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Building a better working world

Independent Accountants' Review Report

To the Management of Verizon Communications, Inc.:

We have reviewed scope 1, scope 2 and scope 3 (exclusively related to corporate business travel) greenhouse gas emissions, carbon intensity and water consumption (the "Subject Matter") for Verizon Communications, Inc. ("Verizon") included in the accompanying schedule (the "Schedule") for the year ended December 31, 2018 in accordance with Verizon's criteria (the "Criteria") as set forth in the Schedule. Verizon's management is responsible for the Subject Matter included in the Schedule in accordance with the Criteria. Our responsibility is to express a conclusion on the Subject Matter based on our review.

Our review was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, *Concepts Common to All Attestation Engagements*, and AT-C section 210, *Review Engagements*. Those standards require that we plan and perform our review to obtain limited assurance about whether any material modifications should be made to the Subject Matter in order for it to be in accordance with the Criteria. A review consists principally of applying analytical procedures, making inquiries of persons responsible for the subject matter, obtaining an understanding of the data management systems and processes used to generate, aggregate and report the Subject Matter and performing such other procedures as we considered necessary in the circumstances. A review is substantially less in scope than an examination, the objective of which is to obtain reasonable assurance about whether the Subject Matter is in accordance with the Criteria, in all material respects, in order to express an opinion. Accordingly, we do not express such an opinion. A review also does not provide assurance that we became aware of all significant matters that would be disclosed in an examination. We believe that our review provides a reasonable basis for our conclusion.

In performing our review, we have also complied with the independence and other ethical requirements set forth in the Code of Professional Conduct and applied the Statements on Quality Control Standards established by the AICPA.

As described in the Schedule, the Subject Matter is subject to measurement uncertainties resulting from limitations inherent in the nature and the methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary.

Based on our review, we are not aware of any material modifications that should be made to the scope 1, scope 2 and scope 3 (exclusively related to corporate business travel) greenhouse gas emissions, carbon intensity and water consumption for the year ended December 31, 2018 in order for it to be in accordance with the Criteria.

Ernst & Young LLP

August 21, 2019

Verizon Communications, Inc.

Schedule of scope 1, 2, and 3 greenhouse gas (GHG) emissions, carbon intensity and water consumption

For year ended December 31, 2018

Final Results

Indicator Name	Unit	Amount
Scope 1 emissions	Metric tonnes (MT) of CO2e	385,241
Scope 2 emissions	Metric tonnes (MT) of CO2e	4,033,579
Scope 3 emissions (exclusively related to corporate business travel)	Metric tonnes (MT) of CO2e	98,188
Carbon Intensity	Metric tonnes of CO2 equivalent per terabytes (TB)	0.02792
Water consumption	Billions of gallons	2.30

Emissions Reporting

Criteria for GHG emissions

1. Scope 1 emissions reported include direct emissions from stationary and mobile fuel combustion from the follow sources:

• Natural gas	• B02
• Gasoline	• B05
• Diesel	• B11
• Jet Fuel	• B20
• Propane	• E85
• Kerosene	• Methanol
• Compressed natural gas	• Ethanol

   For all fuels, except natural gas and ethanol, only CO2 emissions are reported.

2. Scope 2 emissions reported on the location-based method include indirect emissions from the following sources and are calculated on the basis of actual (e.g., metered) and estimated data.

• Electricity	• Steam

3. Scope 3 emissions reported include exclusively emissions from corporate business travel (air and rail) and are calculated based on miles traveled as provided by travel agencies to a third-party data aggregator which then provides total miles traveled to Verizon.

   Air travel distance categorizations are determined using miles traveled data of which 73% is calculated based on individual travel leg with the remaining 27% calculated based on origin and destination.

   Miles traveled are based on original bookings, excluding exchanges. These impacts have been determined to be immaterial to overall corporate business travel emissions. Travel booked outside of our approved vendors are not included.

Emissions Reporting Standards

Verizon calculates scope 1, scope 2 and scope 3 (exclusively related to corporate business travel) GHG based on the following standards:

- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard Revised Edition by the World Resources Institute (WRI)/World Business Council for Sustainable Development (WBCSD)
- GHG Protocol Scope 2 Guidance: An amendment to the GHG Protocol Corporate Standard by WRI
- The Corporate Value Chain (scope 3) Accounting and Reporting Standard: Supplement to the GHG Protocol Corporate Accounting Standard, by the WRI/WBCSD
- Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007)
- The Climate Registry General Reporting Protocol, Version 2.0, March 2013
- UK Department for Environment Food & Rural Affairs (DEFRA) 2012 guidance (used for air travel distance categorizations)

Table 1 - Emission Factors Used

	Emission factors
Scope 1 emissions	• US EPA 2013 Revisions to the Greenhouse Gas Reporting Rule: 40 CFR Part 98 Subpart C, Tables C-1 and C-2 (released November 29, 2013) • US Energy Information Agency (EIA) Voluntary Reporting of Greenhouse Gases Form EIA-1605, Appendix H: Fuel Emissions Factors (November 18, 2010) • WRI GHG Protocol Emission Factor from Cross Sector Tools (March 2017) Stationary Combustion, Table 1-3 and Table 12
Scope 2 emissions	• US EPA 2012 Emissions and Generation Resource Integrated Database (eGRID) (released October 5, 2015) • International Energy Agency (IEA) 2013 CO2 Emissions from Fuel Combustion Highlights Report, “CO2 emissions per kWh from electricity generation” Table (released 2017) • US Energy Information Agency (EIA) Voluntary Reporting of Greenhouse Gases Form EIA-1605, Appendix F.1 Domestic Electricity Emission factors, 1999-2002 and Appendix N: Emission Factors for Steam and Chilled/Hot Water (November 18, 2010)
Scope 3 emissions (exclusively related to corporate business travel)	• UK Department for Environment Food & Rural Affairs (DEFRA) 2013 GHG conversion factors for company reporting

Criteria for Carbon Intensity Reporting

Verizon's carbon intensity metric is calculated as scope 1 and 2 greenhouse gas (GHG) emissions measured in metric tonnes (MT) of CO2e per terabytes (TB) of data traffic.

Verizon measures and defines network data as noted in table 2 below. Where possible, Verizon uses actual network data throughput, in the event that actual data is unavailable, some network data might be extrapolated based on historical data, seasonality, expected growth or other business changes.

Table 2– Terabytes of data traffic estimation methodologies by network

Business Segment	Network	Methodology
Wireless	EVDO + 1X PMD: These are the 3G mobile broadband technologies used by Verizon.	Data traffic is measured in megabytes (MB) for downlink (forward) and uplink (reverse) traffic across Verizon's Evolution Data Optimized (EVDO) and 1X Packet Mode Data (PMD) networks. MB are converted into total terabytes (TB) by using the binary conversion factor (1TB = 1024^2 MB).
Wireless	Voice	Voice traffic is measured in centum call seconds (CCS) across Verizon's wireless network. CCS is a unit of traffic density that is equivalent to one call (including call attempts and holding time) in a specific channel for 100 seconds. CCS are converted into minutes of usage (MOUs) by dividing total CCS by 0.6 (1CCS = 1.66 pegs/min). MOUs are converted into bits by multiplying MOUs by 14,256 bits per second (bps) and then multiplying by 60 seconds per minute. A wireless voice call generates 9,600 bps and it is assumed that the activity factor is 90% (0.45 uplink and 0.45 downlink) and the hand-off factor is 1.65 (9,600 bps * 90% * 1.65 = 14,256 bps). Bits are converted into bytes by dividing by 8 (bits/byte) and then to total terabytes (TB) by using the binary conversion factor (1TB = 1024^4 bytes).
Wireless	Long-term evolution: This is the high speed 4G network.	Data traffic is measured in megabytes for downlink (forward) and uplink (reverse) data traffic across Verizon's 4G LTE network. MB are converted into total TB by using the binary conversion factor (1TB = 1024^2 MB).
Wireless	5G Fixed	Data traffic is measured in megabytes for downlink (forward) and uplink (reverse) data traffic across Verizon's 5G Fixed Wireless network. MB are converted into total TB by using the binary conversion factor (1TB = 1024^2 MB).

Business Segment	Network	Methodology
Wireline Telecom	Transport: This network consists primarily of point to point data transport services sold to small and medium businesses, large corporations, government or individual customers in the US (In Franchise = Verizon Network)	Data traffic was measured in bps by multiplying the monthly billed circuit counts by standard bandwidth rates per circuit type. 100% utilization over each circuit was assumed. The circuits included are the following: ISDN-PRI (Integrated services digital network - Primary rate interface), DS1, DS3, OC3, OC12, OC48, OC192 SONET (synchronous optical networking) and VON_10M_100M_Gain. Bits per second are converted into total TB by using the binary conversion factor (1TB =1024^4 bytes).
Wireline Telecom	Switched Ethernet Service (SES): This network includes metropolitan Ethernet data services in the US.	Data traffic is measured in bytes per second (Bps) for all egress (output) data transferred from aggregation switches (AS) to edge switches (ES), aggregation switches to OLT-SNI (Optical line termination – service node interface) ports and aggregation switches to customer circuits (CC). Data traffic is collected daily by polling each interface on all AS devices in this network. The Bps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).
Wireline Telecom	Video- Broadcast: This network includes video broadcasts through FiOS cable services in the US.	Data traffic is measured in megabits per second (Mbps) for all egress data transferred across all broadband multiplex routers (BMRs). Data traffic is collected daily by polling directly all BMR ports. On a monthly basis, average monthly data traffic per device is estimated by adding daily traffic captured for the entire month and dividing it by the number of days for which data was collected in that given month. Then the averages for each device are summed at month-end and multiplied by total number of days in that given month to obtain total traffic (in Mbps). The Mbps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).
Wireline Telecom	Video on Demand (VOD): This network includes video streaming services (pay per view, subscription or free) available only to FiOS Video customers in the US.	Data traffic is measured in megabits per second (Mbps) for average ingress (input) data received at the video aggregation routers (VAR) from the video distribution routers (VDR). Data traffic is collected daily by sample polling each interface on all VAR devices connected to a VDR every five minutes. The Mbps are converted into TB by using the binary conversion factor (1TB = 1024^4 bytes).

Business Segment	Network	Methodology
Wireline Telecom	Frame Relay (FR), Asynchronous Transfer Mode (ATM): This network provides local DSL (digital subscriber line) services in the US.	Data traffic is measured in cell counts for all egress data transferred across the FR/ATM switches. Cells are of a fixed length of 53 octets (or bytes). Cell counts are converted into bytes by multiplying cell counts by 53 octets (or bytes). Bytes are converted into TB by using the binary conversion factor (1TB = 1024^4 bytes).
Wireline Telecom	Voice: This network includes legacy Voice services provided by Verizon.	Data traffic is measured in minutes of usage (MOUs) for calls originating in Verizon's Telecom network (VZT), transit calls that do not originate or terminate on the VZT network, and calls terminating on the VZT network that originated outside the VZT network. MOUs are captured hourly through all US class 5 and 4/5 access switches. The voice channels transporting this data have a maximum circuit capacity (or bandwidth rate) of 64,000 bps. MOUs are converted into bps by multiplying total MOUs by 60 seconds per minute and by 64,000 bps. The bps are converted into Bps by dividing the bps by 8 bits per byte. The Bps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).
Wireline Business	Domestic Public Internet Protocol (IP): This network includes enterprise and residential public wireline services such as, FiOS internet, high speed internet (DSL), partner ports, peering and security in the US.	Data traffic is measured in megabits per second (Mbps) as the average of ingress and egress from backbone to edge routers domestically (US). Data traffic is collected daily by sample polling the interface from backbone to edge routers every five minutes. The Mbps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).
Wireline Business	International Public Internet Protocol (IP): This network includes enterprise and residential public wireline services in Latin America, Asia, Europe, Canada and Mexico.	Data traffic is measured in megabits per second (Mbps) as the average of ingress and egress from backbone to edge routers internationally (Latin America, Asia, Europe, Canada and Mexico). Data traffic is collected daily by sample polling the interface from backbone to edge routers every five minutes. The Mbps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).

Business Segment	Network	Methodology
Wireline Business	Transport: This network consists primarily of point to point data transport services sold to customers as defined by circuit and speed, typically medium to large businesses globally. (Out of Franchise – Legacy VZB network)	Data traffic is measured in billed bandwidth (gigabits/second) to customers. For first quarter 2016, data traffic was reported based on the inputs and data available from the monthly volume reports. These reports are pulled on approximately the second week of the following month.100% utilization is assumed over each circuit. The product categories included are the following: core synchronous optical networking (SONET), core time division multiplexing (TDM), strategic SONET and strategic wave. Gigabits/second are converted into total TB by using the binary conversion factor (1TB = 1024 gigabytes).
Wireline Business	Private Internet Protocol (PIP): This network provides voice, data and video applications over an integrated network infrastructure. It offers e-commerce, voice over IP (VoIP), converged solutions, shared intranets and extranets to private businesses globally.	Data traffic is measured in Bps for all ingress data transferred across all PIP edge routers. Data traffic is collected daily by polling the network every 15 minutes. Data traffic is added for the day and averaged for the month. The Bps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes), bytes being the total ingress octets for the month.
Wireline Business	Voice: Includes competitive local exchange carrier (CLEC), long-distance and international networks.	Data traffic is measured in minutes of usage (MOUs) for all calls originating in Verizon's Business network (VZB), transit calls that do not originate or terminate on the VZB network, and calls terminating in the VZB network that originated outside the VZB network for competitive local exchange carrier (CLEC), long-distance and international services. MOUs are captured hourly through all US class 5 and 3 switches. The voice channels transporting this data have a maximum circuit capacity (or bandwidth rate) of 64,000 bps. MOUs are converted into bps by multiplying total MOUs by 60 seconds per minute and by 64,000 bps. Bits are converted into Bps by dividing the bps by 8 bits. The Bps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).

Business Segment	Network	Methodology
Wireline Business	Converged Packet Access (CPA): This network converges multiple services, IP, Ethernet, private line data and voice, over a single Ethernet interface. This network can deliver Ethernet access in bandwidth speeds ranging from 1 Mbps to 10 Gbps in various bandwidth increments.	Data traffic is measured in Bps as the average of ingress and egress data transferred across all CPA edge routers. Data traffic is collected daily by polling every edge router every 15 minutes. Data traffic is added for the day and averaged for the month. The Bps are converted into total TB by using the binary conversion factor (1TB = 1024^4 bytes).

Criteria for Water Reporting

Water consumption (in billions of gallons) is based on criteria established by the Global Reporting Initiative Standard 303-1, total volume of water withdrawn from municipal water utilities[1] for all sites that use municipal water[1] within Verizon's operational control. The amounts have been prepared based on:

- Billed consumption data received from utility providers and property management companies as of May 5, 2019 for domestic and June 12, 2019 for international, and is pro-rated monthly.
- Estimated consumption calculated by applying Verizon's water usage intensity (WUI) factors (in kgal per square foot), by region (US state averages and US total average) and facility type, to sites[2] without billed data available.

  The WUI factors are derived from billed consumption and square footage data available from comparable US sites.[3]

  - For US sites without billed data, the state average WUI factors by facility type are applied when available. Otherwise, the US average WUI factors by facility type are used.
  - For international sites without billed data, the US average WUI factor by facility type is applied.
  - For sites without billed data and unknown square footage, estimated square footage is calculated based on known square footage from similar facility types. The WUI factors are then applied as described above.

[1] Does not include surface, ground or rain water.
[2] Sites that use water (e.g., administrative offices, retail stores, data centers, central offices, equipment, garage and warehouses and motor vehicle maintenance centers) are included. Sites that do not routinely use water (e.g., network cabinets and huts, microwave equipment, towers and antennas) are excluded from the estimate.
[3] Sites with billed consumption but unknown square footage data are excluded from the WUI calculation.

Reporting Boundaries

Verizon has selected an organizational boundary based on operational control. Where available, greenhouse gas emissions, and water consumption are calculated on the basis of actual (e.g., metered) data received. In certain instances where actual data is not available Verizon estimates consumption/usage data based on estimation

methodologies defined in standards as explained above. For 2018 reporting, Verizon Media, which includes brands such as Yahoo Inc. and AOL Inc., was included.

- Metered data cutoff for year ending December 31, 2018:
    - Domestic billed energy and water received as of May 5, 2019
    - International billed energy and water received as of June 12, 2019
- Estimated electricity and water data received as of May 5, 2019

Note on Non-Financial Reporting

Non-financial information is subject to measurement uncertainties resulting from limitations inherent in the nature and the methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary.