy efficiency in our products and operations, we are at risk of losing key customers as they pursue their own climate-related goals.

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

Climate-Related Risk Management: At the company level, our Vice President of Sustainability Strategy develops our sustainability strategy and collaborates with our VP of Internal Audit to integrate climate risk into the annual risk assessment process. Our Internal Audit team performs annual compliance risk assessments to assess both identified and emerging risks.

In 2015 VMware executive leadership sponsored the launch of an enterprise resiliency (ER) program in response to the company’s rapid global growth and increasing climate volatility. Today we are focused on improving the company’s resiliency and preparedness toward potentially business-disrupting events. The ER program brings together the company’s business continuity, technology recovery, emergency response, and crisis management programs under a common governance framework. In 2018, we achieved a major milestone by completing Crisis Management Plans for all of our top 9 risks, which were reviewed by the Audit Committee in 2018.

At the asset level, risks associated with climate change are assessed and mitigated by the Real Estate and Workplace (REW) team in conjunction with the Risk Management and ER teams, through the implementation of disaster recovery, crisis management, and business continuity planning. We also perform risk assessments for capital projects, which include energy assessments of alternative locations. As an example, our data center is intentionally located in Wenatchee, WA due to the fact that we can secure 100% clean power at that location.

Climate-Related Opportunity Management: Opportunities are identified at the company level through various channels including customer feedback, internal innovation programs, and formal sustainability materiality assessments. We engage executives and content experts from across the company to provide insights about the importance of environmental and social issues to VMware’s success as a company. We work to identify emerging issues
and evaluate gaps in our product strategies for potential opportunities. We manage climate-related opportunities at the team level, for example integrating insights into our marketing plan, sustainability strategy, or product innovation and development as they apply.

At the asset level, opportunities are identified and managed through rigorous facilities evaluation conducted by our REW team. We review each site for opportunities to reduce energy consumption and implement efficiency projects. The identified opportunities are reviewed during the financial planning process to earmark operating or capital funds. For example, we’ve taken the opportunity to achieve LEED-certification for 12 of our sites globally and are in the midst of working toward LEED Platinum certification for two new buildings on our Palo Alto HQ campus. Opportunities like this enable us to provide our employees with healthier environments, as well as to reduce energy costs and enable carbon savings.

**Physical Risk Example:** One example of how we manage climate-related physical risk is illustrated by our Physical Security team, which tracks climate-related extreme weather events, like floods and storms. We employ over 5,600 people in Bangalore, India, which is an area that is prone to extreme flooding. If there were extreme floods in Bangalore, prevention of employees getting to work would disrupt our ability to operate. To manage this risk, we deployed a new mass communication tool with better capability to reach more of our employees, and standardized our Emergency Site Guides for efficient implementation. To ensure that our success in climate-related physical risk management is shared with other industry actors, VMware Bangalore and the Overseas Security Advisory Council Bangalore chapter hosted a meeting in April 2018 which was attended by Physical Security leadership from more than 30 multinational companies.

**Transitional Risk/Opportunity Example:** One example of a climate-related transitional opportunity that VMware is pursuing is the shift to sourcing our electricity through renewable energy to avoid potential market risks related to increases in the price of fossil fuel-based electricity. In 2017 77% of VMware’s global operations were powered by renewable energy, and we have set the ambitious target to achieve 100% renewable energy by 2020. Committing to renewable energy usage both bolsters our reputation as an environmentally-minded company, helps us to reduce the carbon footprint of our facilities and mitigates risks around existing and future potential carbon pricing schemes (particularly in Europe) as well as price fluctuations of electricity by seeking to secure fixed prices for renewables. To manage this opportunity and ensure we are on course to meet our goals, VMware’s Sustainability team and Real Estate and Workplace team are continually identifying ways to increase the use of renewables across our global operations.
C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Risk 1</th>
</tr>
</thead>
</table>

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type**

Physical risk

**Primary climate-related risk driver**

Acute: Increased severity of extreme weather events such as cyclones and floods

**Type of financial impact**

Reduced revenue and higher costs from negative impacts on workforce (e.g., health, safety, absenteeism)

**Company-specific description**

Change in severity of extreme weather events has the potential to disrupt VMware's own internal operations which could result in delays in fulfilling customer orders and deferred revenue. While our owned and leased facilities are not in highly vulnerable locations, recent disasters have demonstrated that impacts can be anywhere and can be far-reaching in their geographic impact. In particular, these events can affect delivery of services to customers, the ability of our employees to access our facilities, and/or disruption in services to VMware operations. For
example, in February 2018 several countries in Europe were affected by abnormal continuous snow as the “Beast from the East” storm system hit. VMware had 17 sites - including a key facility in Cork, Ireland - in the affected area, and more than 4000 employees were impacted by this event.

**Time horizon**
Medium-term

**Likelihood**
More likely than not

**Magnitude of impact**
Medium-high

**Are you able to provide a potential financial impact figure?**
Yes, an estimated range

**Potential financial impact figure (currency)**

**Potential financial impact figure – minimum (currency)**
0

**Potential financial impact figure – maximum (currency)**
1,000,000,000

**Explanation of financial impact figure**
The financial implications can range from $0 to extended disruption in a targeted geography (e.g., in excess of $1B USD if a data center is non-operational). Acute weather events can lead to operational shutdown due to compromised staff safety, limited site accessibility, or facility damage. Given the analysis of our internal risk assessment, we believe the risk of destruction of key facilities is extremely low.

**Management method**
Several VMware teams work to manage extreme weather risks: Enterprise Resiliency (ER), Crisis Management (CMT), Real Estate and Workplace (REW), Physical Security, and our Security Operations Center (SOC).
The ER team focuses on risk mitigation strategies for key business interruption risks including extreme weather events. The team's primary objectives are to develop Crisis Management Plans for our top risks, drive organizational awareness, and provide stronger governance across global teams so they operate in unison toward improving the company's overall resiliency.

Our CMT team works with site-level teams to develop risk management plans for major sites across the globe. In the event of an incident impacting VMware, we communicate to our employees via the Emergency Notification system, a new two-way mass communication tool to provide direction during an incident and ascertain employee safety. In the case of the "Beast from the East" storm, this tool was successfully implemented and aided in avoiding business disruptions.

Our risk management and global emergency response programs are built into the job responsibilities of many different professionals, including our increasing number CMT, ER staff at sites across the globe. The estimated costs of management including global property insurance premiums and staff time to implement programs exceeds $1M USD.

**Cost of management**

1,000,000

**Comment**

---

**Identifier**

Risk 2

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type**

Transition risk

**Primary climate-related risk driver**
Reputation: Stigmatization of sector

**Type of financial impact**
Reduced revenue from decreased demand for goods/services

**Company-specific description**
We have a long-standing positive reputation as a company. If we are not proactive about climate change, nor seen as a company that is a force for good in the world, our reputation is at risk. Energy use within the IT industry is drawing increased attention for its impact on the environment and climate change. Customers, businesses, and institutional investors are increasingly making investment decisions based on how environmentally responsible companies are. VMware has seen a significant increase in the number of customers requesting environmental information over the last year. For example, one of our customers recently sent us a letter requesting us to have a plan in place for reaching zero carbon emissions for our operations and our own suppliers by 2020 and requiring us to achieve zero carbon emissions by 2030. For VMware, given that we have led the virtualization of IT with our virtualization products - vSphere, vCloudNFV, Horizon - and that our products are known for energy efficiency, it would negatively impact our business if our reputation was damaged due to a lack of performance around the environment and climate change.

**Time horizon**
Medium-term

**Likelihood**
Unlikely

**Magnitude of impact**
Medium

**Are you able to provide a potential financial impact figure?**
Yes, a single figure estimate

**Potential financial impact figure (currency)**
80,000,000

**Potential financial impact figure – minimum (currency)**
Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
Our revenue could decrease if our customers no longer see us as relevant or taking meaningful action to manage our environmental and social impacts. While it is difficult to quantify, if we were to experience a 1% decrease in revenue, that would result in losses of over $80M USD.

Management method
In order to manage this reputational risk we work to clearly convey our commitment to environmental responsibility to all of our stakeholders supported by a robust program of activity. We proactively address how our business activities impact climate change and then communicate our actions and achievements in environmental sustainability through transparent reporting and strategic messaging.

For example, we are committed to ongoing public sustainability reporting through CDP and our annual Global Impact Report. We recently re-designed and enhanced our sustainability page on our corporate website, which includes numerous videos, reports, and interactive resources like a carbon calculator to enable our customers to easily assess their environmental impact. We also use customer events like our global VMworld conference to communicate the carbon avoidance benefit of our product and how we are performing on our sustainability metrics. By making environmentally responsible business decisions and communicating those to our customers, we can cement our reputation as authentic force for good.

We have four FTEs including a Vice President, Director and two Senior Sustainability Managers in our Real Estate and Workplace organization, in addition to a cross-functional team that supports the sustainability group on various projects. The cost of managing this risk is based upon the management costs for this group and are stated within our annual operating plan.

Cost of management
2,000,000

Comment
Identifier
   Risk 3

Where in the value chain does the risk driver occur?
   Direct operations

Risk type
   Physical risk

Primary climate-related risk driver
   Chronic: Changes in precipitation patterns and extreme variability in weather patterns

Type of financial impact
   Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

Company-specific description
   Climate-driven changes in precipitation extremes and droughts have the potential to disrupt VMware's own internal operations which could result in delays in fulfilling customer orders, customer service delays, and ultimately, deferred revenue. Our two largest sites are in drought-prone areas: Palo Alto, California in the US and Bangalore in India. In the last two years California has experienced extreme temperatures and low precipitation, resulting in devastating wildfires that have impacted air quality and electric grid services at our Palo Alto campus. Moving forward, our Palo Alto campus will be impacted by a Public Safety Power Shutoff program that will begin in the 2019 wildfire season. Intended to lessen the risk of wildfires from chronic changes in weather patterns, this program also has the potential to halt our operations if not proactively managed.

Time horizon
   Medium-term

Likelihood
   More likely than not

Magnitude of impact
   Medium-low
Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)
0

Potential financial impact figure – maximum (currency)
1,000,000,000

Explanation of financial impact figure
The financial implications can range from $0 to extended disruption in a targeted geography (e.g., in excess of $1B USD if a data center is non-operational). Chronic weather variability can lead to operational shutdown due to compromised staff safety, limited site accessibility, or facility damage. Given the analysis of our internal risk assessment, we believe the risk of key facilities being significantly compromised is extremely low.

Management method
Several VMware teams work to manage chronic weather risks: Enterprise Resiliency (ER), Crisis Management (CMT), Real Estate and Workplace (REW), Physical Security, and our Security Operations Center (SOC).

The ER team focuses on risk mitigation strategies for key business interruption risks including chronic weather variability. The team's primary objectives are to develop Crisis Management Plans for our top risks, drive organizational awareness, and provide stronger governance across global teams so they operate in unison toward improving the company's overall resiliency. Our CMT team works to develop site-specific risk management plans for major sites across the globe. As of 2018, all major sites have a CMT plan, with multi-stakeholder teams and an executive decisionmaker identified.

In cases of droughts and wildfires, we are managing these risks by implementing aggressive water conservation in these water-stressed regions. In addition, our Microgrid project on our Palo Alto campus will help build energy resiliency by ensuring that our facilities are operational as we navigate the upcoming Public Safety Power Shutoff program that will begin in 2019.
The cost of managing this risk was calculated by factoring in resource costs for building enterprise resiliency and crisis management team strength across the geographies. These teams drive the overall strategy, manage crisis events on the ground and direct governance & reporting.

**Cost of management**
1,000,000

**Comment**

**C2.4**

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

**C2.4a**

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Opp1</th>
</tr>
</thead>
</table>

**Where in the value chain does the opportunity occur?**
Customer

**Opportunity type**
Products and services
Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact
Better competitive position to reflect shifting consumer preferences, resulting in increased revenues

Company-specific description
Should emissions reporting become mandated, we have the capability to provide both insight into and management of energy usage and emissions through our management and automation services, and through our cloud services. Our IT software and our cloud services manage virtualized infrastructure resources and private and public cloud infrastructures.

Examples of products in the management and automation product portfolio include our vRealize product line 1) vRealize Operations, which provides performance, capacity and configuration management for virtual or physical infrastructure, 2) vRealize Automation, which enables customers to rapidly deploy and provision cloud services, and 3) vRealize Network Insight, which maps the flow of application traffic between clouds and data centers. This suite of products also provides cost transparency of their cloud and virtualized workloads.

Examples of our cloud services are CloudHealth, Wavefront, Cost Insight, and Network Insight. CloudHealth enables the analysis of spend to reduce waste and lower overall costs, helping to eliminate the use of unused resources. Wavefront monitors the performance and resource utilization of applications. Cost Insight shows the cost of running workloads in public and private clouds. Network Insight maps the flow of application traffic between clouds and data centers. For more details, please reference VMware's annual report on Form 10-K for the fiscal year ended February 1, 2019.

Time horizon
Medium-term

Likelihood
More likely than not

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

**Potential financial impact figure (currency)**
80,000,000

**Potential financial impact figure – minimum (currency)**

**Potential financial impact figure – maximum (currency)**

**Explanation of financial impact figure**
The increased demand for our services would positively impact our revenue. In general, a 1% increase in revenue equates to approximately $80 million USD.

**Strategy to realize opportunity**
This group of products is managed by our Cloud Management Business Unit, which is part of the larger Software-Defined Data Center (SDDC) group. These products are available on the market and we have annual releases that provide more robust features to support our clients with their requirements. An example of extending our products to enable the enhanced management of energy/GHG emissions would be to incorporate additional metrics to the dashboards of our vRealize Operations products. We are exploring this with our internal teams and will be soliciting customer feedback on requirements. Our SDDC technologies form the foundation of our customers’ private cloud environments and provide the capabilities for our customers to extend their private cloud to the public cloud and to help them run, manage, secure and connect all their applications across all clouds and devices.

If we were to allocate 1% of our Research and Development expenses toward this effort, this would result in a cost of $16,000,000 based on our FY19 financials.

**Cost to realize opportunity**
16,000,000

**Comment**
Identifier
   Opp2

Where in the value chain does the opportunity occur?
   Customer

Opportunity type
   Products and services

Primary climate-related opportunity driver
   Development and/or expansion of low emission goods and services

Type of financial impact
   Increased revenue through demand for lower emissions products and services

Company-specific description
   In the event of a natural disaster, including climate-driven extreme weather events, VMware provides fast and reliable IT disaster recovery products and services within our VMware Site Recovery Manager suite of products in order to protect against site failures. Our products enable our customers to perform frequent, non-disruptive testing to ensure IT disaster recovery predictability and compliance and achieve fast and reliable recovery using fully-automated workflows and complementary Software-Defined Data Center (SDDC) solutions. See more at: https://www.vmware.com/products/site-recovery-manager.html.

   Last year, VMware corporate IT needed to do a server technology refresh (5-year cycle) in its largest data center. This data center was quite expensive and energy-intensive and required a long, complex data center migration. Multiple VMware products such as vRealize Insight, vSphere vMotion and Site Recovery Manager/vSphere Replication facilitated the year-long migration with only 4 hours of downtime. VMware also saved $3M USD, 1.7 million kWh and 410 metric tons carbon emissions per year from this implementation and also uncovered the business opportunity to consolidate unused VMs that were idle. As a result, VMware is looking at ways to help customers more easily identify idle VM’s and hardware to save money, energy and carbon.

Time horizon
Medium-term

Likelihood
Likely

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
80,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
Opportunities to support our customers with their disaster recovery through our Site Recovery Manager products would increase our revenue. In general, a 1% increase in revenue equates to approximately $80 million USD.

Strategy to realize opportunity
Our group of products and features related to disaster recovery is managed by our Storage and Availability Business Unit, which is a part of the larger Software-Defined Data Center (SDDC) group. In the event of a disaster, we are able to provide additional support resources from other product groups to support any increase in demand for our VMware Site Recovery Manager.

An example of this in action is BSN INET in Japan using VMware Site Recovery Manager to join partner data centers in different regions via VMware-based virtual infrastructure and using VMware Site Recovery Manager and vCenter Operations Management Suite to fully automate complex disaster recovery processes. This enabled fully automating their disaster recovery, clearly documenting the recovery process,
optimizing operational procedures, and enhancing testing facilities. As a result of VMware's cloud management solutions, the company has substantially improved the efficiency of its operations, and by partnering with other cloud service providers it has created a shared infrastructure that is highly resilient to natural disasters.

Given the nature of managing disaster recovery, it is difficult to predict demand cycles. If we were to allocate 1% of our R&D expenses toward this effort, this would result in a cost of $16,000,000 based on our FY19 financials.

**Cost to realize opportunity**

16,000,000

**Comment**

---

**Identifier**

Opp3

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Energy source

**Primary climate-related opportunity driver**

Use of new technologies

**Type of financial impact**

Reputational benefits resulting in increased demand for goods/services

**Company-specific description**

We have contracted the construction of two 1MWh battery energy storage installations as CSG and HTG buildings which will be combined with existing solar installations and building management systems serving as a proof of concept for a full-scale Community Microgrid providing clean,
local, renewable power to the 105-acre HQ campus in Palo Alto. Additionally, we are in early negotiations with the city of Palo Alto utilities to provide backup power to their grid and use the microgrid for the benefit of the whole community, for example by providing power to the utility during times of high congestion to avoid rolling blackouts for the community. For the full-scale microgrid we are in the early development stage of creating a Smart Loop around the campus, allowing flexible tie-ins of renewable generation resources like solar canopies on parking garages and parking lots and storage technologies with all buildings on campus. This would allow us to benefit from enhanced resiliency, demand and energy charge reductions while implementing highest technological achievements currently available for environmental protection. In addition, the project may expand electric vehicle charging infrastructure at VMware, improving the company’s Scope 3 carbon emissions related to employee commuting.

Time horizon
Short-term

Likelihood
Very likely

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
7,700,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
It's been estimated that a 0.01% positive impact (resulting from the project) would result in a $7.7M market capitalization increase.
Strategy to realize opportunity

We have signed a memorandum of understanding with the City of Palo Alto and contracted with Consolidated Edison to build an initial microgrid proof of concept covering HTG and CSG buildings on campus. Both buildings will have stand-alone battery storage installations which will be charged by both solar panels and the 100% renewable Palo Alto grid power. The buildings are expected to use a cutting-edge “blinkless” software system to predict grid failures and island themselves to provide uninterrupted power supply for the whole building for up to 4 hours and for selected areas of each building for a longer period of time-based on available solar insulation. Furthermore, both buildings will be capable to deliver power for the Palo Alto Fire Department Emergency Response Vehicles in times of emergencies creating value for the Palo Alto community as a whole. We continue our collaboration with external consultants and the internal team to move the microgrid project forward.

We have reviewed multiple project scenarios with external consultants who have advised that, if we were to execute this project at full scale, the estimated cost would be $50,000,000.

Cost to realize opportunity

50,000,000

Comment

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Identifier

Opp4

Where in the value chain does the opportunity occur?

Customer

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services
Type of financial impact
Increased revenue through demand for lower emissions products and services

Company-specific description
VMware Cloud on AWS allows customers to easily migrate their on-premises workloads to the public cloud. This gives customers the ability to shut down data centers while using centralized cloud infrastructure for performance and optimization. The energy avoidance of turning off a data center is enormous. Also, the infrastructure in VMware Cloud on AWS is leading edge. This means that usually, customers will see a greater virtual machine density than what they were able to obtain in their private data centers. This means less servers are used in VMware Cloud on AWS as compared to their older on-premises data centers, which are less energy efficient.

Time horizon
Short-term

Likelihood
Likely

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
80,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
The increased demand would positively impact our revenue. In general, a 1% increase in revenue equates to approximately $80 million USD.
Strategy to realize opportunity
Our next step related to this opportunity would be additional research and development.

If we were to allocate 1% of our Research and Development expenses toward this effort, this would result in a cost of $16,000,000 based on our FY19 financials.

Cost to realize opportunity
16,000,000

Comment

---

Identifier
Opp5

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact
Increased revenue through demand for lower emissions products and services

Company-specific description
As demonstrated by our compute virtualization platform, vSphere, we've supported our customers in avoiding over 665 million MT CO2e since 2003 (White Paper referenced below). In the same vein, we provide offerings for our customers to reduce their storage hardware and network
and security hardware footprints by using vSAN and NSX products. These products virtualize storage, network and security functions allowing those traditional operations to occur in a software layer, thereby reducing the need for excess hardware, while providing a more robust set of capabilities. This also allows our customers to consume cloud services in a more efficient manner, which provides additional financial and environmental benefits.

VMware’s vSAN platform allows customers to migrate their virtual machines and data from large, monolithic, storage arrays to drives populated in a server they are already using for running those machines on vSphere. This gives customers the advantage of then powering off the large storage arrays resulting in the potential for power and cooling cost savings in their private cloud.

VMware’s NSX platform allows customers to run network and security services for their clouds in software. This reduces the need of physical switch and security hardware in their data centers and facilitates moving workloads to other clouds. The energy benefit of this is two-fold: unneeded hardware is turned off and no longer requires energy for power and cooling; furthermore, workloads can be moved to other clouds that provide better energy efficiency (or, in the future, lower carbon intensity).


**Time horizon**
- Current

**Likelihood**
- Virtually certain

**Magnitude of impact**
- High

**Are you able to provide a potential financial impact figure?**
- Yes, a single figure estimate
Potential financial impact figure (currency)
80,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
The increased demand would positively impact our revenue. In general, a 1% increase in revenue equates to approximately $80 million USD.

Strategy to realize opportunity
These products are part of the larger Software-Defined Data Center (SDDC) group. These products are currently in use and we have annual releases that provide more robust features to support our clients with their requirements. We've quantified the environmental benefits of vSAN and NSX in our 2019 IDC White Paper, "Exploring the Impact of Infrastructure Virtualization on Digital Transformation Strategies and Carbon Emissions," which can be found at: https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/company/vmware-exploring-impact-of-infrastructure-virtualization-on-digital-transformation-strategies-and-carbon-emissions-whitepaper.pdf. Our SDDC technologies form the foundation of our customers’ private cloud environments and provide the capabilities for our customers to extend their private cloud to the public cloud and to help them run, manage, secure and connect all their applications across all clouds and devices.

If we were to allocate 1% of our Research and Development expenses toward this effort, this would result in a cost of $16,000,000 based on our FY19 financials.

Cost to realize opportunity
16,000,000

Comment
## C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products and services</td>
<td>Impacted</td>
</tr>
<tr>
<td></td>
<td>Climate change is integrated into our business strategy, now and in the future. VMware provides cloud infrastructure and business mobility solutions that accelerate our customers’ digital transformations by enabling enterprises to master a software-defined approach to business and IT. These solutions are based on our desktop, server, and data center virtualization solutions that also help customers reduce their energy costs and consumption. VMware pioneered the development of virtualization technologies and continues its legacy of transforming the way businesses build, deliver and consume IT resources by allowing organizations to manage resources across private clouds and complex multi-cloud, multi-device environments. Our products have played a major role in increasing the efficiency of IT resources and therefore reducing the consumption of energy for our customers. Server virtualization (where multiple server instances are created on one physical server machine) is a key element of cloud computing. Through virtualization solutions, the total energy required to support a given service is reduced – often dramatically – which results in lower carbon emissions. For example, every server virtualized results in an avoidance of approximately 4 tons of CO2 per year. Cloud computing is a way to transition to a lower carbon business model while increasing the efficiency of business operations. Each year since 2016, we have quantified the impact our products have had on our customers by way of a commissioned study by IDC. The magnitude of the positive carbon impact VMware has had is significant: over 665 million metric tons of CO2e have been avoided by our customers as a result of deploying our virtualization products since 2003. Please see our 2019 IDC White Paper, “Exploring the Impact of Infrastructure Virtualization on Digital Transformation Strategies and Carbon Emissions,” which can be found at: <a href="https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/company/vmware-exploring-impact-of-infrastructure-virtualization-on-digital-transformation-strategies-and-carbon-emissions-whitepaper.pdf">https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/company/vmware-exploring-impact-of-infrastructure-virtualization-on-digital-transformation-strategies-and-carbon-emissions-whitepaper.pdf</a>.</td>
</tr>
<tr>
<td>Supply chain and/or value chain</td>
<td>Impacted for some suppliers, facilities, or product lines</td>
</tr>
<tr>
<td></td>
<td>Given the inherent risks faced by all businesses in today’s climate along with the scale of our global supply chain, VMware has joined CDP’s Supply Chain initiative. We have relationships with over 7,000 suppliers, 600 of which are considered preferred suppliers. Our goal is to have 50% of our suppliers (by spend) disclosing their climate data to CDP by 2020. Through CDP disclosures, we aim to create an awareness of climate-related risks among our suppliers that will better enable them to identify and prepare for future events. Engaging with our suppliers also presents an opportunity to reduce...</td>
</tr>
</tbody>
</table>
emissions beyond our direct operations. The magnitude of impact on our supply chain from our climate-related risks and opportunities is moderate.

<table>
<thead>
<tr>
<th>Adaptation and mitigation activities</th>
<th>Impacted for some suppliers, facilities, or product lines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The aspect of climate change mitigation and adaptation that has influenced – and drives – our strategy is primarily the opportunity to enable energy efficiency through Information Technology. Our internal sustainability strategy that we've been implementing over the last 3 years involves adaptation and mitigation activities in the form of reducing our carbon footprint, mitigating our carbon intensive activities, and addressing our water footprint in water-stressed regions where we operate. Since 2003, VMware's products have avoided over 665 million MT CO2e for our customers, and we expect this number to continue growing as we maximize the opportunity to promote energy efficiency through our virtualization technologies. In 2018 alone, the emissions avoidance associated with customers using our products was 60 million MT CO2e. The magnitude of impact on our adaptation and mitigation activities from our climate-related opportunities is low.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Investment in R&amp;D</th>
<th>Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>We have made, and expect to continue to make, significant investments in research and development (R&amp;D) as we identify climate-related risks and opportunities that impact our cloud product offerings. We have assembled an experienced group of developers with systems management, public and private cloud, desktop, digital mobility, security, applications, software-as-a-service, networking, storage and open source software expertise. We also have strong ties to leading academic institutions around the world, and we invest in joint research with academia. We prioritize our product development efforts through a combination of engineering-driven innovation and customer- and market-driven feedback. Our R&amp;D culture places a high value on innovation, quality and open collaboration with our partners. Our R&amp;D expenses grew from $1.5 billion in fiscal year 2016 to $1.98 billion in fiscal year 2019. We continue to invest in our key growth areas, including NSX and VMware vSAN, while also investing in areas that we expect to be significant growth drivers in future periods, such as VMware Cloud on AWS. The magnitude of impact on our investment in R&amp;D from our climate-related opportunities is moderate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operations</th>
<th>Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Our operations are subject to a number of climate-related risks, all of which present opportunities for VMware to evolve and innovate. We are motivated to pursue increased efficiency in our operations, and we constantly seek to do more with less. Our plan to install a microgrid on our 105-acre campus in Palo Alto is just one example of what is possible when it comes to innovating how we operate. The magnitude of impact of installing a full-scale Community Microgrid would extend far beyond our campus, providing local renewable power, energy storage, and emergency back-up power to be realized by an entire community.</td>
</tr>
</tbody>
</table>
**Other, please specify**

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**C2.6**

**(C2.6) Describe where and how the identified risks and opportunities have been factored into your financial planning process.**

<table>
<thead>
<tr>
<th>Relevance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues</strong></td>
<td>VMware has the opportunity to increase our revenue through expanding sales of our cloud solutions. We believe that over time these product lines will meet or exceed their growth projections due to the more and more visible impacts of climate change and the need to decouple growth from resource consumption. Our financial planning factors in R&amp;D expenses associated with developing new, energy efficient offerings, as well as projected net revenues increases. The magnitude of impact on our financial planning process for revenues is low.</td>
</tr>
<tr>
<td><strong>Operating costs</strong></td>
<td>VMware has the opportunity to decrease operating costs while gaining reputational benefits and lowering emissions by exploring energy alternatives and energy efficiency. For example, the microgrid we are installing on our Palo Alto campus will require a capital outlay before significantly reducing our electricity demand charges. The costs associated with managing climate-related operating risks such as disaster recovery are already accounted for within our Enterprise Resilience Business Units. The magnitude of impact on our financial planning process for operating costs is low.</td>
</tr>
<tr>
<td><strong>Capital expenditures / capital allocation</strong></td>
<td>VMware has the opportunity to improve the energy-efficiency of our buildings through smart upgrades and design. For example, we have achieved LEED-certification for 12 of our sites globally and are in the midst of working toward LEED Platinum certification for two new buildings on our Palo Alto HQ campus. We developed VMware’s Sustainable Design Guidelines in order to support our teams in achieving LEED certification for both existing retrofits/remodels and new construction, enabling future cost and carbon savings for our sites. This has implications for our capital expenses and associated financial planning. Each year, we put together an operating budget for future capital expenditures. All of our energy-efficiency and other related real estate projects are budgeted for each year by the Real Estate and Workplace teams. The magnitude of impact on our financial planning process for operating costs is low.</td>
</tr>
<tr>
<td>Category</td>
<td>Impact</td>
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<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>Acquisitions and divestments</td>
<td>Impacted</td>
</tr>
<tr>
<td>Access to capital</td>
<td>Not impacted</td>
</tr>
<tr>
<td>Assets</td>
<td>Impacted</td>
</tr>
<tr>
<td>Liabilities</td>
<td>Not impacted</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>
C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?
   Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?
   Yes, qualitative and quantitative

C3.1c

(C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

Climate change is integrated into our business strategy, now and in the future. The aspect of climate change mitigation and adaptation, that has influenced – and drives – our strategy is primarily the opportunity to enable energy efficiency through software. Our climate change strategy is also informed by our customers, operations and employees, with short-and long-term initiatives defined below.

**Software Solutions**: VMware provides cloud infrastructure and business mobility solutions that accelerate our customers’ digital transformations by enabling enterprises to master a software-defined approach to business and IT. These solutions are based on our desktop, server, and data center virtualization solutions that help customers reduce their energy costs and consumption. VMware pioneered the development of virtualization technologies and continues its legacy of transforming the way businesses build, deliver and consume IT resources by allowing organizations to manage resources across private clouds and complex multi-cloud, multi-device environments. Our products have played a major role in increasing the efficiency of IT resources and therefore reducing the consumption of energy for our customers. Server virtualization (where multiple server instances are created on one physical server machine) is a key element of cloud computing.
Through virtualization solutions, the total energy required to support a given service is reduced – often dramatically – which results in lower carbon emissions. For example, every server virtualized results in an avoidance of approximately 4 tons of CO2 per year, which demonstrates that cloud computing is a way to transition to a lower carbon business model while increasing the efficiency of business operations. Each year (since 2016), we quantify the impact our products have had on our customers by way of a commissioned study by IDC. The positive carbon impact VMware has had is significant: over 665 million MT CO2e have been avoided by our customers as a result of deploying our virtualization products since 2003. Please see the August 2019 IDC White Paper, "Exploring the Impact of Infrastructure Virtualization on Digital Transformation Strategies and Carbon Emissions," which can be found at: https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/company/vmware-exploring-impact-of-infrastructure-virtualization-on-digital-transformation-strategies-and-carbon-emissions-whitepaper.pdf.

**Customers:** In 2018 alone, our customers avoided over 91 million metric tons through the use of our virtualization products. Our short-term strategy is to address servers and desktops that are not virtualized yet, which are still consuming 70-80% of their rated power even when idle. As of the writing of this report, 569 companies have committed to setting a science-based target reduction as per SBTi. Out of these companies 94% are VMware customers - we are committed to helping these customers in their business transformation journeys to enable a resource efficient business model for the future.

Our long-term strategy – that has been influenced by various climate change factors described above – is to include sustainability features in every product release and will include a focus on quantifying costs and emissions avoided for customers. One of our internal goals is to cultivate a mindset of sustainability innovation within the company.

**Operations:** In 2017, we made a substantial business decision to reach our 2020 goal of carbon neutrality two years early, in 2018. This decision required re-prioritizing our work, cross-functional collaboration and re-allocation of funds to make this happen. We announced the achievement of this goal in the third quarter of 2018 and received third-party certification as a CarbonNeutral® company aligning to the CarbonNeutral Protocol. We believe that certification is critical to demonstrate leadership, differentiate from competitors and engage stakeholders. CarbonNeutral certification enables us to demonstrate the quality of our carbon neutral action by following a robust, credible, third-party framework that is internationally accepted and scientifically informed.

**Employees:** Central to our long-term strategy is to shift the behaviors of our employees through both incentives and engagement. One of our competitive advantages is the ability to recruit and retain top talent, many of whom increasingly care about the broader impact of our products and the way we engage on global environmental issues like climate change. We offer an array of environmentally responsible benefits in the workplace, including compensation to employees using public transit to get to/from work. We provide free EV charging infrastructure to more than 1,000 registered users on our Palo Alto HQ campus. We also offer employees the opportunity to benefit from discounted residential solar power and are exploring
programs that will enable employees to offset carbon in their personal lives. At our Bangalore offices, we operate one of the largest corporate EV fleets to mitigate the region’s heavy traffic congestion and reduce employee commute related emissions. The EV fleet charges using renewable energy, thereby making the entire loop green.

C3.1d

(C3.1d) Provide details of your organization's use of climate-related scenario analysis.

<table>
<thead>
<tr>
<th>Climate-related scenarios</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2DS</td>
<td>VMware has completed a quantitative and qualitative climate-related scenario analysis for the purposes of understanding and evaluating the implications of setting a science-based target (SBT) to reduce our emissions. The SBT methods considered include CDP criteria, which utilizes the 2DS scenario, as well as SBTi criteria that utilize various scenarios while requiring a Scope 3 screening to determine significance. These were selected based on their applicability and use for evaluating a science-based target. We have chosen to report on the 2DS scenario to CDP as we continue to develop our SBT commitments in alignment with SBTi criteria. The analysis included taking into account, as well as decoupling our company’s business and emissions growth trajectories including facilities, data centers and labs, and employees and applied forecasted trends using a vetted set of KPI’s from the business to project our GHG emissions inventory and determine a business-as-usual (BAU) scenario. Assumptions around our future growth rates, sales, employee headcount and square footage of real estate were used.</td>
</tr>
</tbody>
</table>

Our analysis included both medium- and long-term time horizons as prescribed by SBTi and CDP (5-15 years, 15+ years, respectively), as we wanted to use this goal setting exercise to meet or exceed the SBTi criteria. For the SBTi analysis we screened our Scope 3 sources for the most recent annual reporting period. The SBT assessment applies to our company as a whole, including our operating boundary for scope 1 and 2 emissions, and our indirect scope 3 emissions. The assessment relies on assumptions and inputs from specific business and stakeholder groups including facilities, data center labs, real estate, finance, and our supplier network. Results of the analysis indicate that VMware would need to achieve reductions ranging from 25% to 55% for the medium- and long-term timeframes, respectively.

Results of this analysis were used to inform our objectives and corporate strategy by providing us with reference points to determine feasibility and plans of action to reduce our emissions. Consequentially, we have set a SBT to reduce our scope 1 and 2 emissions by
35% by 2030 from a 2017 base-year. The analysis demonstrated that energy efficiency measures alone would not be sufficient to achieve such an ambitious goal, whereas our planned and in progress commitment to achieve RE100 has now become a central initiative that will enable us to achieve our target. Specifically, the analysis has influenced our strategy in the form of raising the importance of a progressive renewable energy procurement strategy, and will influence our future decisions to consider moving beyond solely purchasing renewable energy credits to achieve our RE100 commitment. We used, and will continue to use, the analysis to provide specific details around the types of projects, both renewable energy focused and for energy efficiency, that we expect to implement for achieving our target. Specifically, the analysis has influenced our strategy in the form of raising the importance of a progressive renewable energy procurement strategy, and will influence our future decisions to consider moving beyond solely purchasing renewable energy credits to achieve our RE100 commitment. We used, and will continue to use, the analysis to provide specific details around the types of projects, both renewable energy focused and for energy efficiency, that we expect to implement for achieving our target. Our analysis also revealed that 89% of our total emissions were scope 3, and that 61% of our scope 3 emissions were attributable to purchased good and services. As a result, we are in the process of evaluating a scope 3 target.

**RCP 2.6**

VMware has completed a quantitative and qualitative climate-related scenario analysis for the purposes of understanding and evaluating the implications of setting a science-based target (SBT) to reduce our emissions. The SBT methods considered include CDP criteria, which utilizes the 2DS scenario, as well as SBTi criteria that utilize various scenarios while requiring a Scope 3 screening to determine significance. These were selected based on their applicability and use for evaluating a science-based target. We have chosen to report on the 2DS scenario to CDP as we continue to develop our SBT commitments in alignment with SBTi criteria. The analysis included taking into account, as well as decoupling our company’s business and emissions growth trajectories including facilities, data centers and labs, and employees and applied forecasted trends using a vetted set of KPI’s from the business to project our GHG emissions inventory and determine a business-as-usual (BAU) scenario. Assumptions around our future growth rates, sales, employee headcount and square footage of real estate were used.

Our analysis included both medium- and long-term time horizons as prescribed by SBTi and CDP (5-15 years, 15+ years, respectively), as we wanted to use this goal setting exercise to meet or exceed the SBTi criteria. For the SBTi analysis we screened our Scope 3 sources for the most recent annual reporting period. The SBT assessment applies to our company as a whole, including our operating boundary for scope 1 and 2 emissions, and our indirect scope 3 emissions. The assessment relies on assumptions and inputs from specific business and stakeholder groups including facilities, data center labs, real estate, finance, and our supplier network. Results of the analysis indicate that VMware would need to achieve reductions ranging from 25% to 55% for the medium- and long-term timeframes, respectively.

Results of this analysis were used to inform our objectives and corporate strategy by providing us with reference points to determine feasibility and plans of action to reduce our emissions. Consequentially, we have set a SBT to reduce our scope 1 and 2 emissions by...
35% by 2030 from a 2017 base-year. The analysis demonstrated that energy efficiency measures alone would not be sufficient to achieve such an ambitious goal, whereas our planned and in progress commitment to achieve RE100 has now become a central initiative that will enable us to achieve our target. Specifically, the analysis has influenced our strategy in the form of raising the importance of a progressive renewable energy procurement strategy, and will influence our future decisions to consider moving beyond solely purchasing renewable energy credits to achieve our RE100 commitment. We used, and will continue to use, the analysis to provide specific details around the types of projects, both renewable energy focused and for energy efficiency, that we expect to implement for achieving our target. Our analysis also revealed that 89% of our total emissions were scope 3, and that 61% of our scope 3 emissions were attributable to purchased good and services. As a result, we are in the process of evaluating a scope 3 target.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?
Both absolute and intensity targets

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

<table>
<thead>
<tr>
<th>Target reference number</th>
<th>Scope</th>
<th>% emissions in Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abs 1</td>
<td>Scope 1 +2 (market-based)</td>
<td>100</td>
</tr>
</tbody>
</table>
Targeted % reduction from base year
35

Base year
2017

Start year
2018

Base year emissions covered by target (metric tons CO2e)

Target year
2030

Is this a science-based target?
Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% of target achieved

Target status
Underway

Please explain
The percentage achieved is a result of the reduction in our Scope 1 and 2 emissions since 2017.

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).
Target reference number
  Int 1

Scope
  Scope 2 (market-based)

% emissions in Scope
  100

Targeted % reduction from base year
  10

Metric
  Metric tons CO2e per unit revenue

Base year
  2015

Start year
  2016

Normalized base year emissions covered by target (metric tons CO2e)
  4.58

Target year
  2020

Is this a science-based target?
  No, but we are reporting another target that is science-based

% of target achieved
  63
Target status
Underway

Please explain
We set our first formal target in 2015, which is to reduce our carbon emissions intensity 10% for our Scope 2 market-based emissions by 2020. Our normalized base year emissions covered by target were calculated by dividing our market-based MT CO2e by our FY15 revenue in millions (30,106 MT CO2e/$6,571). It is important to note that many efficiencies are factored into our 2015 base year. Since our founding in 1998, the company has made many proactive sustainability decisions beyond the transformational products that have enabled energy efficiencies across the IT Sector for over a decade. Each year we have continued this investment, whether it’s procuring a data center in Wenatchee, Washington that is 100% clean-powered by the local utility to achieving LEED certification for various sites around the world.

In 2018, we’re proud to report that our absolute emissions decreased while our revenue increased by 36% from the base year. In 2018, we achieved an intensity metric of 1.7 MT CO2e per revenue in millions. This is a 63% decrease from our base year, surpassing our 10% reduction goal. In 2015, this intensity metric was 4.58 MT CO2e. To continue meeting this intensity target over the next year, VMware will continue to aggressively pursue energy efficiency in our facilities, operations and data center.

Note: the intensity figure above (4.58) is calculated with our revenue in millions. We have continued this format for consistency since this is how this metric has been reported in previous years.

% change anticipated in absolute Scope 1+2 emissions
29

% change anticipated in absolute Scope 3 emissions
0

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.
Target
Renewable electricity consumption

KPI – Metric numerator
Renewable energy consumption

KPI – Metric denominator (intensity targets only)
Total energy consumption

Base year
2015

Start year
2016

Target year
2020

KPI in baseline year

KPI in target year

% achieved in reporting year
94

Target Status
Underway

Please explain
We increased our global consumption of renewable energy from 77% in 2017 to 94% in 2018. We have a detailed plan to support us in achieving our goal of 100% renewable energy by 2020. In fact, we plan to achieve RE100 in 2019, one year ahead of schedule. Please see VMware’s Global Impact Report for more information on our corporate sustainability goals.

**Part of emissions target**

Abs1

**Is this target part of an overarching initiative?**

RE100

---

**Target**

Waste

**KPI – Metric numerator**

**KPI – Metric denominator (intensity targets only)**

**Base year**

2015

**Start year**

2016

**Target year**

2020

**KPI in baseline year**
**KPI in target year**

**% achieved in reporting year**
92.7

**Target Status**  
Underway

**Please explain**  
Our waste diversion rate increased from 91% to 92.7% while we also increased our coverage to 52% of our sites globally. The 94% diversion rate is applicable to our Palo Alto location, which makes up 33.7% of our global real estate portfolio. We have maintained our high diversion rate in Palo Alto and are aiming to increase the diversion rate at our remaining sites by implementing best practices from Palo Alto. Please see VMware's Global Impact Report for more information on our corporate sustainability goals.

**Part of emissions target**

Is this target part of an overarching initiative?  
Other, please specify

**C4.3**

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.  
Yes

**C4.3a**

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.
Number of initiatives | Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
--- | ---
Under investigation | 1 | 0
To be implemented* | 1 | 128.69
Implementation commenced* | 3 | 0
Implemented* | 17 | 694.55
Not to be implemented | 0 | 0

**C4.3b**

*(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.*

**Initiative type**
Energy efficiency: Building services

**Description of initiative**
Lighting

**Estimated annual CO2e savings (metric tonnes CO2e)**
123.6

**Scope**
Scope 2 (location-based)

**Voluntary/Mandatory**
Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**
8,540
Investment required (unit currency – as specified in C0.4)
39,380

Payback period
4 - 10 years

Estimated lifetime of the initiative
6-10 years

Comment
Lighting retrofit

Initiative type
Energy efficiency: Building services

Description of initiative
Building controls

Estimated annual CO2e savings (metric tonnes CO2e)
412.58

Scope
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
152,445

Investment required (unit currency – as specified in C0.4)
649,000

**Payback period**
4 - 10 years

**Estimated lifetime of the initiative**
6-10 years

**Comment**
Submetering and installation of enterprise energy management systems.

---

**Initiative type**
Energy efficiency: Building services

**Description of initiative**
HVAC

**Estimated annual CO2e savings (metric tonnes CO2e)**
158.3

**Scope**
Scope 2 (location-based)

**Voluntary/Mandatory**
Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**
5,529

**Investment required (unit currency – as specified in C0.4)**
99,500
Payback period
4 - 10 years

Estimated lifetime of the initiative
21-30 years

Comment

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

<table>
<thead>
<tr>
<th>Method</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated budget for energy efficiency</td>
<td>VMware has a dedicated budget for operational energy efficiency across our global facilities portfolio. In addition, we also have a separate annual capital budget to fund projects globally in an effort to expedite those with deep energy savings by 2020.</td>
</tr>
<tr>
<td>Compliance with regulatory requirements/standards</td>
<td>Certain projects may be necessary to meet or exceed regulatory or customer compliance requirements. In such cases, compliance would be the driver and objective.</td>
</tr>
<tr>
<td>Partnering with governments on technology development</td>
<td>VMware supports a pilot project with a software startup, Measurabl, and the City of Palo Alto, which will enable and streamline municipal-level sustainability reporting to CDP as well as small businesses sustainability disclosure.</td>
</tr>
<tr>
<td>Internal incentives/recognition programs</td>
<td>In 2018, VMware sponsored SunShares for the fourth consecutive year, enabling our employees to reduce their carbon emissions at home. SunShares is a solar bulk purchase program that is available for all of our California employees. This program contributed over 1.1 Megawatt of new solar capacity through central and northern California. For our U.S. employees outside of California, we have several partnerships with solar providers that provide corporate discounts. We are working with Human Resources to expand these types of services globally.</td>
</tr>
<tr>
<td>Employee engagement</td>
<td>We have a unique professional development opportunity for our employees called a “Take 3.” This enables an employee to work in a different group for three months as a respite from their normal work and as a way to broaden their understanding of how the organization works. Our sustainability team actively recruits employees for Take 3</td>
</tr>
</tbody>
</table>
opportunities and we’ve had great success in leveraging these (new) relationships to support us in more effectively communicating with various business units and increasing engagement in our sustainability strategy overall. We also engage our employees on a regular basis through various communication channels, including our enterprise collaboration platform, Social (formerly Socialcast). It is here where employees can have active dialogues about the issues, they care about including sustainability. We've seen an increase in participation from all the global sites since last year and regularly develop and share content to drive engagement.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation
Group of products

Description of product/Group of products
Since its inception, VMware has avoided over 665 million tons of carbon from the air – or over one trillion automobile miles – through virtualization, as measured through its work with the International Data Corporation (IDC). Over time, VMware has expanded its focus from computing to storage and networking through its vSAN technology, increasing its ability to reduce CO2 emissions. VMware was the first company to articulate a vision for the Software-Defined Data Center (SDDC), where increasingly, infrastructure is virtualized, enabling management of the data center to be entirely automated by software, from one, unified platform. Traditional data centers are loose collections of technology silos where each application type has its own vertical stack consisting of a CPU and operating system, storage pool, networking and
security, and management systems. Over time, costs to maintain the data center infrastructure have been increasing because the data center environment has become divergent, leading to higher complexity. The increased complexity of the data center demands constantly increasing resources to manage and maintain the IT infrastructure.

The SDDC is designed to transform the data center into an on-demand service that addresses application requirements by abstracting, pooling, and automating the services that are required from the underlying hardware. SDDC promises to dramatically simplify data center operations and lower costs. Additionally, through the consolidation benefits of SDDC we optimize/maximize the usage of compute, network and storage equipment, thereby reducing waste in spare and under-utilized equipment – directly avoiding GHG emissions. Our SDDC architecture consists of four main product categories: 1) Compute, 2) Storage and Availability, 3) Network and Security, and 4) Management and Automation.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Evaluating the carbon-reducing impacts of ICT

% revenue from low carbon product(s) in the reporting year

70

Comment

For every server virtualized, we estimate that 4 tons of CO2e per year are avoided. In 2019, VMware commissioned its fourth study with IDC to quantify the impact of our products. The IDC white paper shows that VMware’s virtualization products have avoided over 665 million MT CO2e for our customers over the last 15 years. This study demonstrates VMware’s positive carbon impact and has enabled us to engage more deeply with our customers around their environmental goals. This research provides a baseline for further efforts to quantify the impact of our other software products.

Level of aggregation
  Group of products

Description of product/Group of products
  Our End-User Computing (EUC) portfolio enables IT organizations to efficiently deliver more secure access to applications, data and devices for their end users. Our solutions provide end users a digital workspace, within which they can deliver any application to any device in an increasingly mobile-cloud era, while supporting corporate IT with appropriate management and security to networks, preventing data loss, and enabling a high-quality of service on premises or in the cloud. Our solutions are designed to optimize simplicity and choice to end users, while providing security and control to corporate IT. EUC’s product portfolio consists of our AirWatch unified endpoint management solutions, our Horizon application and desktop virtualization solutions, and a set of common services such as VMware Identity Manager. We have combined these solutions into a single offering, Workspace ONE, which brings together application and access management, unified endpoint management, and virtual application delivery. This solution provides customers with a complete digital workspace which leverages our software-defined data center solutions so that customers can extend the value of virtualization from their data center to their devices.

Are these low-carbon product(s) or do they enable avoided emissions?
  Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions
  Evaluating the carbon-reducing impacts of ICT

% revenue from low carbon product(s) in the reporting year
  30

Comment
  Our Horizon desktop products power end user desktops directly from the data center, and for every server virtualized in the data center, we estimate 4 tons of CO2 per year are avoided. When considering the entire lifecycle, cradle-to-grave, thin clients offer numerous environmental benefits. These include energy efficiency, a longer life-span, improved reliability, less packaging, and fewer raw materials.

  Please see the IDC White Paper, sponsored by VMware, “Exploring the Impact of Infrastructure Virtualization on Digital Transformation"
Strategies and Carbon Emissions,” dated August 2019 which can be found at:

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start
January 1, 2015

Base year end
December 31, 2015

Base year emissions (metric tons CO2e)
4,878

Comment

Scope 2 (location-based)

Base year start
January 1, 2015

Base year end
December 31, 2015
Base year emissions (metric tons CO2e)

71,230

Comment

Scope 2 (market-based)

Base year start
January 1, 2015

Base year end
December 31, 2015

Base year emissions (metric tons CO2e)
30,106

Comment

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.


C6. Emissions data

C6.1

(C6.1) What were your organization’s gross global Scope 1 emissions in metric tons CO2e?
### Reporting year

| **Gross global Scope 1 emissions (metric tons CO2e)** | 4,454 |
| **Start date** | February 1, 2018 |
| **End date** | January 31, 2019 |

**Comment**

Our gross global Scope 1 emissions are 4,454 MT CO2e. While the City of Palo Alto has provided carbon neutral natural gas since July 1, 2017, we have not considered this offset into our calculation. We are exploring green gas tariffs in other sites with natural gas use as well.

### C6.2

(C6.2) **Describe your organization’s approach to reporting Scope 2 emissions.**

**Row 1**

| **Scope 2, location-based** | We are reporting a Scope 2, location-based figure |
| **Scope 2, market-based** | We are reporting a Scope 2, market-based figure |

**Comment**
C6.3

(C6.3) What were your organization’s gross global Scope 2 emissions in metric tons CO2e?

**Reporting year**

<table>
<thead>
<tr>
<th>Scope 2, location-based</th>
<th>67,524</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope 2, market-based (if applicable)</td>
<td>15,237</td>
</tr>
</tbody>
</table>

**Start date**
February 1, 2018

**End date**
January 31, 2019

**Comment**
The location-based figures have gone up because we are reporting colocation related Scope 2 emissions attributable to VMware owned IT equipment in colocation data centers for the first time. We did a deep dive on Scope 3 emissions categories in 2018 and consider this reporting as thought leadership. Future of Internet Power (https://www.bsr.org/en/collaboration/groups/future-of-internet-power) recommends that colocation data center clients split colocation Scope 3 emissions into Scope 2 (IT equipment owned by client) and Scope 3 and report accordingly.

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

No
**C6.5**

(C6.5) Account for your organization’s Scope 3 emissions, disclosing and explaining any exclusions.

### Purchased goods and services

<table>
<thead>
<tr>
<th>Evaluation status</th>
<th>Relevant, calculated</th>
</tr>
</thead>
</table>

**Metric tonnes CO2e**

204,427

**Emissions calculation methodology**

VMware uses Environmentally Extended Economic Input Output (EEIO) lifecycle analysis (LCA) emissions factors to quantify the emissions associated with its annual supplier and procurement purchasing activity. Annualized spend data is mapped to corresponding scope 3 categories, supplier categories, and industry sectors and is then multiplied by cradle-to-gate LCA emission factors for the sector to provide an estimated carbon emissions associated with the extraction, production and transport of purchased goods and services acquired or purchased by VMware in the reported year. Supplier spend activity that was already included in Scope 1 or 2 (such as electricity purchases from leased buildings) and other Scope 3 categories (such as upstream leased assets) that could be further defined to a GHG Protocol scope 3 category were removed from the Purchased Goods and Services category to prevent double counting. This may represent an under- or over- reporting of emissions in certain supplier categories and specific suppliers based on available spend data due to the nature of cost and accrual accounting.

We anticipate improving the methodology and availability data in the future which will impact our year-on-year reporting and trends over time.

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Explanation**

**Capital goods**

<table>
<thead>
<tr>
<th>Evaluation status</th>
<th></th>
</tr>
</thead>
</table>
Relevant, calculated

**Metric tonnes CO2e**

49,050

**Emissions calculation methodology**

VMware uses Environmentally Extended Economic Input Output (EEIO) lifecycle analysis (LCA) emissions factors to quantify the emissions associated with its annual supplier and procurement purchasing activity. Annualized spend data is mapped to corresponding scope 3 categories, supplier categories, and industry sectors and is then multiplied by cradle-to-gate LCA emission factors for the sector to provide an estimated carbon emissions associated with the extraction, production and transport of capital goods acquired or purchased by VMware in the reported year. We have elected to use this methodology over using a single generic emissions factor (EF) for ‘all’ capital goods as reported, to enable better visibility into specific capital good categories by spend and carbon impact. Supplier spend activity that was already included in Scope 1 or 2 (such as electricity consumption from owned IT hardware) and other Scope 3 categories (such as upstream leased assets) that could be further defined to a GHG Protocol scope 3 category were removed from the Capital Goods category to prevent double counting. This may represent an under- or over- reporting of emissions in certain supplier categories and specific suppliers based on available spend data due to the nature of cost and accrual accounting. We anticipate improving the methodology and availability data in the future which will impact our year-on-year reporting and trends over time.

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Explanation**

**Fuel-and-energy-related activities (not included in Scope 1 or 2)**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

18,841
Emissions calculation methodology
Emissions were calculated for fuel-and-energy-related activities (not included in Scope 1 or 2) by totaling activity data for each Scope 1 fuel type and electricity consumption by country. These totals were multiplied by their relevant specific emission factors from UK Defra / DECC 2018 Conversion Factors for Company Reporting.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Metric tonnes CO2e
3,408

Emissions calculation methodology
VMware uses Environmentally Extended Economic Input Output (EEIO) lifecycle analysis (LCA) emissions factors to quantify the emissions associated with its annual supplier & procurement purchasing activity. Annualized spend data is mapped to corresponding scope 3 categories, supplier categories, and industry sectors and is then multiplied by cradle-to-gate LCA emission factors for the sector to provide an estimated carbon emissions associated with the extraction, production and transport of capital goods acquired or purchased by VMware in the reported year. This may represent an under- or over-reporting of emissions in certain supplier categories and specific suppliers based on available spend data due to the nature of cost and accrual accounting. We anticipate improving the methodology and availability data in the future which will impact our year-on-year reporting and trends over time.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Waste generated in operations

Evaluation status
Relevant, calculated

Metric tonnes CO2e
306.72

Emissions calculation methodology
VMware uses the EPA's WARM methodology which assigns values to each material that gets, landfilled, recycled and composted, along with GHG Protocol's guidance on waste generated in operations to calculate the emissions associated with waste generated in our global operations.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
18

Explanation

Business travel

Evaluation status
Relevant, calculated

Metric tonnes CO2e
58,081

Emissions calculation methodology
Flight miles by trip is provided by the travel agent, American Express Global Business Travel. Based on the flight mileage, each flight is categorized as short or long haul to align with the DEFRA business travel emissions factors. The DEFRA EFs are then multiplied by the total miles to determine the carbon emissions.
Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Explanation

Employee commuting

Evaluation status
Relevant, calculated

Metric tonnes CO2e
42,653

Emissions calculation methodology
We estimated Scope 3 employee commute emissions using internal data. Our sample’s calculations included full-time, commuting only employees from Tier 1 and Tier 2 offices. FY18 survey data was used as proxy to reflect estimated geographical differences in distance traveled, and number of working days. Commuter mode is based on average mode split from the Americas and India per our transportation team. Estimate sample calculation includes vehicle and passenger miles and represents about 70% of global commuters. For the remaining 30% of commuting employees emissions calculations, we used vehicle miles and US average commute distance and working days. And for final emission calculations, we utilized EPA emissions factors Table 8. This number also includes emissions from employee vehicle leases, which are determined based on spend, and utilizing Environmentally Extended Economic Input Output (EEIO) lifecycle analysis (LCA) emissions factors to quantify the emissions.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Upstream leased assets
Evaluation status
  Relevant, calculated

Metric tonnes CO2e
  1,356

Emissions calculation methodology
VMware uses Environmentally Extended Economic Input Output (EEIO) lifecycle analysis (LCA) emissions factors to quantify the emissions associated with its annual supplier and procurement purchasing activity. Annualized spend data is mapped to corresponding scope 3 categories, supplier categories, and industry sectors and is then multiplied by cradle-to-gate LCA emission factors for the sector to provide an estimated carbon emissions associated with the extraction, production and transport of upstream leased assets acquired or purchased by VMware in the reported year. Supplier spend activity that was already included in Scope 1 or 2 (such as electricity consumption from colocation data centers) that could be further defined to a GHG Protocol scope 3 category were removed from the Upstream Leased Assets category to prevent double counting. This may represent an under- or over-reporting of emissions in certain supplier categories and specific suppliers based on available spend data due to the nature of cost and accrual accounting. We anticipate improving the methodology and availability data in the future which will impact our year-on-year reporting and trends over time.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Downstream transportation and distribution

Evaluation status
  Not relevant, explanation provided

Explanation
  VMware is part of the IT Service industry and does not produce a significant amount of physical products to transport or distribute.

Processing of sold products
Evaluation status
   Not relevant, explanation provided

Explanation
   VMware is part of the IT Service industry and does not produce a significant amount of physical products for sale for customer use.

Use of sold products

Evaluation status
   Not relevant, explanation provided

Explanation
   VMware is part of the IT Service industry and does not produce a significant amount of physical products for sale for customer use, nor do the products VMware sells produce a significant amount of direct emissions from their use phase.

End of life treatment of sold products

Evaluation status
   Not relevant, explanation provided

Explanation
   VMware is part of the IT Service industry and does not produce a significant amount of physical products for sale.

Downstream leased assets

Evaluation status
   Not relevant, explanation provided

Explanation
   VMware does not have significant leased spaces.

Franchises
C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?
C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.0000022

Metric numerator (Gross global combined Scope 1 and 2 emissions)

19,692

Metric denominator

unit total revenue

Metric denominator: Unit total

8,974,000,000

Scope 2 figure used

Market-based

% change from previous year

38

Direction of change

Decreased

Reason for change

The 38% decrease in our emissions intensity from last year is due to a number of emissions reduction activities, including energy-efficiency projects that were implemented across our global portfolio. We’re proud of the fact that we reduced our combined Scope 1 and 2 emissions
intensity by 38% in the past year. Additionally, we were able to experience 14% revenue growth compared to 2018. In 2018 we expanded our purchases of renewable energy in support of our carbon neutrality goal and attained 94% of energy consumption through renewables.

<table>
<thead>
<tr>
<th>Intensity figure</th>
<th>2.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric numerator (Gross global combined Scope 1 and 2 emissions)</td>
<td>71,978</td>
</tr>
<tr>
<td>Metric denominator</td>
<td>full time equivalent (FTE) employee</td>
</tr>
<tr>
<td>Metric denominator: Unit total</td>
<td>24,200</td>
</tr>
<tr>
<td>Scope 2 figure used</td>
<td>Location-based</td>
</tr>
<tr>
<td>% change from previous year</td>
<td>3.6</td>
</tr>
<tr>
<td>Direction of change</td>
<td>Increased</td>
</tr>
<tr>
<td>Reason for change</td>
<td>The 3.6% increase in our emissions intensity from last year is due to colocation related scope 2 emissions attributable to VMware reported for the first time. While we have implemented a number of emissions reduction activities, our overall scope 2 location-based emissions increased due to reporting of colocation emissions.</td>
</tr>
</tbody>
</table>
C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

<table>
<thead>
<tr>
<th>Greenhouse gas</th>
<th>Scope 1 emissions (metric tons of CO2e)</th>
<th>GWP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>2,906.8</td>
<td>IPCC Fifth Assessment Report (AR5 – 100 year)</td>
</tr>
<tr>
<td>CH4</td>
<td>6.4</td>
<td>IPCC Fifth Assessment Report (AR5 – 100 year)</td>
</tr>
<tr>
<td>N2O</td>
<td>1.3</td>
<td>IPCC Fifth Assessment Report (AR5 – 100 year)</td>
</tr>
<tr>
<td>HFCs</td>
<td>1,540</td>
<td>IPCC Fifth Assessment Report (AR5 – 100 year)</td>
</tr>
</tbody>
</table>

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Scope 1 emissions (metric tons CO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>3,130</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>51</td>
</tr>
<tr>
<td>United Kingdom of Great Britain and Northern Ireland</td>
<td>105</td>
</tr>
<tr>
<td>India</td>
<td>591</td>
</tr>
</tbody>
</table>
**C7.3**

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By activity

**C7.3c**

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Scope 1 emissions (metric tons CO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>2,504</td>
</tr>
<tr>
<td>Diesel</td>
<td>403</td>
</tr>
<tr>
<td>Fleet</td>
<td>8</td>
</tr>
<tr>
<td>Refrigerants</td>
<td>1,540</td>
</tr>
</tbody>
</table>

**C7.5**

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Scope 2, location-based (metric tons CO2e)</th>
<th>Scope 2, market-based (metric tons CO2e)</th>
<th>Purchased and consumed electricity, heat, steam or cooling (MWh)</th>
<th>Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>271.23</td>
<td>88</td>
<td>635.78</td>
<td>429.35</td>
</tr>
<tr>
<td>United States of America</td>
<td>39,474.1</td>
<td>9,375.1</td>
<td>99,485.59</td>
<td>99,485.59</td>
</tr>
<tr>
<td>Malaysia</td>
<td>56.7</td>
<td>0</td>
<td>87.12</td>
<td>87.12</td>
</tr>
<tr>
<td>Thailand</td>
<td>34.56</td>
<td>0</td>
<td>67.02</td>
<td>67.02</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>67.05</td>
<td>4.37</td>
<td>1,595.78</td>
<td>1,484</td>
</tr>
<tr>
<td>Armenia</td>
<td>44.07</td>
<td>0</td>
<td>399.86</td>
<td>399.86</td>
</tr>
<tr>
<td>Country</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td>Year 4</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>116.56</td>
<td>0</td>
<td>153.49</td>
<td>153.49</td>
</tr>
<tr>
<td>Netherlands</td>
<td>65.59</td>
<td>0</td>
<td>174.11</td>
<td>174.11</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>3.67</td>
<td>0</td>
<td>9.51</td>
<td>9.51</td>
</tr>
<tr>
<td>Sweden</td>
<td>5.62</td>
<td>0</td>
<td>129.58</td>
<td>129.58</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>65.54</td>
<td>65.54</td>
<td>127.85</td>
<td>0</td>
</tr>
<tr>
<td>Pakistan</td>
<td>5.57</td>
<td>5.57</td>
<td>12.11</td>
<td>0</td>
</tr>
<tr>
<td>Ireland</td>
<td>1,624.31</td>
<td>0</td>
<td>3,474.83</td>
<td>3,474.83</td>
</tr>
<tr>
<td>China</td>
<td>3,172.52</td>
<td>3,172.52</td>
<td>4,258.64</td>
<td>0</td>
</tr>
<tr>
<td>Poland</td>
<td>45.46</td>
<td>0</td>
<td>70.76</td>
<td>70.76</td>
</tr>
<tr>
<td>Brazil</td>
<td>9.23</td>
<td>9.23</td>
<td>139.09</td>
<td>0</td>
</tr>
<tr>
<td>Chile</td>
<td>8.43</td>
<td>0</td>
<td>22.49</td>
<td>22.49</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1,526.69</td>
<td>0</td>
<td>3,278.31</td>
<td>3,278.31</td>
</tr>
<tr>
<td>France</td>
<td>25.81</td>
<td>0</td>
<td>280.31</td>
<td>280.31</td>
</tr>
<tr>
<td>Argentina</td>
<td>36.62</td>
<td>0</td>
<td>102.42</td>
<td>102.42</td>
</tr>
<tr>
<td>Japan</td>
<td>832.03</td>
<td>832.03</td>
<td>1,995.65</td>
<td>0</td>
</tr>
<tr>
<td>United Kingdom of Great Britain and Northern Ireland</td>
<td>838.42</td>
<td>0</td>
<td>1,856.1</td>
<td>1,856.1</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>119.51</td>
<td>119.51</td>
<td>188.66</td>
<td>0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.13</td>
<td>0</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Spain</td>
<td>55.55</td>
<td>0</td>
<td>184.55</td>
<td>184.55</td>
</tr>
<tr>
<td>India</td>
<td>16,985.84</td>
<td>0</td>
<td>17,811.95</td>
<td>17,811.95</td>
</tr>
<tr>
<td>New Zealand</td>
<td>5.39</td>
<td>5.39</td>
<td>31.94</td>
<td>0</td>
</tr>
</tbody>
</table>
C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By activity

<table>
<thead>
<tr>
<th>Country</th>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
<th>Scope 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>7.99</td>
<td>7.99</td>
<td>39.74</td>
<td>0</td>
</tr>
<tr>
<td>Czechia</td>
<td>6.15</td>
<td>0</td>
<td>11.9</td>
<td>11.9</td>
</tr>
<tr>
<td>Turkey</td>
<td>37.98</td>
<td>0</td>
<td>78.77</td>
<td>78.77</td>
</tr>
<tr>
<td>Taiwan, Greater China</td>
<td>24.81</td>
<td>24.81</td>
<td>48.41</td>
<td>0</td>
</tr>
<tr>
<td>Denmark</td>
<td>12.66</td>
<td>0</td>
<td>41.52</td>
<td>41.52</td>
</tr>
<tr>
<td>Mexico</td>
<td>41.13</td>
<td>41.13</td>
<td>89.96</td>
<td>0</td>
</tr>
<tr>
<td>Italy</td>
<td>76.9</td>
<td>0</td>
<td>197.89</td>
<td>197.89</td>
</tr>
<tr>
<td>Israel</td>
<td>707.32</td>
<td>707.32</td>
<td>1,014.67</td>
<td>0</td>
</tr>
<tr>
<td>Australia</td>
<td>637.68</td>
<td>637.68</td>
<td>745.7</td>
<td>0</td>
</tr>
<tr>
<td>Germany</td>
<td>325.51</td>
<td>0</td>
<td>752.27</td>
<td>752.27</td>
</tr>
<tr>
<td>Austria</td>
<td>5.37</td>
<td>0</td>
<td>32.45</td>
<td>32.45</td>
</tr>
<tr>
<td>Portugal</td>
<td>3.42</td>
<td>0</td>
<td>9.23</td>
<td>9.23</td>
</tr>
<tr>
<td>Peru</td>
<td>0.96</td>
<td>0.96</td>
<td>4.04</td>
<td>0</td>
</tr>
<tr>
<td>Indonesia</td>
<td>16.17</td>
<td>16.17</td>
<td>21.62</td>
<td>0</td>
</tr>
<tr>
<td>Colombia</td>
<td>0.13</td>
<td>0.13</td>
<td>0.72</td>
<td>0</td>
</tr>
<tr>
<td>Philippines</td>
<td>7.48</td>
<td>7.48</td>
<td>15.57</td>
<td>0</td>
</tr>
<tr>
<td>South Africa</td>
<td>116.43</td>
<td>116.43</td>
<td>125.44</td>
<td>0</td>
</tr>
</tbody>
</table>
C7.6c

(C7.6c) Break down your total gross global Scope 2 emissions by business activity.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Scope 2, location-based emissions (metric tons CO2e)</th>
<th>Scope 2, market-based emissions (metric tons CO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>67,524</td>
<td>15,237</td>
</tr>
</tbody>
</table>

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Change in emissions (metric tons CO2e)</th>
<th>Direction of change</th>
<th>Emissions value (percentage)</th>
<th>Please explain calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in renewable energy consumption</td>
<td>8,215</td>
<td>Decreased</td>
<td>29</td>
<td>In 2018, we increased our overall consumption of renewable energy for our portfolio 17% - from 77% to 94% globally. The change in emissions is the reduction in our Scope 2 market-based emissions from 2017 to 2018. The Emissions value is the delta between our Scope 1 and 2 totals for 2017 and 2018, divided by 2017 Scopes 1 and 2. Scope 2 references are to our market-based figures.</td>
</tr>
<tr>
<td>Other emissions reduction activities</td>
<td>694.55</td>
<td>Decreased</td>
<td>2.5</td>
<td>The numerous and varied proactive emissions reductions activities VMware implemented at owned and leased facilities worldwide in 2018 resulted in significant energy savings and corresponding emissions avoidance of more than 695 MT</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divestment</td>
<td>VMware divested vCloudAir in 2017; however, this did not impact our carbon emissions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisitions</td>
<td>VMware acquired Heptio, CloudHealth Technologies, Inc., and VeloCloud in 2018; however, these did not impact our carbon emissions significantly.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mergers</td>
<td>There were no mergers that impacted our emissions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in output</td>
<td>There were no changes in output that impacted our emissions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in methodology</td>
<td>In 2017, we purchased energy instruments to progress toward 100% renewable energy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in boundary</td>
<td>There were no changes in boundary that impacted our emissions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in physical operating conditions</td>
<td>There were no changes in physical operating conditions that impacted our emissions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**C7.9b**

*(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?*

Market-based
C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?
  More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Indicate whether your organization undertakes this energy-related activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption of fuel (excluding feedstocks)</td>
<td>Yes</td>
</tr>
<tr>
<td>Consumption of purchased or acquired electricity</td>
<td>Yes</td>
</tr>
<tr>
<td>Consumption of purchased or acquired heat</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of purchased or acquired steam</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of purchased or acquired cooling</td>
<td>No</td>
</tr>
<tr>
<td>Generation of electricity, heat, steam, or cooling</td>
<td>No</td>
</tr>
</tbody>
</table>

C8.2a

(C8.2a) Report your organization’s energy consumption totals (excluding feedstocks) in MWh.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Heating value</th>
<th>MWh from renewable sources</th>
<th>MWh from non-renewable sources</th>
<th>Total MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption of fuel (excluding feedstock)</td>
<td>HHV (higher heating value)</td>
<td>0</td>
<td>15,374</td>
<td>15,374</td>
</tr>
</tbody>
</table>
C8.2b

(C8.2b) Select the applications of your organization’s consumption of fuel.

<table>
<thead>
<tr>
<th>Fuel Application</th>
<th>Indicate whether your organization undertakes this fuel application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption of fuel for the generation of electricity</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of fuel for the generation of heat</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of fuel for the generation of steam</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of fuel for the generation of cooling</td>
<td>No</td>
</tr>
<tr>
<td>Consumption of fuel for co-generation or tri-generation</td>
<td>No</td>
</tr>
</tbody>
</table>

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

<table>
<thead>
<tr>
<th>Fuels (excluding feedstocks)</th>
<th>Heating value</th>
<th>Total fuel MWh consumed by the organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>HHV (higher heating value)</td>
<td>13,787</td>
</tr>
</tbody>
</table>
Fuels (excluding feedstocks)
  Diesel

Heating value
  HHV (higher heating value)

Total fuel MWh consumed by the organization
  1,587

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Diesel

Emission factor
  10.36

Unit
  kg CO2e per gallon

Emission factor source
  2017 Climate Registry Default Emission Factors
Natural Gas

Emission factor
0.182

Unit
metric tons CO2e per MWh

Emission factor source
2017 Climate Registry Default Emission Factors

Comment

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor
Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

Low-carbon technology type
Solar PV

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
Emission factor (in units of metric tons CO2e per MWh)
0

Comment
VMware has on-site solar panels at our Palo Alto campus.

Basis for applying a low-carbon emission factor
Contract with suppliers or utilities (e.g. green tariff), supported by energy attribute certificates

Low-carbon technology type
Solar PV
Wind
Hydropower

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
85,350

Emission factor (in units of metric tons CO2e per MWh)
0

Comment
Our local utility providers in Palo Alto, California and Wenatchee, Washington, the City of Palo Alto Utilities and Douglas County PUD respectively, provide 100% clean electric power to our facilities in those locations. This is the total consumption for those two locations.

[Please note that in 2018 we updated our greenhouse gas inventory calculation methodology. As recommended by BSR’s Future of Internet Power initiative, we have separated out our colocated data center emissions related to scope 2 and added this figure to VMware’s total figures]
for market-based and location-based scope 2 emissions. Previously all colocated data center emissions were categorized as scope 3, but we believe this new methodology increases the accuracy and transparency of our reporting. We are unable to attribute these emissions to their specific locations of origin, but estimate that 90% of our colocated data center emissions originate in the United States. In question 7.5, we have therefore added 9,371.1 MT CO2e to both market-based and location-based totals for the United States to account for colocated data center emissions. Without colocated data center emissions, our scope 2 market-based emissions for the United States are 0.]

Basis for applying a low-carbon emission factor
- Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type
- Solar PV
- Wind

Region of consumption of low-carbon electricity, heat, steam or cooling
- Other, please specify
  - India, Europe, Asia, and US (outside of Palo Alto, CA and Wenatchee, WA)

MWh consumed associated with low-carbon electricity, heat, steam or cooling
- 46,257

Emission factor (in units of metric tons CO2e per MWh)
- 0

Comment
VMware purchased 30,000 MWh of 2018 US Green-e Energy certified Renewable Energy Certificates (RECs), 2324 MWh REGO and 9479 MWh EKOenergy Guarantees of Origin EACs in Europe. In addition to REGO we also have direct green tariff through Engie for Staines, London (Greater Britain) site. These energy instruments covered the entirety of the United States and European portfolio electricity consumption that was not already using renewable energy. 14,899 MWh of the US RECs were unapplied and 1,274 MWh of the REGOs were unapplied.

VMware also purchased 17,523 MWh of PowerPlus iRECs for India in addition to a wind power agreement for our South Bangalore sites.
13,498 MWh of the India PowerPlus iRECs were unapplied. We bought 2941 MWh of iRECs for Costa Rica, Brazil, Malaysia, Thailand, Singapore, Turkey, UAE, and Saudi Arabia. VMware invested in these energy instruments in alignment with our long-term strategy to support growth of US and European renewable energy infrastructure.

[Please note that in 2018 we updated our greenhouse gas inventory calculation methodology. As recommended by BSR’s Future of Internet Power initiative, we have separated out our colocated data center emissions related to scope 2 and added this figure to VMware’s total figures for market-based and location-based scope 2 emissions. Previously all colocated data center emissions were categorized as scope 3, but we believe this new methodology increases the accuracy and transparency of our reporting. We are unable to attribute these emissions to their specific locations of origin, but estimate that 90% of our colocated data center emissions originate in the United States. In question 7.5, we have therefore added 9,371.1 MT CO2e to both market-based and location-based totals for the United States to account for colocated data center emissions. Without colocated data center emissions, our scope 2 market-based emissions for the United States are 0.]

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

<table>
<thead>
<tr>
<th>Description</th>
<th>Metric value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metric numerator</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Metric denominator (intensity metric only)</th>
</tr>
</thead>
</table>
% change from previous year
1.7

**Direction of change**
Decreased

**Please explain**
Our waste diversion rate increased from 91% to 92.7% while we also increased our coverage to 52% of our sites globally. The 94% diversion rate is applicable to our Palo Alto location, which makes up 33.7% of our global real estate portfolio. We have maintained our high diversion rate in Palo Alto and are aiming to increase the diversion rate at our remaining sites by implementing best practices from Palo Alto. Please see VMware’s Global Impact Report for more information on our corporate sustainability goals.
Please explain
In 2019, for the fourth consecutive year, we commissioned IDC to complete a white paper including detailed calculations and a study on the impacts of VMware's virtualization products since 2003. The outcome of this research concluded that our customers have avoided over 665 million MT CO2e as a result of our products. We look forward to continuing this positive carbon impact through the deployment of other VMware solutions.


C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

<table>
<thead>
<tr>
<th>Scope</th>
<th>Verification/assurance status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope 1</td>
<td>Third-party verification or assurance process in place</td>
</tr>
<tr>
<td>Scope 2 (location-based or market-based)</td>
<td>Third-party verification or assurance process in place</td>
</tr>
<tr>
<td>Scope 3</td>
<td>Third-party verification or assurance process in place</td>
</tr>
</tbody>
</table>

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.
Scope
Scope 1

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement

VMWare 2018 CDP Verification Statement.pdf

Page/ section reference
Page 1

Relevant standard
Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)
100

Scope
Scope 2 location-based

Verification or assurance cycle in place
**Annual process**

**Status in the current reporting year**
- Complete

**Type of verification or assurance**
- Limited assurance

**Attach the statement**

[VMWare 2018 CDP Verification Statement.pdf](VMWare 2018 CDP Verification Statement.pdf)

**Page/section reference**
- Page 1

**Relevant standard**
- Attestation standards established by AICPA (AT105)

**Proportion of reported emissions verified (%)**
- 100

---

**Scope**
- Scope 2 market-based

**Verification or assurance cycle in place**
- Annual process

**Status in the current reporting year**
- Complete

**Type of verification or assurance**
Limited assurance

Attach the statement

VMWare 2018 CDP Verification Statement.pdf

Page/ section reference
Page 1

Relevant standard
Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope
Scope 3 - at least one applicable category

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Attach the statement
Attestation standards established by AICPA (AT105)

**C10.2**

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

**C10.2a**

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

<table>
<thead>
<tr>
<th>Disclosure module verification relates to</th>
<th>Data verified</th>
<th>Verification standard</th>
<th>Please explain</th>
</tr>
</thead>
<tbody>
<tr>
<td>C8. Energy</td>
<td>Other, please specify</td>
<td>Attestation standards established by AICPA (AT105)</td>
<td>In addition to having our carbon emissions assured by Bureau Veritas, they assured VMware’s business travel Scope 3 emissions. Details can be found in the attached letter.</td>
</tr>
<tr>
<td>C9. Additional metrics</td>
<td>Other, please specify</td>
<td>Commissioned study by IDC</td>
<td>VMware sponsored a white paper in 2019 with IDC to quantify the estimated carbon avoided through the use of our products. Please see the August 2019 IDC White Paper, sponsored by VMware, entitled “Exploring the Impact of Infrastructure Virtualization on Digital Transformation Strategies and Carbon Emissions,” which can</td>
</tr>
</tbody>
</table>
C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

No, and we do not anticipate being regulated in the next three years

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

- Credit purchase

Project type

- Energy distribution

Project identification
The Harapanahalli Wind Power Project located in the Davangere District of Karnataka, India, delivers approximately 81,000 MWh of zero emissions renewable electricity to India’s national grid each year. This plays a key role in achieving the country’s 2022 green power targets, while enhancing the local economy and livelihood of residents through the creation of jobs. The project is validated and verified to the Verified Carbon Standard (VCS), and is registered with the Clean Development Mechanism (CDM). VMware has purchased 31,621 metric tonnes CO2e from the Harapanahalli Wind Power Project to support Carbon Neutral® company certification and 900 metric tonnes CO2e for LEED Project 1000107537 in Bangalore India.

The project is in a rural area and the wind farm contributes to the local economy and livelihood of residents through the creation of jobs for both full time operational roles as well as temporary positions required for planning and construction. The project improves overall local air quality as it does not incur the environmental pollution or solid waste problems associates with fossil fuel power plants. Additionally, consumption of large quantities of water required for generation of electricity in the current mix of power plants is avoided. Wind power contributes increased energy security and economic well-being as dependence on imported fossil fuels and the associated price variations is reduced.

This project supports the following Sustainable Development Goals (SDGs): SDG 6 Clean Water and Sanitation SDG 7 Affordable and Clean Energy SDG 8 Decent Work and Economic Growth SDG 9 Industry Innovation and Infrastructure SDG 13 Climate Action.

**Verified to which standard**

VCS (Verified Carbon Standard)

**Number of credits (metric tonnes CO2e)**

32,521

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

32,521

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting
Credit origination or credit purchase
Credit purchase

Project type
Energy efficiency: households

Project identification
Improved Cookstoves Household air pollution is a serious public health concern in India and is attributable to around 5% of India’s national burden of disease risk (higher for women and children). This Gold Standard project is enabling households to significantly reduce health risks and fuel costs through the distribution of more efficient biomass cookstoves. Additionally, the manufacturing, sales and distribution of the stoves has increased employment and the sale of the efficient cookstove is subsidised to help households who are unable to afford the upfront costs. VMware has purchased 3,250 metric tonnes CO2e from the India Improved Cookstove project to support CarbonNeutral® company certification.

India uses the greatest amount of fuel wood of any country in the world. This project enables households to significantly reduce health risks and fuel costs through the distribution of more efficient biomass cookstoves. Additionally, the manufacturing, sales and distribution of the stoves has increased employment, with subsidies available to help households who are unable to afford the upfront costs.

This project supports the following Sustainable Development Goals (SDGs): SDG 1 No Poverty SDG 3 Good Health and Well-being SDG 5 Gender Equality SDG 7 Affordable and Clean Energy SDG 8 Decent Work and Economic Growth SDG 13 Climate Action SDG 15 Life on Land.

Verified to which standard
Gold Standard

Number of credits (metric tonnes CO2e)
3,250

Number of credits (metric tonnes CO2e): Risk adjusted volume
3,250

Credits cancelled
Yes

**Purpose, e.g. compliance**
Voluntary Offsetting

**Credit origination or credit purchase**
Credit purchase

**Project type**
Other, please specify
Household devices, water

**Project identification**
Water-borne disease has been identified as a national priority in Guatemala given the high incidence of diarrheal disease and chronic malnutrition. The Guatemala Water Filtration and Improved Cookstoves project distributes water filters and stoves that enable access to clean water and improve cooking conditions by increasing fuel efficiency and reducing harmful indoor air pollution. It is the first Gold Standard water treatment or cookstove project in the country. The project is currently is Alta Verapaz, Huehuetenango and San Marcos departments and has so far benefited over 230,000 people.

The water filter uses a gravity-fed ceramic filter made of clay, sawdust, colloidal silver and carbon to treat two litres of non-potable water per hour. It removes 99% of pathogens, making it safer for drinking and cooking by reducing water-borne disease and also reduces the need for fuelwood, consequently decreasing indoor air pollution. The distributed improved cookstove burn biomass fuel cleanly and efficiently which contributes to a reduction of indoor air pollution that families, particularly women, are exposed to.

The water filters and improved cookstoves are sold to households by Ecofiltro and a local NGO, Socorro Maya. Carbon finance enables them to be made more affordable to low-income households with an 18-month payment plan that allows households to access interest-free loans. There is no upfront cost and families can begin to save on fuelwood (and the associated costs) immediately. The average household that uses an improved cookstove will reduce its biomass use by an estimated 65% which equates to 1,700kg each year. Given that 49% of households that use biomass purchase the wood, we estimate that the average family makes fuel savings of US $35 per year. VMware has purchased 45,000
metric tonnes CO2e from the Guatemala Water Filtration and Improved Cookstoves project to support CarbonNeutral® company certification.

This project supports the following Sustainable Development Goals (SDGs): SDG 1 No Poverty SDG 3 Good Health and Well-being SDG 5 Gender Equality SDG 6 Clean Water and Sanitation SDG 7 Affordable and Clean Energy SDG 8 Decent Work and Economic Growth SDG 10 Reduced Inequalities SDG 12 Responsible Consumption and Production SDG 13 Climate Action SDG 15 Life on Land.

**Verified to which standard**
Gold Standard

**Number of credits (metric tonnes CO2e)**
45,000

**Number of credits (metric tonnes CO2e): Risk adjusted volume**
45,000

**Credits cancelled**
Yes

**Purpose, e.g. compliance**
Voluntary Offsetting

**C11.3**

(C11.3) Does your organization use an internal price on carbon?

No, but we anticipate doing so in the next two years
C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
   Yes, our suppliers
   Yes, our customers

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
   Information collection (understanding supplier behavior)

Details of engagement
   Collect climate change and carbon information at least annually from suppliers

% of suppliers by number
   6

% total procurement spend (direct and indirect)
   26

% Scope 3 emissions as reported in C6.5

Rationale for the coverage of your engagement
2018 was our first year working with the CDP Supply Chain platform. We have developed a plan to receive CDP responses from the suppliers who make up at least 50% of our annual spend by 2020. In 2018 we identified the subset of suppliers who make up 26% of our spend to request disclosure and in 2019 we are reaching out to 200 suppliers through CDP Supply Chain platform.

Impact of engagement, including measures of success
2018 was the first year that we utilized the CDP Supply Chain platform to gather this data from our suppliers. Through this platform, we learned that our suppliers are highly capable and understand the need for emissions reductions. We received responses from 95% of the suppliers we engaged, and gleaned valuable insight into the climate-related activities being pursued by a number them. For example, 86% of suppliers reported active climate targets, while 5 had approved science-based targets (SBTs), 4 were committed to SBTs, and 11 more anticipated setting SBTs within 2 years. Empowered by the knowledge that our supplier base has a mature sustainability strategy, we are taking next steps to embed aggressive emissions reduction practices across our supply chain and we are in the process of evaluating a scope 3 target. We will continue to measure the success of our supplier engagement through our CDP Supply Chain response rate, and other metrics.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement
Education/information sharing

Details of engagement
Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

% of customers by number
100

% Scope 3 emissions as reported in C6.5
Please explain the rationale for selecting this group of customers and scope of engagement

VMware’s products have supported our 500+ customers in reducing their carbon footprints for the last 15 years. We offer information on customer emissions reductions on the Sustainability page of our website, including interactive resources like a carbon calculator to enable our customers to easily assess their environmental impact. This year, we sponsored our 4th consecutive report from IDC that quantifies the cumulative positive carbon impact of our products for our customers. VMware’s infrastructure virtualization solution — which encompasses compute (server), storage, networking, and management capabilities — forms the underpinning of modern data center infrastructure. It enables firms to gain data center-wide and IT-wide efficiencies as well as establish metrics to track and ultimately curb carbon emissions resulting from IT infrastructure growth. Please see our August 2019 IDC White Paper is entitled “Exploring the Impact of Infrastructure Virtualization on Digital Transformation Strategies and Carbon Emissions,” which can be found at: https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/company/vmware-exploring-impact-of-infrastructure-virtualization-on-digital-transformation-strategies-and-carbon-emissions-whitepaper.pdf.

Impact of engagement, including measures of success

We measure the success of our customer education efforts around the climate change impacts of data center products by measuring avoided greenhouse gas emissions during product use phase. Since 2003, VMware’s products have avoided over 665 million MT CO2e for our customers. In 2018 alone, the emissions avoidance associated with customers using our products was 91 million MT CO2e. We also share product impact data at our annual user conference, VMworld, which is held in both the United States (“U.S.”) and Europe, while our vForum events are held in the Asia Pacific and Japan region.

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

% of customers by number

28
% Scope 3 emissions as reported in C6.5

Please explain the rationale for selecting this group of customers and scope of engagement

We have many opportunities to engage with our customers and actively seek their input and requirements. We specifically engage in annual or bi-annual Customer Advisory Councils across each region of our business and feedback is incorporated into our product roadmaps, where applicable. We have experienced a significant increase in engagement with our customers regarding our environmental and corporate social responsibility (CSR) performance over the last year. We currently have 30 customers on the EcoVadis platform. In early 2018, we improved our EcoVadis assessment score from a Silver to a Gold level. This effort is to support our customers in providing them with a holistic view of our sustainability efforts through transparency and third-party review, and to empower us with an efficient response process. We prioritize responding to our customer's annual questionnaires, as well as ad-hoc queries aiming to be as responsive as possible on these issues and concerns. We have a global team that includes members from our field support, sustainability and compliance groups that is responsible for responding to customer environmental, social and CSR questions.

Globally, more than 569 companies have committed to setting science-based targets for emissions reductions. We realize that more than 94% of those are our customers. We are working with the field sales teams to help these customers in their digital transformation journeys through deeper penetration of our technologies. We deploy and test products in our own IT environments and then share the learnings, business & sustainability benefits with our customers.

Impact of engagement, including measures of success

As a measure of success, we have received positive confirmation from our customers upon review of our data and to date, they have all been satisfied with our responses. As another example of engagement, in the past, VMware has been an active pioneer in working with utility companies to offer incentive programs supporting virtualization projects in data centers. VMware worked with utilities across North America including Pacific Gas and Electric, Southern California Edison, SDGandE, BC Hydro and Austin Energy to provide customer incentives based on the amount of energy savings achieved through data center consolidation. Additionally, we have a customer advocacy team that engages regularly through a Net Promoter Score (NPS) survey.
C12.3

Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?
- Direct engagement with policy makers
- Trade associations
- Other

C12.3a

On what issues have you been engaging directly with policy makers?

<table>
<thead>
<tr>
<th>Focus of legislation</th>
<th>Corporate position</th>
<th>Details of engagement</th>
<th>Proposed legislative solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency</td>
<td>Support</td>
<td>Given that VMware's headquarters are located in Palo Alto we are actively engaged with the City of Palo Alto as a committee member of its Sustainability Climate Action Plan. This committee includes other corporate participants, as well as local residents, and it provides insights and guidance on the City's plan to reduce its carbon emissions by way of encouraging electrification, facilitating mass transit and providing 100% green power. The committee meets regularly throughout the year and VMware is represented by its Sustainability Manager. (VMware's headquarters are in Palo Alto and it has forged strong relationships with the City, Stanford University and its Stanford Research Park neighbors.)</td>
<td>Palo Alto's Climate Action Plan informs many of the initiatives that are implemented by the City for its residents and businesses. It also informs how the City runs its operations and has driven numerous sustainability practices internally, including procurement of goods and services. The goal is to embed the plan as much as possible within the City's processes, in order to create efficiencies and achieve its climate goals. On opening day—Nov. 1, 2018 of VMware’s New Discovery center and to celebrate this vision of innovation and sustainability, we also had the honor of hosting Palo Alto Mayor Liz Kniss and Congresswoman Anna Eshoo. These leaders spoke about the importance of public-private partnerships at the local, state and federal levels to innovate</td>
</tr>
</tbody>
</table>
ways for society to become more sustainable and resilient.

<table>
<thead>
<tr>
<th>Other, please specify Energy Infrastructure</th>
<th>Support</th>
<th>VMware supports and actively participates in policy academies with the National Governors Association (NGA) Center for Best Practices Resource Center on Cyber Security.</th>
<th>The NGA works with Governors across the country to assist states in developing responsible policies and state legislation to enhance the cybersecurity of state energy systems and infrastructure. The NGA recognizes that a cyber-attack on the systems that run water treatment facilities, and electrical and nuclear power plants, can have significant negative environmental consequences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency</td>
<td>Support</td>
<td>VMware has supported H.R. 306, Efficient Government Technology Act, and continues to work with Congresswoman, Rep. Anna Eshoo and her staff to advocate for its passage in the House and Senate.</td>
<td>Our Palo Alto Congresswoman, Rep. Anna Eshoo (D-CA), introduced H.R. 306, Efficient Government Technology Act, which requires the Department of Energy to update its 2007 baseline for energy efficiency at data centers, with an eye to making new data centers operate with less expenditure of power -- and by extension fewer costs. The legislation also tasks agencies with collaborating with DOE, the Office of Management and Budget (OMB) and the Environmental Protection Agency to come up with ways of measuring and verifying energy saving methods to make data centers operate with less energy. OMB would have to report on agency progress. Additionally, OMB would establish a program to certify tech workers in the evaluation and management of energy usage for the purpose of tracking data center efficiency. Stats: The federal government could realize $5 billion in energy savings over seven years with more efficient use of data centers, according to a 2013 report from the Center for Climate and Energy Solutions. The Department of Energy estimates that implementation of best practices alone could reduce the government’s data center...</td>
</tr>
</tbody>
</table>
energy bill by 20 to 40 percent. With investments in the latest technologies, experts estimate that most data centers could slash their energy use by 80 to 90 percent. Bill Status: On March 14, 2016, the House of Representatives passed the Energy Efficient Government Technology Act, designed to make federal data centers use energy more efficiently. The Senate will now need to act before the bill becomes law. The legislation is included as a subsection of the Senate Energy Bill (Energy Policy Modernization Act), currently being considered in the Senate.

Other, please specify IT Modernization Support

Other = IT Modernization: VMware supported through its trade association memberships the MGT Act which was adopted into law in December 2017.

The Modernizing Government Technology (MGT) Act of 2016 is working to reform the way the Federal Government funds and modernizes IT solutions and keeps pace with innovations, such as virtualization, and cloud computing that can positively impact the environment.

**C12.3b**

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

**C12.3c**

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

---

**Trade association**

IT Alliance for Public Sector
Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association’s position
IT Alliance for Public Sector (ITAPS) is an organization formed to engage with policymakers across the country with an aim to educate government leaders on the importance of the growing technology industry and to promote a technology-led innovation ecosystem. Additionally, the organization advocates for modernization of the Federal IT infrastructure and national standards for the Internet of Things (IoT) adoption.

How have you influenced, or are you attempting to influence their position?
VMware participates in the executive policy committees that set the policy strategy for the year at both the Federal and State levels with our VP of Public Sector on the Board at the Federal level. ITAPS’ priorities include supporting and advancing policies for clean energy technologies and R&D as well as responsible stewardship for natural resources and the environment. VMware supports policy efforts to promote the adoption of internet-enabled devices and the Internet of Things (IoT). IoT adoption has the potential to greatly impact climate change. According to ITAPS, by connecting on an individual level our home appliances and thermostats, and scaling that across multiple communities, the IoT can cut nine gigatons of carbon emissions by 2020 (a 19% reduction in our emissions).

Trade association
The Information Technology Industry Council

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association’s position
Information Technology Industry Council (ITI) and its members seek to continuously improve the energy efficiency landscape in the US and globally to leverage energy-efficient technologies. ITI works on behalf of its member companies to advocate for policies that advance both intelligent efficiency and product efficiency.

How have you influenced, or are you attempting to influence their position?
VMware’s VP of Global Government Relations sits on the Executive Committee of ITI and influences ITI’s policy positions. ITI and its member companies understand that we have a major stake in the fight against climate change. VMware supports the three strategic commitments ITI
has made in this regard. ITI also supports government policies that emphasize an innovation agenda for mitigating and adapting our changing climate. On energy efficiency, ITI unites the tech sector and the NGO community to advance policies that drive sustainable economic growth through technology-enabled energy and product efficiency innovation. ITI works proactively with the Environmental Protection Agency as an active partner in and advisor to the ENERGY STAR program, their activities in Europe in coordination with Digital Europe, their work in China in coordination with USITO and their policy efforts elsewhere in Asia, Latin America, Africa, and the Middle East. It also participates actively in energy efficiency efforts within the G-20, the Asia Pacific Economic Cooperation (APEC) forum, the United Nations, and other international venues.

Trade association
TechNet

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association’s position
TechNet supports policies that are technology-neutral and that foster and promote a climate for innovation in clean energy supply and demand. TechNet’s state clean energy priorities include advocacy and support around the following policy areas:
• Demand Response (DR)
• Distributed Energy Resources (DER)
• Energy Efficiency Standards
• Resilient Energy Supply
• Clean Energy Standards, Renewable Portfolio Standards, and Renewable Fuel Standards
• Grid Modernization
• Retail Energy Competition and Self-Supply
• Grid and Customer Data Access and Transparency
• Electrification of Transportation
• Clean Energy Supply
• Microgrids
• Demand Charges
How have you influenced, or are you attempting to influence their position?
VMware’s State and Local Government Relations team participate in regional discussions and decisions about which state legislation TechNet should support. This includes contemplation of policies that support a robust, technology-neutral energy agenda that will spur the development and the deployment of clean energy resources; the implementation of policies that support customer choice for clean energy technologies; policies and programs that recognize the importance of resiliency in the face of security threats, natural disasters, and the need for uninterrupted energy supplies; and understanding that clean energy and resilient energy are not mutually exclusive, TechNet will seek to advance the focus on the intersection of sustainable energy and resilient energy.

Trade association
The United States Information Technology Office (USITO)

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association’s position
The United States Information Technology Office (USITO) is an independent, non-profit, membership-based trade association, representing the US information communication technologies (ICT) industry in China.

How have you influenced, or are you attempting to influence their position?
VMware’s VP of VMware Labs, Greater China was invited by the USITO to speak at the Consumer Electronics Show (CES) Asia on challenging national, regional and customer requirements for environmental issues as well as how sustainability concerns and the emergence of better technologies is converging to change the industry.

C12.3e

(C12.3e) Provide details of the other engagement activities that you undertake.
VMware is an active member of the Stanford Research Park Advisory Council. We are integrally involved in the Park and the City of Palo Alto’s transportation initiative and our Senior Director of Real Estate & Workplace serves on the Council. Stanford Research Park employers and tenants collaborate to solve transportation issues that affect them, as well as the residents of our neighboring communities. Transportation is a key issue for the
City of Palo Alto when it comes to meeting its Climate Action Plan goals.

VMware is a member of Digital Europe and its Digital Sustainability Policy Group (DSPG) which aims to be the trusted and preferred partner for environmental policy makers, reaching out for constructive discussion with other stakeholders. It advocates the integration of environmental considerations at the stage of product design with the aim of reducing all relevant potential environmental impacts over its entire life cycle. DSPG aims to demonstrate leadership in this area helping to support other industries through advancement in electronics, software applications, and services.

The digital technology industry is committed to meeting the challenge of a material and energy-efficient Europe. Our industry helps citizens and commerce to move to a more sustainable society and efficient use and reuse of the materials in our products. The industry promotes the use of recyclable and recycled materials and will design products and services to be renewable, recoverable, or recyclable without compromising their ability to meet our customer’s demands. It therefore contributes to a sustainable and competitive economy.

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

VMware has established a tiered governance structure that consists of a Sustainability Technical Council and an Executive Sustainability Advisory Group.

The Technical Council includes various representation within the Office of the CTO and Products and Cloud Services Business Unit. This Technical Council meets quarterly with the VP of Sustainability Strategy to provide insights, share ideas and drive cross-company sustainability initiatives. The goal of the Council is to drive sustainability into our engineering processes and to collaborate on assessing the environmental impacts of our products. The Executive Sustainability Advisory Group includes key internal stakeholders whose role it is to review and guide our sustainability strategy, reporting, and corporate sustainability goals.

The Executive Sustainability Advisory Group includes the following stakeholders:
• Chief People Officer
• Chief Technology Officer
• Chief Communications Officer
• VP, Global Government Relations and Public Policy
With regard to policy, all of our policy engagement activities are coordinated through our VP of Global Government Relations and Public Policy who is on the Executive Sustainability Advisory Group. Given that our core business drives energy efficiency, these groups are not at odds when it comes to supporting appropriate climate or energy-related legislation.

**C12.4**

*(C12.4) Have you published information about your organization’s response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).*

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**Publication**

In voluntary communications

**Status**

Underway – previous year attached

**Attach the document**


**Page/Section reference**

Pages 13-15, 20

**Content elements**

Strategy
Risks & opportunities
C14. Signoff

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

Please note that in 2018 we updated our greenhouse gas inventory calculation methodology. As recommended by BSR’s Future of Internet Power initiative, we have separated out our colocated data center emissions related to scope 2 and added this figure to VMware’s total figures for market-based and location-based scope 2 emissions. Previously all colocated data center emissions were categorized as scope 3, but we believe this new methodology increases the accuracy and transparency of our reporting. We are unable to attribute these emissions to their specific locations of origin, but estimate that 90% of our colocated data center emissions originate in the United States. In question 7.5, we have therefore added 9,371.1 MT CO2e to both market-based and location-based totals for the United States to account for colocated data center emissions. Without colocated data center emissions, our scope 2 market-based emissions for the United States are 0.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

<table>
<thead>
<tr>
<th>Row 1</th>
<th>Job title</th>
<th>Corresponding job category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CFO</td>
<td>Chief Financial Officer (CFO)</td>
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