

Module: Introduction**Page: Introduction****CC0.1****Introduction**

Please give a general description and introduction to your organization.

IBM is a cognitive solutions and cloud platform company. IBM sees cognitive and cloud as two dimensions of a single model – cognitive to ingest and extract value from the new natural resource of data in all its forms, so that it can be turned into competitive advantage and societal value; and cloud as the platform on which these solutions are designed, built, tested and deployed in the world. IBM takes the most advanced technologies and applies them to change how our clients work, and through them, how the world works. Through the application of cognitive and cloud capabilities, along with its full range of products, services and solutions IBM realizes its two principal goals: helping clients to become more innovative, efficient and competitive through the application of business insight and information technology (IT) solutions; and providing long-term value to shareholders. The business model has been developed over time through strategic investments in capabilities and technologies that have superior long-term growth and profitability prospects based on the value they deliver to clients. The company's strategy is to focus on the high-growth, high-value segments of the IT industry. The company's global capabilities include services, software, systems, fundamental research and financing, and provides solutions to clients in all sectors of economy. The broad mix of IBM's businesses and capabilities are combined to provide business insight and solutions for the company's clients. The business model is dynamic, adapting to the continuous changing market and economic environment. The company continues to divest certain businesses and strengthen its position through strategic organic investments and acquisitions in higher value areas. In addition, the company has transformed itself into a globally integrated enterprise which has improved overall productivity and participates in markets with significant long-term opportunity.

The IBM disclosure addresses our complete scopes 1 and 2 inventory for our global operations and selected scope 3 categories. IBM's scope 1 emissions result from the use of fossil fuels to heat facilities and operate co-generation units, fuel for leased vehicles and other transportation activities that support IBM operations, and emissions from refrigeration, chiller, and heat transfer fluids that are used in our operations. Scope 2 emissions result from generation of our purchased electricity and energy commodities such as chilled & hot water. Overall, IBM collects energy consumption data from over 90% of its space footprint (representing 98% of our energy consumption) through enterprise level databases to calculate our scopes 1 and 2 GHG emissions. We also collect data on system losses from chillers and cooling systems to calculate hydrochlorofluoro carbon (HCFCs) and Heat Transfer fluid GHG emissions in CO2 equivalents. These emissions are included in the scope 1 inventory.

IBM has three corporate wide goals to address GHG emissions reduction. They are:

Achieve annual energy conservation savings equal to 3.5% of IBM's total energy consumption. IBM achieved reductions of 5.3% in 2016 and average reductions of 6.3% from 2011 to 2016.

Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020 over and above the renewable electricity from our grid supplied electricity. IBM contracted from renewable generation sources for 21.5% of its 2016 electricity consumption.

Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. This represents an additional 20% reduction from year-end 2012 to year-end 2020 over the reductions achieved from 2005 to 2012 under our second generation goal. In 2016, IBM reduced its CO2 emissions by 38.5% against the 2005 baseline.

Selected Scope 3 categories are disclosed: purchased goods and services, fuel and energy related activities not reported in scopes 1 and 2, employee commuting, use of sold products and business travel. Scope 3 GHG emissions are not in the scope of our reduction goal. Many of the scope 3 emissions categories have inherent errors of 20% to 100% because of the many assumptions that must be made to calculate a value and allocate emissions across a company's value chain. Moreover, an organization's asserted Scope 3 emissions are Scope 1 and 2 emissions of their suppliers or customers. These emissions are best addressed by those companies responsible for the operations that generate them.

CC0.2

Reporting Year

Please state the start and end date of the year for which you are reporting data.

The current reporting year is the latest/most recent 12-month period for which data is reported. Enter the dates of this year first.

We request data for more than one reporting period for some emission accounting questions. Please provide data for the three years prior to the current reporting year if you have not provided this information before, or if this is the first time you have answered a CDP information request. (This does not apply if you have been offered and selected the option of answering the shorter questionnaire). If you are going to provide additional years of data, please give the dates of those reporting periods here. Work backwards from the most recent reporting year.

Please enter dates in following format: day(DD)/month(MM)/year(YYYY) (i.e. 31/01/2001).

Enter Periods that will be disclosed

Fri 01 Jan 2016 - Sat 31 Dec 2016

CC0.3

Country list configuration

Please select the countries for which you will be supplying data. If you are responding to the Electric Utilities module, this selection will be carried forward to assist you in completing your response.

Select country

CC0.4

Currency selection

Please select the currency in which you would like to submit your response. All financial information contained in the response should be in this currency.

USD(\$)

CC0.6

Modules

As part of the request for information on behalf of investors, companies in the electric utility sector, companies in the automobile and auto component manufacturing sector, companies in the oil and gas sector, companies in the information and communications technology sector (ICT) and companies in the food, beverage and tobacco sector (FBT) should complete supplementary questions in addition to the core questionnaire.

If you are in these sector groupings, the corresponding sector modules will not appear among the options of question CC0.6 but will automatically appear in the ORS navigation bar when you save this page. If you want to query your classification, please email respond@cdp.net.

If you have not been presented with a sector module that you consider would be appropriate for your company to answer, please select the module below in CC0.6.

Further Information

The IBM GHG emissions inventory will be reported by region, not by country.

Module: Management

Page: CC1. Governance

CC1.1

Where is the highest level of direct responsibility for climate change within your organization?

Other Manager/Officer

CC1.1a

Please identify the position of the individual or name of the committee with this responsibility

IBM's VP of Corporate Environmental Affairs and Product Safety has overall responsibility for IBM Climate Protection programs and reviews IBM's environmental affairs program, including climate protection programs and performance, with the Directors and Corporate Governance Committee of the Board of Directors. The Directors and Corporate Governance Committee of IBM's Board of Directors, formed in 1993 and consisting of a subset of Board Members, is responsible for reviewing and considering the company's positions and practices on significant areas of corporate responsibility, one of which is protection of the environment. This Committee reviews IBM's energy conservation and climate protection goals and performance annually as part of its review of the company's environmental strategy, programs and performance. The entire Board of Directors receives a report on the energy and climate goals and performance annually.

CC1.2

Do you provide incentives for the management of climate change issues, including the attainment of targets?

Yes

CC1.2a

Please provide further details on the incentives provided for the management of climate change issues

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comment
Other: Corporate Environmental Staff, Managers and Executives	Monetary reward	Emissions reduction project Emissions reduction target Energy reduction target	These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comment
		Supply chain engagement	projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.
Environment/Sustainability managers	Monetary reward	Emissions reduction project Emissions reduction target Energy reduction project Energy reduction target Supply chain engagement	These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.
Energy managers	Monetary reward	Emissions reduction target Energy reduction project Energy reduction target	These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comment
			<p>reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.</p>
Process operation managers	Monetary reward	Emissions reduction project Emissions reduction target Energy reduction project Energy reduction target	<p>These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.</p>
Facility managers	Monetary reward	Emissions reduction target Energy reduction project Energy reduction target	<p>These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective</p>

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comment
			to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.
Business unit managers	Monetary reward	Emissions reduction target Energy reduction target	These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.
Other: Employees responsible for executing energy conservation and climate protection programs	Monetary reward	Emissions reduction project Energy reduction project	These IBM employees have responsibility for carrying out IBM's corporate policy on company's energy conservation and climate protection programs, which includes defining strategies and driving actions and projects to enable the attainment of IBM's energy and GHG emissions reduction goals. IBM has three goals in this area: a) an annual objective to implement energy conservation projects to reduce or avoid energy use

Who is entitled to benefit from these incentives?	The type of incentives	Incentivized performance indicator	Comment
			equivalent to 3.5% of that year's energy use, b) Procure electricity from renewable sources for 20% of IBM's annual electricity consumption by 2020, c) Reduce CO2 emissions associated with IBM's energy consumption 35% by year-end 2020 against base year 2005 adjusted for acquisitions and divestitures. These responsibilities are executed using the "Check Point" process through which employees set their business goals and receive feedback and assessments on their performance. The assessments are used in IBM's employee compensation program to determine an employee's annual salary increases and bonus pay. There are also incentives for employees whose research and development in energy and climate related innovations result in patents, products and solutions.
Executive officer	Recognition (non-monetary)	Emissions reduction project Emissions reduction target Energy reduction project Energy reduction target Efficiency project Other: IBM products, services and solutions related to environmental sustainability and energy efficiency.	The IBM Chairman's Environmental Award recognition program was established in 1991, and has continued to this day. The purpose of this annual award is to encourage environmental leadership, strengthen integration of environmental affairs throughout IBM's business and to recognize environmental leadership, innovation, progress and results on the part of IBM's organizations. The program currently alternates criteria every other year. One year the award focuses on internal operational environmental excellence. This recognition considers all environmental programs and results, including attainment of the company's energy conservation and GHG emissions reduction goals. This was the criteria for the 2016 award program. The criteria for the alternating year covers products, services and solutions IBM develops and provides to its clients in helping them achieve environmental protection and efficiency results, again inclusive of energy and climate. Each year IBM's Chairman personally presents this annual award to the top executive of the organization receiving the award. The Real Estate and Strategy organization received the 2016 IBM Chairman's Environmental Award.

Further Information

Page: CC2. Strategy

CC2.1

Please select the option that best describes your risk management procedures with regard to climate change risks and opportunities

Integrated into multi-disciplinary company wide risk management processes

CC2.1a

Please provide further details on your risk management procedures with regard to climate change risks and opportunities

Frequency of monitoring	To whom are results reported?	Geographical areas considered	How far into the future are risks considered?	Comment
Annually	Board or individual/sub-set of the Board or committee appointed by the Board	Global	> 6 years	IBM executes integrated corporate and business unit (BU) risk management processes to comprehensively assess risks including those related to climate change and water supply risks. The assessments include potential physical, operational, & reputational impacts as well as trends & opportunities in the marketplace. We also follow the process for identifying significant environmental aspects as part of our global Environmental Management System (EMS) to assess the company's business intersections with the environment. Among the significant aspects we have identified are energy use, GHG emissions & water withdrawal in water scarce locations. Based on the assessment, Corporate Environmental Affairs staff sets or updates corporate requirements, objectives & targets, with input from BUs responsible for execution. The BUs are responsible for developing & executing plans to reduce energy use & GHG emissions, & mitigate potential environmental impacts or risks.

CC2.1b

Please describe how your risk and opportunity identification processes are applied at both company and asset level

Regarding operational matters, our EMS assessment process begins at the corporate level, assessing significant environmental aspects across the corporation and globally including energy use and GHG emissions. Based on this assessment, corporate goals (e.g., energy conservation, renewable electricity procurement, and GHG emissions reduction) are set to mitigate or address climate risk. Considering corporate level assessments, our business units, country organizations and locations further assess their specific impacts and develop and execute plans to mitigate them and meet the corporate goals. Similar assessments are done for products, services and solutions as relevant. The IBM product stewardship program requires that hardware (e.g., server and storage systems) products be assessed

and designed to address a range of material, safety, and energy use attributes in order to reduce their environmental impacts. Design approaches include innovative uses of materials and enhanced energy efficiency through better power management and greater utilization attributes of products. IBM's efforts with regards to IT equipment, software, data center energy efficiency, and our analytics and cognitive offerings can address the full range of environmental issues to achieve energy and material efficiency and conservation, and GHG emissions reduction across the economy to combat climate change. Our comprehensive corporate risk management processes assess risks relevant to the corporation, including business unit and location operational risks and supply chain risks that may potentially affect IBM's business inclusive of research; product development, manufacturing and assembly; and data center operations. These processes assess the potential for disruptive events and establish plans to ensure business continuity as well as asset protection. Plans are developed and implemented down to the location level. Client matters are discussed in later sections.

CC2.1c**How do you prioritize the risks and opportunities identified?**

Under our EMS process, environmental aspects are assessed for their significance. The opportunities to mitigate or reduce the significant impacts are identified & evaluated as part of the assessment. Ongoing risks or concerns are addressed in accordance with corporate policy & requirements. Strategic & tactical initiative and as appropriate, objectives & goals are established to address identified impacts. Specific to climate change, IBM has had an energy conservation goal since 1996, 3 generations of CO2 emissions reduction goals (the first two completed in 2005 & 2012, respectively) with the 3rd generation goal announced in February 2015 and achieved in 2016. PRODUCTS (INCLUDE SYSTEMS, SOFTWARE AND SOLUTIONS) & SERVICES: IBM's climate protection strategy & programs directly inform & support its business strategy & offerings. IBM prioritizes these opportunities based on the capabilities enabled by our broad research and industry expertise, the maturity of available technologies, the impact of the product or solution & the needs of our clients. IBM leverage our expertise across the board to help solve environmental & business challenges faced by companies, governments & society at large. Our expertise includes energy efficient IT equipment, intelligent energy grid, smart transportation systems, biofuel & solar photovoltaics, energy & material use optimization, logistics planning, "dematerialization" efforts (delivering a physical good through the IT network) & other applications in assisting clients, & the world, tackle climate change. Similarly risks identified by the company's integrated risk management processes are prioritized and addressed based on their impact on our facilities, assets, operations & continuity of service to IBM's clients.

CC2.1d

Please explain why you do not have a process in place for assessing and managing risks and opportunities from climate change, and whether you plan to introduce such a process in future

Main reason for not having a process	Do you plan to introduce a process?	Comment
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CC2.2

Is climate change integrated into your business strategy?

Yes

CC2.2a

Please describe the process of how climate change is integrated into your business strategy and any outcomes of this process

- i. Our global EMS drives internal operational excellence & informs &/or influences our business strategy, product roadmaps & service offerings with regards to environmental issues. The EMS places a specific focus on energy use, efficiency & GHG emissions reductions. IBM has enterprise wide IT systems that collect & analyse data on energy use, GHG emissions, water use, waste generation & other key performance indicators (KPIs) to enable performance assessment & goal setting. We also execute established processes that monitor & identify emerging regulations & trends; timely advise our business units & ensure they are competitively positioned to comply &/or stay ahead of the requirements & capture business opportunities.
- ii. We use data to enhance our corporate objectives, continually improve our programs, identify & use innovative new technologies such as monitoring & analytics based applications to minimize energy use & improve our operations & those of our clients. To take the IBM energy efficiency & use reduction driven efforts to the next level, IBM is promoting the use of analytics & cognitive systems & solutions to ourselves & our customers to mine & analyse data to gain new insights into how to address the challenges facing their business. A specific example involves using analytic & cognitive tools for analysing building operational data against a set of defined rules to identify energy use reduction opportunities resulting in energy use reductions of 10% or more.
- iii. IBM's strategy considers adaptation, regulatory changes & opportunities related to climate change. For IBM's operations, both our short term & long term goals continue to focus on energy conservation, shifting to greater use of renewable electricity & reducing emissions. We continue to implement IT based monitoring & management systems to minimize our energy use & continually maintain our operational efficiency at an optimal level. We offer solutions to our clients to address similar challenges, such as our Building Management Center solution. We also offer more efficient data center outsourcing or cloud solutions to manage clients' IT workload. In adaptation, IBM, in collaboration with a global engineering firm, created a free, publically available Disaster Resilience Scorecard based on United Nation's "10 Essentials for Making Cities Resilient". The Scorecard has been deployed by many cities around the world to facilitate iterative assessments to initiate improved response & resilience to disasters & other forms of impacts from climate change.
- iv & v. Our leadership in analytics, cognitive capabilities & cloud services give us a tactical & strategic competitive advantage. Solving the challenges of climate change is going to take both continual improvement in existing systems & transformational change in key systems such as energy generation & transmission. IBM's Energy, Environment & Utility Solutions group offers a suite of capabilities for electricity generation & distribution systems. These capabilities enable detailed monitoring & forecasting of weather, energy demand & output; & integrate intermittent renewable generation sources into the grid in a reliable manner. In the area of disaster management & operational continuity, we have combined the weather forecasting capabilities of the Weather Company with analytics & cognitive capability to identify a company's or government infrastructure assets that are most at risk from a major weather event to enable early response planning. IBM Global Technology Services (GTS) applies a version of this solution to plan mitigation efforts of storm impacts for its clients' IT operations. Overall, our SOLUTIONS strategy for our clients is to offer IT based tools, data analytics, cognitive computing via cloud platforms to make their operations more efficient & reliable, & to assist them to address their climate change impacts.
- vi. We have invested & continue to invest significant resources to expand existing & introduce new solutions offerings developed from our continuous learning from both our own & client operations as well as our ongoing research work. These offerings & our focus on continually enhancing the efficiency & performance of our

operations, products & solutions generate benefits ranging from reductions in our own energy use, GHG emission & expenditures, & recognition of IBM as a leader in the marketplace in helping our clients to do the same for their operations. Investing in & applying innovative technologies to our own & our clients' challenges, including those created by climate change, deliver more robust & impactful solutions to our clients giving IBM a competitive advantage in the marketplace.

vii. IBM considers a full range of internal & external factors, including climate change, in ensuring that we maintain our business strategy & risk management processes in a manner capable of achieving the company's missions & objectives. Within IBM's stated imperatives of Watson & the Cloud & the associated analytics, mobile, social & security offerings IBM has continued to make investments in R&D, forge partnerships & expand its solutions. One example is the announcement of two partnerships in 2016 which combine the partner's building management systems with IBM analytics & cognitive capability to offer improved solutions that optimize building system operations & minimize energy consumption. IBM continues to make major investments in Power & OpenPower server & Flash based storage systems to drive more efficient IT operations through high system utilization & measured by performance/power metrics. These efficient systems are desirable for handling computational & data dense analytic & cognitive based applications needed to mine & refine the vast data sets such as those from building, electricity grid & transportation systems captured through the Internet of Things to improve the efficiencies of these systems & minimize their energy consumption or maximize energy output.

viii. The Paris Agreement validates IBM's longstanding commitment of providing leadership in combating climate change & our strategy & actions, including goal setting, to continually improving our operational efficiency & reducing CO2 emissions. During 2016 IBM achieved its 3rd generation operational CO2 emissions reduction goal, 4 years ahead of schedule. IBM offers solutions to clients across the world, helping them to likewise combat climate change.

ix. IBM's GHG reduction goal for its scopes 1 & 2 emissions sets an annualized reduction goal of 2.3% of its operational MT CO2 emissions per year, in line with reduction rates generally agreed to align with a '2oC scenario'. The setting of corporate level goals embeds the financing & resources required to reach the commitment into our overall business plan. As already discussed we regularly inform our solutions strategy using our expertise & experience in addressing challenges of climate change.

CC2.2b

Please explain why climate change is not integrated into your business strategy

CC2.2c

Does your company use an internal price on carbon?

No, and we currently don't anticipate doing so in the next 2 years

CC2.2d

Please provide details and examples of how your company uses an internal price on carbon

CC2.3

Do you engage in activities that could either directly or indirectly influence public policy on climate change through any of the following? (tick all that apply)

- Direct engagement with policy makers
- Trade associations
- Other

CC2.3a

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

Focus of legislation	Corporate Position	Details of engagement	Proposed legislative solution
Energy efficiency	Support with minor exceptions	IBM has been a sustaining and active supporter of product efficiency requirements for ICT products, particularly servers and storage equipment, developed under various programs such as the ENERGY STAR and EPEAT and by various governments including European Union and the Chinese Government. IBM has committed significant human resources and systems assets to generate and provide test data, analyses and recommendations to EPA, the EU, China National Institute of Standardization and others regarding product categorization, qualification requirements, test methods and approaches for establishing energy efficiency requirements for ICT products.	IBM has advocated both as an individual company and through industry associations globally such as the Green Grid (TGG), the Information Technology Industry Council (ITIC), DIGITALEUROPE, and the China based United States Information Technology Office for rational, economic and credible testing protocols, categorization of server and storage products, and active efficiency or idle thresholds for assessing product energy efficiency. Unlike many consumer IT products already subject to ENERGY STAR requirements, server and storage equipment have a broad range of configurations with widely varied power profiles within a single model. This is because many components and options are available in server and storage equipment to configure a product to the exact specifications needed to address a customer's workload. Care and requisite expertise are required to ensure efficiency

Focus of legislation	Corporate Position	Details of engagement	Proposed legislative solution
			requirements are not biased against higher power, higher performing servers.
Energy efficiency	Support with minor exceptions	IBM has worked with ITIC, DIGITALEUROPE, the G20/Connnect Devices Alliance project on intelligent efficiency, TechUK and The Green Grid on a range of data center energy efficiency initiatives. The efforts are intended to disseminate information on data center energy efficiency and drive improvements in effective energy utilization in data centers. These engagement efforts have involved both government data center efficiency initiatives and green procurement standards.	IBM advocates for improved data center energy efficiency initiatives, as we recognize that there are significant opportunities in this area for both new and existing data centers to improve their efficiency through the application of intelligent data center management systems, and virtualization and consolidation technologies. IBM also advocates for the benefits that intelligent systems can bring to improving the efficiency of a range of infrastructure, operations and processes, reducing the energy use and improving efficiency of systems 2 times or more over and above the energy “invested” in the operation of the data centers that run the intelligent systems.
Clean energy generation	Support with minor exceptions	IBM is a member of the American Council on Renewable Energy, the Business Renewables Center, the Renewable Energy Buyers Association, a partner with WRI and WWF on working with regulated utilities to improve corporate access to renewable electricity at scale. IBM has advocated for increased corporate access to renewables for facility consumption and for improvements in grid technology to facilitate the integration of distributed generation, specifically wind and solar systems with intermittent power delivery. As currently configured, the grid cannot effectively integrated large, intermittent solar, wind and wave generation systems.	IBM has advocated for necessary regulatory adjustments and funding to facilitate the introduction of Smart Grid technology into grid systems around the globe to enable the diversification of the grid generation system, greater deployment and dispatching of intermittent renewable generation assets and improvements in the stability of the grid. IBM has also worked with NGOs and regulated utilities to explore contractual and regulatory approaches to making renewable generated electricity more accessible to corporate customers.
Adaptation resiliency	Support	IBM engages with various NGOs, local, state and national governments, academic groups and peers on programs and solutions to assist with adaptation and resiliency demanded by changing demographics and weather patterns. IBM offers analytics and cognitive based solutions which offer improved monitoring, management, and emergency response capability to a full range of city systems which enable optimization of operations of sewer, water, electricity and traffic systems and identify preventative, rather than reactive maintenance management and pinch or risk points that will benefit from investment or infrastructure improvements. Through its Corporate Citizenship program IBM provided support in a collaboration with the Nature Conservancy on an effort to make it easier for municipalities in the Brazilian Amazon to establish land-ownership records, monitor land use with a goal to stop	IBM works with governments to execute legislation and programs that enable IT based solutions to more effectively manage, control and modernize city infrastructure to address and manage the impacts of changing demography, land use patterns and climate conditions.

Focus of legislation	Corporate Position	Details of engagement	Proposed legislative solution
		<p>illegal deforestation. In collaboration with AECOM, we published a Disaster Resilience Scorecard for the United Nations based on the U.N.'s "10 Essentials for Making Cities Resilient." The scorecard facilitates iterative assessments of, and drives continual improvements in, an organization's resilience to disasters and other forms of impacts driven by climate change and other factors. The scorecard has been deployed by many cities around the world. It is available in the public domain free of charge.</p>	

CC2.3b

Are you on the Board of any trade associations or provide funding beyond membership?

Yes

CC2.3c

Please enter the details of those trade associations that are likely to take a position on climate change legislation

Trade association	Is your position on climate change consistent with theirs?	Please explain the trade association's position	How have you, or are you attempting to, influence the position?
Various	Mixed	<p>The positions of specific trade associations of interest to CDP or others can be found by reviewing their respective websites. IBM sets and communicates its own position on climate protection. IBM's unambiguous position on climate change has been made public for a decade on the ibm.com website: http://www.ibm.com/ibm/environment/climate/position.shtml, and we repeat it below.</p> <ul style="list-style-type: none"> IBM recognizes climate change is a serious concern that warrants meaningful action on a global basis to stabilize the atmospheric concentration of greenhouse gases 	<p>IBM belongs to various trade and industry associations that add value to IBM, its shareholders and employees. Trade associations cover diverse issue sets, and it is not unexpected that the views of an association member may differ from that of the trade association on a particular</p>

Trade association	Is your position on climate change consistent with theirs?	Please explain the trade association's position	How have you, or are you attempting to, influence the position?
		<p>(GHGs). • IBM believes all sectors of society, the economy and governments worldwide must participate in solutions to climate change. • IBM supports joint efforts by the private and public sectors to reduce global GHG emissions. These initiatives are most effective when they are implemented through market-driven mechanisms and are economically efficient, environmentally effective and sustainable. • IBM believes a diverse energy portfolio is necessary to achieve an orderly adaptation to a world in which GHG emissions are constrained while maintaining successful economies and secure supplies of energy, and also meeting the needs of humanity. • IBM considers energy conservation to be a cornerstone of climate protection. IBM will continue to conserve energy and continually improve the energy efficiency of its operations, products and services while collaborating with and encouraging its global suppliers to do likewise. • Consistent with its values, IBM will collaborate with its clients to create new innovations and solutions that are protective of the climate.</p>	<p>topic from time to time. IBM does not conduct any advocacy activities on climate change legislation through any trade association. IBM is on the board of some trade associations but does not provide any funding for lobbying activities.</p>

CC2.3d

Do you publicly disclose a list of all the research organizations that you fund?

CC2.3e

Please provide details of the other engagement activities that you undertake

IBM has been active in advocating the importance, benefits & opportunities of increased energy efficiency for both the climate as well as for business & the economy. IBM has also been an early and continued advocate for available solutions to combat climate change. IBM works with NGOs such as the Center for Climate and Energy Solutions (C2ES), the World Resources Institute (WRI), the Business Renewables Center, and the Renewable Energy Buyers Alliance, government entities such as the EU Joint Research Council, the U.S. Department of Energy and USEPA, and trade organizations such as the American Council on Renewable Energy, Business Roundtable, The Green Grid, DIGITALEUROPE, and Information Technology Industry Council (ITIC). Our efforts focus on sharing learning and solutions on energy efficiency and GHG emissions reductions, increasing the availability of renewable energy in commercial quantities and economically priced for procurement, and promoting programs and benchmarks that encourage innovation in energy efficiency in product and processes. We provide expert comments assisting regulatory or standards development, government studies and more. Examples in this area include EU's energy related Lot 9

study on server and storage products; assessment of the aggregation of SERT metrics for use in assessing the energy efficiency of servers; the BSR/WRI scope 2 guidance for co-location data centers; and the Electronic Industry's Citizenship Coalition updates to the GHG emissions reduction item in its code for suppliers. Given IBM's business focus and capabilities, we believe IBM can best contribute to sound policy making by informing policymakers substantively and in a manner that is solutions- and results-oriented and based on the deep expertise possessed by our company. To that end, we continue to demonstrate that effective and economical solutions exist today to reduce GHG emissions, and companies like IBM continue to develop/enhance and bring to the market new innovations that enable such reductions across the economy. IBM is carrying out this role with three deliberate objectives: 1. Providing support to governments in their policy making by developing real solutions and demonstrating that these solutions can be implemented; 2. Providing confidence to governments & enterprises that a broad range of specific energy efficiency initiatives to address climate challenges are feasible, available & cost effective; & 3. Leading by example & taking early and continuing actions to conserve energy & other resources, improve operational efficiency, & reduce IBM's own GHG emissions. IBM has published an annual environmental report since 1990 without interruption through which we transparently communicate our environmental programs and results, including our energy management and climate protection program, requirements for suppliers, products, services and solutions for clients. IBM also communicate / disclose similar information via many other publications, communication vehicles and external disclosure schemes, including our annual Corporate Responsibility Report, our website, conferences and publications. IBM is also active, both on its own and through ICT industry organizations, to provide input and proposed metrics for voluntary and regulatory energy efficiency schemes for ICT products and data centers.

CC2.3f

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?

The process we follow adheres to clearly and explicitly defined organizational roles and responsibilities set by the company and documented in our global Environmental Management System. IBM's Corporate Environmental Affairs staff organization is responsible for developing IBM environmental public policy positions including those addressing climate protection, and advocating the company's policy positions. Lines of business are responsible for executing against the requirements applicable to them. All direct and indirect activities that could be considered to influence policy must be approved through the Corporate Environmental Affairs management, ensuring consistency with our own overall climate change strategy.

CC2.3g

Please explain why you do not engage with policy makers

Further Information

Page: CC3. Targets and Initiatives

CC3.1

Did you have an emissions reduction or renewable energy consumption or production target that was active (ongoing or reached completion) in the reporting year?

Absolute target
Renewable energy consumption and/or production target

CC3.1a

Please provide details of your absolute target

ID	Scope	% of emissions in scope	% reduction from base year	Base year	Base year emissions covered by target (metric tonnes CO2e)	Target year	Is this a science-based target?	Comment
Abs1	Scope 1+2 (market-based)	97%	35%	2005	2028000	2020	Yes, but this target has not been approved as science-based by the Science Based Targets initiative	Achieving the IBM goal requires a 2.3% per year absolute reduction in GHG emissions over the period of the goal. This is in line with the generally referenced target of an annualized reduction rate of 2% or higher to meet the goal of maintaining global temperature increases to 2oC or less. That said, IBM does not plan to subscribe to the SBT program. One of the concerns IBM has is the inclusion of scope 3 emissions in the criteria of the SBT program. Scope 3 emissions, with a few exceptions are highly uncertain and not quantifiable for the majority of scope 3 categories.

CC3.1b

Please provide details of your intensity target

ID	Scope	% of emissions in scope	% reduction from base year	Metric	Base year	Normalized base year emissions covered by target	Target year	Is this a science-based target?	Comment
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CC3.1c

Please also indicate what change in absolute emissions this intensity target reflects

ID	Direction of change anticipated in absolute Scope 1+2 emissions at target completion?	% change anticipated in absolute Scope 1+2 emissions	Direction of change anticipated in absolute Scope 3 emissions at target completion?	% change anticipated in absolute Scope 3 emissions	Comment
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CC3.1d

Please provide details of your renewable energy consumption and/or production target

ID	Energy types covered by target	Base year	Base year energy for energy type covered (MWh)	% renewable energy in base year	Target year	% renewable energy in target year	Comment
RE1	Electricity consumption	2005	4951000	2.7%	2020	20%	This goal does not have a base year. It sets the objective to increase our purchases of contracted renewable electricity to 20% of our total consumption by 2020 over and above the quantity of renewable energy provided as part of the electricity mix that we purchase from the grid.

CC3.1e

For all of your targets, please provide details on the progress made in the reporting year

ID	% complete (time)	% complete (emissions or renewable energy)	Comment
Abs1	73%	100%	IBM's emissions from electricity and fuel use reduced by 13.2% from 2015 to 2016 by the IBM method and 14.6% by the market-based method. As of year-end 2016, IBM achieved operational CO2 emission reductions of 38.1% against the 2005 baseline, using the IBM method, and 38.5% against the 2005 baseline using the market-based method, hence achieving its CO2 emissions reduction goal four years ahead of schedule.
RE1	73%	100%	IBM's direct purchase of renewable electricity accounted for 21.5% of its total electricity consumption for the year of 2016, hence achieving its renewable electricity procurement goal four years ahead of schedule. From 2015 to 2016, IBM increased its purchase of contracted renewable electricity by 18.7%. These figures do not include the renewable electricity consumed off the grid, which adds an additional 19.1%. Combining the amount of renewable electricity IBM received from both our contracted purchases and from grid supply electricity, over 40% of electricity IBM consumed was generated with renewable sources.

CC3.1f

Please explain (i) why you do not have a target; and (ii) forecast how your emissions will change over the next five years

CC3.2

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

CC3.2a

Please 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	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
Group of products	IBM Server Products: All calculations provided use an electricity emissions factor of 0.42 Metric Ton (MT) CO2/MWH. IBM Power® Systems servers can deliver the most workload for unit of energy consumed of any server when the system is configured to achieve maximum utilizations of up to 70 percent and	Avoided emissions	Evaluating the carbon reducing impacts of ICT	.1%	Less than or equal to 10%	Specific revenue and R& D investment information is not provided to protect business confidential information. IBM did invest \$5.7 billion in research and development activities in 2016 (IBM annual report) and a portion of this investment went to technologies and solutions which enable clients to

Level of aggregation	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
	<p>EnergyScale™ power management capabilities, which reduce server energy use by 25 to 65% with reduced workload, are employed. This saves between 0.3 & 1 kwh/day with a scope 2 emissions reduction of 1.3-3.8 MT CO2/yr/server. A data center running 100 servers avoids 130 to 380 MT of CO2/yr. POWER@ systems & System z servers can be run at up to 70% to 95% utilization, delivering more workload per unit energy consumed. One client implemented an IBM Power Systems S822L server solution to perform complex time and computational intensive workloads. IT reduced computing time by 40 hours (40 percent) while reducing energy consumption by 6 MWh/year (40%) with avoiding 3 MT of CO2 emissions for each S822L deployed. Another client installed two IBM Power Systems E880 servers and six IBM FlashSystem 820 storage products to replace a legacy IT system. The system improved performance by 90% while the energy consumption of the IT equipment was reduced by over 450 MWh/year, avoiding 210 MT of CO2/year. A cloud services client selected the IBM Power Systems S812L server because it could host twice the number of virtual</p>					<p>become more efficient and reduce their GHG emissions. The percent of revenue for low carbon products is an estimate.</p>

Level of aggregation	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
	<p>environments as a competing x86 based server. Deployment of the Power Systems server reduced the server count by half and energy consumption by approximately 40%, saving 3 MWH/year and avoiding 1 MT of CO2 emissions. One client, using a workload management automation tool, consolidated and optimized software from its legacy server and storage systems onto an IBM z13 server reducing overall energy use in its data center by 40 % saving approximately 45 MWh/year of electricity consumption and avoiding 18 MT CO2 emissions. Similar productivity and energy efficiency improvements can be achieved across the thousands of IBM Power Systems and System Z servers that IBM sells each year.</p>					
Group of products	<p>IBM Storage products: Storage systems utilizing capacity optimization methods, higher capacity storage devices and tiering tools can significantly reduce the energy and space use of next generation storage solutions. One client implemented an IBM flash storage solution to replace a large disk storage system. The solution integrated a new IBM FlashSystem V9000 and SAN controller to</p>	Avoided emissions	Evaluating the carbon reducing impacts of ICT	.1%	Less than or equal to 10%	<p>Specific revenue and R& D investment information is not provided to protect business confidential information. IBM did invest \$5.7 billion in research and development activities in 2016 (IBM annual report) and a portion of this investment went to technologies and solutions which enable clients to become more efficient and reduce their GHG emissions. The percent of</p>

Level of aggregation	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
	<p>existing IBM XIV and Storwize V7000 storage products using IBM Spectrum Virtualize™ software and VersaStack solutions to integrate the hardware. The integration of the FlashSystem storage improved system performance by 57 percent while reducing floor space 98 percent, energy use by over 60 MWh/year, and associated CO2 emissions by 23 MT. Another client consolidated six high-end storage racks onto two IBM Storwize V7000 storage products using IBM Spectrum Virtualize software to centralize storage management. The consolidation boosted storage capacity by 150% and performance by 200%, while reducing floor space and energy use by 75% and 55%. The reduced energy consumption represents over 5 MWh/year and associated CO2 emissions of 2 MT. Similar productivity and energy efficiency improvements can be achieved across the thousands of IBM storage systems that IBM sells each year.</p>					revenue for low carbon products is an estimate.
Group of products	IBM Cognitive and Analytics offerings enable clients to implement systems management of activities such as logistics, water systems, traffic systems, utility grids, & other processes & infrastructures to	Avoided emissions	Evaluating the carbon reducing impacts of ICT	.1%	Less than or equal to 10%	Specific revenue and R& D investment information is not provided to protect business confidential information. IBM did invest \$5.7 billion in research and development activities in 2016 (IBM

Level of aggregation	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
	<p>optimize activity flows & minimize resource use. The Building Management Center (BMC) solution which uses I analytics tools such as Spark, enabling our clients to reduce building energy use by 5 to 15% by using analytics to monitor & control HVAC & lighting systems & proactive equipment maintenance. IBM has installed this solution at 27 major IBM campuses, encompassing 155 buildings representing roughly one-third of its real estate footprint. The system reduced annualized energy use by 41,800 MWH in 2016 avoiding 11,000 MT of CO2 avoidance. Clients would be expected to achieve similar results. IBM is working with utilities and governments on projects which utilize smart meters, energy storage, demand response, and renewable generation forecasting to reduce peak electricity demand and better integrate renewable generation into the power grid. IBM is working with two utilities to implement grid management software which can improve the utilization of renewable generation assets by 5 to 10%. Assuming a 200 MW wind farm with an average utilization of 45%, a 10% improvement in utilization corresponds to 20 MW of capacity, which is 175,000</p>					<p>annual report) and a portion of this investment went to technologies and solutions which enable clients to become more efficient and reduce their GHG emissions. The percent of revenue for low carbon products is an estimate.</p>

Level of aggregation	Description of product/Group of products	Are you reporting low carbon product/s or avoided emissions?	Taxonomy, project or methodology used to classify product/s as low carbon or to calculate avoided emissions	% revenue from low carbon product/s in the reporting year	% R&D in low carbon product/s in the reporting year	Comment
	MWH/year of increased production. Assuming replacement of coal generation at 1.2 MT CO2/ MWH, CO2 emissions would be reduced by 210,000 MT CO2/year. IBM is applying its IT expertise in cognitive and analytics tools and software & systems, to provide energy efficiency & avoided CO2 emissions solutions for its clients across a full range of business & process types.					

CC3.3

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

Yes

CC3.3a

Please identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings

Stage of development	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	1350	48000
Implementation commenced*	900	27000
Implemented*	1200	49000
Not to be implemented	0	0

CC3.3b

For those initiatives implemented in the reporting year, please provide details in the table below

Activity type	Description of activity	Estimated annual CO2e savings (metric tonnes CO2e)	Scope	Voluntary/ Mandatory	Annual monetary savings (unit currency - as specified in CC0.4)	Investment required (unit currency - as specified in CC0.4)	Payback period	Estimated lifetime of the initiative	Comment
Energy efficiency: Building services	Data Center Energy Efficiency: 1. Best Practices implementation (air flow balancing and temperature adjustments). 2. Virtualization and Consolidation of Server and Storage Assets.	43000	Scope 1 Scope 2 (location-based)	Voluntary	11000000	1	1-3 years	3-5 years	The Data Center Energy Efficiency initiatives will continue to deliver energy and CO2 savings for many years following the completion of the projects. Specific investment information not provided to protect business confidential information.

Activity type	Description of activity	Estimated annual CO2e savings (metric tonnes CO2e)	Scope	Voluntary/Mandatory	Annual monetary savings (unit currency - as specified in CC0.4)	Investment required (unit currency - as specified in CC0.4)	Payback period	Estimated lifetime of the initiative	Comment
Energy efficiency: Building services	Heating Ventilation and Air Conditioning and Lighting Systems: 1. Equipment Upgrades: control systems and more efficient equipment. 2. Refine alignment of system operation times with building occupancy times.	15000	Scope 1 Scope 2 (location-based)	Voluntary	3700000	5400000	1-3 years	Ongoing	The Heating, Ventilation and Air Conditioning and Lighting Systems initiatives will continue to deliver energy and CO2 savings for many years following the completion of the projects drive energy efficiency improvements. The IBM team is also implementing innovative, leading-edge technologies that enable real-time management of energy use. IBM is deploying its Smarter Building technologies (for example, IBM Building Monitoring and Management Solution) to increase the energy efficiency of its own facilities. The value of investments in 2016 in these projects was provided to provide a sense of the level of investment IBM is making in conservation projects.
Energy efficiency:	Central Utility Plant systems, Building System Recommissioning and	10000	Scope 1 Scope 2 (location-	Voluntary	2600000	1	1-3 years	Ongoing	Central Utility Plant systems, Building System Recommissioning and

Activity type	Description of activity	Estimated annual CO2e savings (metric tonnes CO2e)	Scope	Voluntary/Mandatory	Annual monetary savings (unit currency - as specified in CC0.4)	Investment required (unit currency - as specified in CC0.4)	Payback period	Estimated lifetime of the initiative	Comment
Building services	implementation of real time metering, data collection and analytic programs. The IBM team is also implementing innovative, leading-edge technologies that enable real-time management of energy use.		based)						implementation of real time metering, data collection and analytic programs. Specific investment information not provided to protect business confidential information.
Energy efficiency: Building services	IBM is deploying its Cognitive and Analytics technologies such as the Building Management Control Center, which includes IBM Building Monitoring and Management Solution and analytics programs such as Spark, to increase the energy efficiency of its own facilities. These tools collect and integrate data from the full range of available building system meters and sensors and applies analytics to continually minimize energy use in the building and identify anomalies in building operation. Currently 27 major IBM	5000	Scope 1 Scope 2 (location-based)	Voluntary	1400000	1	1-3 years	3-5 years	The Energy Efficiency: Building Systems will deliver energy and CO2 savings for many years following the completion of the project. Specific investment information not provided to protect business confidential information.

Activity type	Description of activity	Estimated annual CO2e savings (metric tonnes CO2e)	Scope	Voluntary/Mandatory	Annual monetary savings (unit currency - as specified in CC0.4)	Investment required (unit currency - as specified in CC0.4)	Payback period	Estimated lifetime of the initiative	Comment
	campuses, encompassing 155 buildings are monitored and managed by this tool.								
Other	Other Energy Efficiency projects including cafeterias improvements, printer systems utilization and energy management, and workstation (e.g., laptops, desktops) power management.	3000	Scope 1 Scope 2 (location-based)	Voluntary	800000	1	1-3 years	3-5 years	The Other Energy Efficiency initiatives will continue to deliver energy and CO2 savings for many years following the completion of the project. Specific investment information not provided to protect business confidential information.
Low carbon energy purchase	IBM contracted for the purchase of 783,000 MWH of renewable electricity in 2016.	300000	Scope 1 Scope 2 (market-based)	Voluntary	1	1	>25 years	1-2 years	IBM pays a premium for the majority of its renewable electricity purchases. Specific investment or savings information not provided to protect business confidential information.
Low carbon energy installation	IBM installed a MW fuel cell at its Connecticut U.S. data center facility	600	Scope 1 Scope 2 (location-based)	Voluntary	0	3000	4-10 years	11-15 years	System installed on a power purchase agreement/lease. IBM will achieve limited cost savings with the fuel cell installation.

CC3.3c

What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Financial optimization calculations	We prioritize on energy efficiency and conservation projects that meet our internal financial IRR and ROI requirements, and continue to be successful in identifying them. IBM's commitment to meeting its energy conservation goal, combined with the business returns generated by conservation projects sustain our ability to have these projects funded and implemented.
Employee engagement	IBM promotes a variety of programs to engage employees in achieving energy use and related GHG emission reductions including publicity campaigns, "best idea" solicitations, personal energy use, software based meters for office employees, and other methods to encourage employees to identify, propose, and/or implement energy saving and GHG reduction ideas. IBM locations also work with local transit authorities or use IBM developed software tools to encourage more efficient employee commuting activities including van pooling, ride sharing, and the use of public transit.
Compliance with regulatory requirements/standards	IBM makes the requisite investments to meet or exceed requirements of applicable regulations or meaningful standards. UK's Carbon Reduction Commitment is a regulatory example. ENERGY STAR program is an example of a meaningful standard. IBM also anticipates and proactively addresses emerging requirements through its product development processes to improve product and service energy efficiency with the objective of competitively positioning the company in the marketplace.
Partnering with governments on technology development	IBM has partnered with governments around the globe on the development and implementation of innovative solar electricity generation systems, development of technologies and IT based solutions to improve the efficiency of built infrastructure, the use of high performance computers to analyze climate and energy challenges, development of IT based electric grid management systems to facilitate the integration of EV charging stations and distributed, renewable energy generation into the grid infrastructure, development of innovative data center power and cooling infrastructures, and other projects which drive energy efficient technology development.
Internal finance mechanisms	Within IBM, Corporate Environmental Affairs staff, Finance, and business units collaborate to execute a cross functional business process that identifies energy conservation projects which need support and involvement from multiple business units to enable them to be competitive for capital funding.
Other	IBM organizations make use of energy efficiency incentives, grants, and tax incentives offered by governments, utilities, and energy efficiency utilities to improve the financial viability of projects and justify co-funding to implement energy conservation projects which might not otherwise meet internal IRR or ROI requirements.

CC3.3d

If you do not have any emissions reduction initiatives, please explain why not

Further Information

IBM's CO2 emissions reduction goal as described in sections CC3.1a and CC3.1e only includes IBM's scope 1 and 2 emissions related with IBM's energy consumption, meaning emissions from operational fuel combustion, as well as from electricity and purchased commodities consumption. It does not include emissions related to transportation, or from PFCs, HFCs and HTFs releases to the atmosphere. The progress toward attaining this goal is also not calculated according to the latest GHG Protocol's market-based or location-based methods. The reason for this is that IBM has been reporting its GHG emissions since 1990 using its own methodology. To allow comparable year-to-year results, the goal monitoring has maintained the original methodology. However, a comparison of IBM's and the GHG Protocol's methods showed that these methods deliver results within 0.6% difference, which validates the method IBM has been using long before The GHG Protocol instituted the market- and location-based methods. That said, had we calculated progress toward our CO2 reduction goal using the market-based methodology, we would have reported a 38.5% reduction in CO2 emissions against the 2005 baseline.

Page: CC4. Communication

CC4.1

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)

Publication	Status	Page/Section reference	Attach the document	Comment
In voluntary communications	Underway - previous year attached	Energy Conservation and Climate Protection pages: 10-20, Product Stewardship pages 21 to 27 Solutions pages 30 to 33	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC4.1/IBMEnvReport_2015-13.pdf	The 2016 IBM and the Environment Report will be available in late June or early July at this url: https://www.ibm.com/ibm/environment/annual/ Energy Conservation and Climate Protection will be found on pages 12-27. The 2016 GHG emissions inventory is on page 27; Product Stewardship is on pages 31-37; and Solutions on pages 51-55.

Publication	Status	Page/Section reference	Attach the document	Comment
In voluntary communications	Complete	IBM CDP disclosure		The CDP report is posted on the IBM environmental website at this url: https://www.ibm.com/ibm/environment/annual/
In voluntary communications	Complete	GRI Report		The completed GRI report is available at this url: https://www.ibm.com/ibm/environment/annual/
In voluntary communications	Underway - previous year attached	See the Environment Section pages 50 to 60 of the IBM Corporate Responsibility Report	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC4.1/IBM_2015_CR_report.pdf	The 2015 Environmental Section of the Corporate Responsibility Report can be found at this url: http://www.ibm.com/ibm/responsibility/2015/environment/ The 2016 report will be available at: https://www.ibm.com/ibm/environment/index.shtml It will be found in the lower right hand corner of that page.

Further Information

Module: Risks and Opportunities

Page: CC5. Climate Change Risks

CC5.1

Have you identified any inherent climate change risks that have the potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply

- Risks driven by changes in regulation
- Risks driven by changes in other climate-related developments

CC5.1a

Please describe your inherent risks that are driven by changes in regulation

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Uncertainty surrounding new regulation	The main risk deals with uncertainties, lack of harmonization, and/or overly prescriptive regulatory requirements affecting energy (consumption, supply) emissions, (GHG, air pollution, etc.), product design, operations, etc. negatively impacting the efficacy of our compliance and proactive programs. In addition, as specific actions are enacted, they are likely to increase IBM's energy costs and potentially impact reliability of energy supply. Uncertainty and lack of harmonization	Other: Operational Inefficiency, increased operational costs and inability to do business	1 to 3 years	Direct	Virtually certain	Medium	The uncertainty and lack of harmonization in regulatory requirements may impact the operating modes we use to meet our client's reliability, availability and serviceability requirements, our product design strategy and ability to put products on the market, as well as operating and compliance costs. IBM does not provide estimates of potential capital, expense and revenue implications of specific regulatory actions.	IBM has experienced staff and long established processes to track and manage regulations and standards including those affecting product design, sale and marketing, as well as data center operations. IBM complies with applicable regulations and standards globally.	It is not possible to assess the cost and revenue implications of a given regulatory change until that change is proposed. We expect some cost increases in energy cost over time above our current levels.

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>exist as a result of different jurisdictions implementing different, or even contradictory, requirements. Overly prescriptive, or even inconsistent, requirements may cause significant reliability risks for data center operations or our ability to meet client requirements given that data center operations are often technology-specific and client requirements driven. We also anticipate uncertainties associated with government implementation of regulatory schemes such as those dealing with energy and carbon taxes; emissions cap & trade;</p>								

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	emissions reporting.. While we believe these are largely priced into the market and hence did not specifically list them as direct risks, the potential impacts will change with time and there is potential for higher energy costs if/when one or more of these actions is implemented.								
Product efficiency regulations and standards	Product energy efficiency regulations and standards, such as the EU Energy Related Product Directive, ICT Equipment energy efficiency standards proposed by China National Institute of Standardization and Ministry of Environmental Protection in	Other: Operational Inefficiency, increased operational costs and inability to do business	1 to 3 years	Direct	Virtually certain	High	As countries and regions drive to adopt more product energy efficiency requirements, failure to anticipate these developments and design energy efficiency products risks losing market access with resulting loss of revenue. Financial	At the most foundational level IBM has executed a formal product stewardship program since 1991. One of the stated focus of this program is designing products to be energy efficient. The IBM product design teams follow the IBM Product	Integration of energy efficiency considerations in the product development process as part of the IBM formal product stewardship program limits the financial impact of these requirements. However, there are cost implications as energy efficient

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>China, the Japan Energy Law, and the ENERGY STAR® IT equipment requirements, will have applicability to IBM's product design, manufacturing, testing and qualification processes. They also will impact component design requirements and sourcing strategies from our supply chain.</p>						<p>implications include those associated with testing required to measure energy use of the products and updating fulfillment systems to provide necessary product information (through labels, fliers, and/or electronic documentation, etc.) If no action is taken, market access may be lost.</p>	<p>Stewardship process giving consideration to product energy efficiency. With respect to the external requirements landscape, IBM is actively involved in the development of ICT product energy efficiency requirements through participation in industry groups such as The Green Grid, standards bodies such as ETSI, and government efforts such as the USEPA ENERGY STAR program. IBM works through these groups toward setting sensible energy efficiency requirements for ICT equipment .which enable</p>	<p>designs are likely to have higher component costs and require the development of more sophisticated firmware and software management systems for which different jurisdictions may set different requirements.</p>

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
								product innovation while delivering more performance per unit of energy consumed by ICT equipment users.	
Renewable energy regulation	Increased renewable energy generation requirements are likely to increase the cost of electricity at facilities and increase the risk of grid instability where aggressive efforts have not been taken to upgrade the grid and its associated management systems to manage the intermittent nature of wind and solar generating facilities.	Other: Increased operational cost and increase potential for power interruptions due to intermittent nature of renewable generation sources causing grid instability.	1 to 3 years	Direct	Very likely	Medium	Currently, electricity generated from renewable sources has higher costs than that generated from conventional sources. Higher levels of renewable generation, under current market conditions and technology capabilities, will drive higher utility rates.	See the discussion in section 3 on IBM's energy conservation program; efforts to reduce our electricity consumption help to offset the additional cost drive by renewable generation assets in some jurisdictions. IBM is working with various suppliers to identify and capture opportunities to install on-site renewable generation projects, primarily solar	We expect some cost increases of 1 to 5% over time above our current energy costs.

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
								photovoltaic installations, and or procure renewable electricity from grid based, commercial projects at rates equal to or less than grid rates.	

CC5.1b

Please describe your inherent risks that are driven by changes in physical climate parameters

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management

CC5.1c

Please describe your inherent risks that are driven by changes in other climate-related developments

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Reputation	Companies are increasingly being assessed on their environmental programs, including their efforts to improve the energy efficiency of their operations, reducing their GHG emissions and providing products and services that enable their clients to address these attributes of their operation. IBM has demonstrated leadership in energy management for 4 decades and in climate protection for over two decades; IBM's products and services enable its clients to improve their performance and demonstrate leadership. These programs are described in section 3 of this document and in	Other: Impacts to a company's reputation extend across many of the potential impacts detailed in the dropdown list.	Up to 1 year	Direct	About as likely as not	Medium	IBM's early action and robust programs on energy conservation & GHG emissions reduction, and our focus on developing energy efficient products, services & solutions for our clients. Our strategy to drive analytics and cognitive based solutions through a cloud platform enables us to adapt in the current and evolving world of public policy and regulatory environment, client demands and impacts of climate change. These programs and capabilities enable us to avoid disruptions and minimize financial	IBM has a well established, global Environmental Management System (EMS), which requires regular assessment of the environmental impacts of its operations and setting goals and objectives to pro-actively manage its significant environmental aspects. In addition, IBM's operational expertise and experience from executing our own programs and results inform the companies regarding potential and likely business opportunities. IBM possesses, and continues to invest in, deep subject matter	There are no extraordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	the 2016 IBM and Environment report.						impacts while capturing revenue opportunities.	expertise across private and public sectors of economy enabling IBM to effectively help our clients achieve their operational efficiency.	
Changing consumer behavior	As consumers from all sectors increase their focus on energy efficiency and GHG emissions, companies must anticipate requirements for their products and innovate to address changing market needs.	Reduced demand for goods/services	3 to 6 years	Direct	Likely	High	IBM's early action and robust programs on energy conservation & GHG emissions reduction, and our focus on developing energy efficient products, services & solutions for our clients. Our strategy to drive analytics and cognitive based solutions through a cloud platform enables us to adapt in the current and evolving world of public policy and regulatory	IBM has a well established, global Environmental Management System (EMS), which requires regular assessment of the environmental impacts of its operations and activities and setting goals and objectives to pro-actively manage its significant environmental aspects. In addition, IBM's operational expertise and experience from executing our own programs	There are no extraordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
							environment, client demands and impacts of climate change. These programs and capabilities enable us to avoid disruptions and minimize financial impacts while capturing revenue opportunities.	and results inform the companies potential and likely business opportunities. IBM possesses, and continues to invest in, deep subject matter expertise across private and public sectors of economy enabling IBM to effectively help our clients achieve their operational efficiency.	impacts of climate change.
Other drivers	As society meets its energy needs and address the environmental implications of energy use, including from GHG emissions, it is likely that transformational innovations will be needed. It will be important for companies to identify, anticipate,	Other: Loss of Competitiveness and Relevancy in this space.	1 to 3 years	Direct	Unlikely	High	IBM's early action and robust programs on energy conservation & GHG emissions reduction, and our focus on developing energy efficient products, services & solutions for our clients. Our strategy to drive	IBM has a well established, global Environmental Management System (EMS), which requires regular assessment of the environmental impacts of its operations and activities and setting goals and	There are no extraordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in

Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	and be prepared to capture key transformational opportunities.						analytics and cognitive based solutions through a cloud platform enables us to adapt in the current and evolving world of public policy and regulatory environment, client demands and impacts of climate change. These programs and capabilities enable us to avoid disruptions and minimize financial impacts while capturing revenue opportunities.	objectives to proactively manage its significant environmental aspects. In addition, IBM's operational expertise and experience from executing our own programs and results inform the companies regarding potential and likely business opportunities. IBM possesses, and continues to invest in, deep subject matter expertise across private and public sectors of economy enabling IBM to effectively help our clients achieve their operational efficiency.	research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.

Please explain why you do not consider your company to be exposed to inherent risks driven by changes in regulation that have the potential to generate a substantive change in your business operations, revenue or expenditure

CC5.1e

Please explain why you do not consider your company to be exposed to inherent risks driven by changes in physical climate parameters that have the potential to generate a substantive change in your business operations, revenue or expenditure

At this time, based on the nature and scope of our business operations, IBM does not perceive unusual physical impacts outside of those we plan for as part of our ongoing business and risk management processes. These risk management processes look at business risk comprehensively including, but not limited to, risks and impacts related to climate change. We apply analytic tools to our supply chain assessment activities, integrating and assessing over 10,000 data points to evaluate potential risks. There are potential physical impacts, albeit not unique to IBM, in certain geographies which may include water scarcity or diseases. We anticipate that the business models of both IBM's and our suppliers' operations will enable those operations to anticipate and adapt to potential risks and mitigate the impacts without significant disruptions to the business.

CC5.1f

Please explain why you do not consider your company to be exposed to inherent risks driven by changes in other climate-related developments that have the potential to generate a substantive change in your business operations, revenue or expenditure

Further Information

Page: CC6. Climate Change Opportunities

CC6.1

Have you identified any inherent climate change opportunities that have the potential to generate a substantive change in your business operations, revenue or expenditure? Tick all that apply

- Opportunities driven by changes in regulation
- Opportunities driven by changes in physical climate parameters
- Opportunities driven by changes in other climate-related developments

CC6.1a

Please describe your inherent opportunities that are driven by changes in regulation

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Other regulatory drivers	IBM's portfolio of energy efficient ICT equipment, data centers, and cloud offerings, deep expertise and offerings in analytics and optimization solutions, and systems, analytics, cognitive and blockchain capabilities uniquely position IBM to assist its clients in responding to the full range of energy use and GHG reduction mandates that	Other: Increased demand for products and services, premium pricing opportunities for new products and business services	1 to 3 years	Indirect (Client)	Virtually certain	Medium-high	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics,	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	have been established or may be considered in the future. These drivers may include international, national and local laws, regulations and voluntary agreements						cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change		of products and solutions intended to address the impacts of climate change.
Cap and trade schemes	IBM's experience in making its own operations more energy efficient and its internal deployment of the capabilities developed by the company lend credibility to various solutions IBM offers to clients, including data management, analytics and	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	1 to 3 years	Indirect (Client)	Likely	Low	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>cognitive software. These tools can help clients optimize their operations, reduce their energy use and GHG emissions. IBM's business consulting services offers a suite of strategy setting, change management, business planning and process development tools to help clients minimize the impact of and adapt to regulations. In addition, IBM could be a provider of IT infrastructure for trading schemes. IBM's expertise and offerings such as those in intelligent grid management help utility clients become more competitive in servicing customers in a</p>						<p>management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change</p>	<p>expertise and offerings.</p>	<p>research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.</p>

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	carbon constrained economy.								
General environmental regulations, including planning	IBM's systemized approach to environmental management, its compliance processes, experience and record lends credibility for its business consulting services. These service offerings include strategy setting, compliance assurance, GHG inventory and reporting, asset management, intelligent and cognitive infrastructure and operational efficiency. Using its range of analytics and cognitive capabilities, IBM is poised to develop cognitive solutions that assist our clients	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	1 to 3 years	Indirect (Client)	Virtually certain	High	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	to become more effective and efficient in identifying, understanding and complying with laws and regulations that affect them.						a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change		
Emission reporting obligations	IBM's suite of software offerings including Building Management Control Center and Grid management systems offer IT based software to inventory, assess and manage energy and asset / material utilization, and provide a platform that entities can use to gather data, manage assets, reduce energy use and report energy use or GHG emissions. Using its range of analytics and cognitive	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	Up to 1 year	Indirect (Client)	Likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities.	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	capabilities, IBM is poised to develop cognitive solutions that assist our clients to become more effective and efficient in identifying, understanding and complying with laws and regulations that affect them.						IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change		address the impacts of climate change.
Renewable energy regulation	IBM Intelligent Grid management software with analytics and cognitive capabilities has functionality that facilitates the integration of distributed, renewable electricity generation systems into the electricity distribution grid. IBM has also done work on innovative means	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	Up to 1 year	Indirect (Client)	Likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center management systems, software	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	of managing and storing peak generation through the use of EV charging/docking systems and energy storage in refrigerated warehouses and water heaters. IBM Research continues to conduct basic research and develop materials and know how to drive down the cost of solar energy and storage technology.						solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change		these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.
Fuel/energy taxes and regulations	IBM's experience in making its own operations more energy efficient and its internal deployment of the capabilities developed by the company lend credibility to various solutions IBM offers to	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	Up to 1 year	Indirect (Client)	Likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions	IBM implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>clients including data management, analytics and cognitive solutions. These tools can help clients optimize their operations, reduce their energy use and GHG emissions. IBM's business consulting services offers a suite of strategy setting, change management, business planning and process development tools to help clients minimize the impact of and adapt to regulations. IBM's expertise and offerings such as which enable more efficient transportation systems help clients minimize the impact of increased fuel costs.</p>						<p>including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change</p>	<p>which can be addressed with IBM's range of expertise and offerings.</p>	<p>invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.</p>

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Air pollution limits	IBM's Green Horizons initiative is based on innovations from the company's Research Laboratory in Beijing, with contributions from leading environmental experts across IBM's global network of research labs. To help address the issue of air pollution -- considered to be the greatest environmental threat to human health -- IBM has developed next-generation pollution forecasting and management systems which draw on vast amounts of Big Data from environmental monitoring stations, weather stations, traffic cameras and	Other: Increased demand for products and services, premium pricing opportunities, new products and business services	1 to 3 years	Indirect (Client)	Virtually certain	Medium-high	These opportunities present IBM expanded market opportunities based on its portfolio of systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no extra-ordinary cost risks, as costs to execute our programs and strategy are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 billion in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to address the impacts of climate change.

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>meteorological and environmental satellites. Cognitive technologies understand this data, and use it to tune a predictive model that shows where the pollution is coming from, where it will likely go, and what will be its potential effect, allowing more informed decisions about how to improve air quality. Machine learning technologies ensure that the system automatically adjusts the predictive models to different seasons and topographies.</p>						and public sectors to respond to challenges of climate change		

Please describe your inherent opportunities that are driven by changes in physical climate parameters

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Change in mean (average) precipitation	IBM has invested in advanced water management and weather forecasting solutions both through its research activities and its acquisition of The Weather Company. The solutions generated from these platforms leverage IBM's hardware, software and data analytics and cognitive capabilities to enable business, governments and others to better understand, anticipate, and address the potential physical impacts of climate change with regards to water, resource,	Increased demand for existing products/services	1 to 3 years	Direct	Very likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 B in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above. IBM also continues to be the leader in generating patents on a wide range of innovations across our operations.

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	and systems challenges.						private and public sectors to respond to challenges of climate change.		
Induced changes in natural resources	IBM's hardware and software, data analytics and cognitive based capabilities, services, technologies and solutions enable business, governments and others to better understand (e.g., through modelling, predictive analytics), anticipate, and address the potential physical impacts of climate change with regards to water, resource and broader eco-systems challenges.	Increased demand for existing products/services	1 to 3 years	Direct	Likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 B in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above. IBM also continues to be the leader in generating patents on a

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
							capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change.		wide range of innovations across our operations.
Change in precipitation extremes and droughts	IBM possesses deep research expertise and high performance predictive computing capabilities (e.g., weather data collection and forecasting) which have been deployed to assist with preparedness and response ahead of anticipated storms; as well as water use budgeting / planning based on predictive rainfall. These capabilities can be leveraged to help with	Increased demand for existing products/services	1 to 3 years	Direct	Likely	Medium	These opportunities present IBM expanded market opportunities based on its portfolio systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 B in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above. IBM also

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	anticipating and preparing for extreme weather events and more accurately targeting resources to the points of need.						positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change.		continues to be the leader in generating patents on a wide range of innovations across our operations.
Change in precipitation pattern	IBM has invested in advanced water management and weather forecasting solutions both through its research activities and its acquisition of The Weather Company. The solutions generated from these platforms leverage IBM's hardware, software, data analytics and cognitive capabilities to enable business,	Increased demand for existing products/services	1 to 3 years	Direct	More likely than not	Low-medium	These opportunities present IBM expanded market opportunities based on its portfolio systems, software, services and solutions including the building control center, data center management systems, software solutions, service offerings, and analytics,	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 B in 2016) in research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture

Opportunity driver	Description	Potential impact	Timeframe	Direct/Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	governments and others to better understand, anticipate, and address the potential physical impacts of climate change with regards to water, resource, and systems challenges.						cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change.		opportunities including those discussed above. IBM also continues to be the leader in generating patents on a wide range of innovations across our operations.
Snow and ice	IBM possesses deep research expertise and high performance, predictive computing capabilities (e.g., weather data collection and forecasting and cognitive functionality) which have been deployed to assist with preparedness and response ahead of	Increased demand for existing products/services	1 to 3 years	Direct	More likely than not	Low-medium	These opportunities present IBM expanded market opportunities based on its portfolio systems, software, services and solutions including the building control center, data center management systems, software	IBM implements ongoing and effective business processes to identify, analyze and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. IBM continues to invest significantly (\$5.7 B in 2016) in research activities. A portion of these research dollars were applied to the development of products and

Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	anticipated storms; as well as water use budgeting / planning based on predictive precipitation levels. These capabilities can be leveraged to help with anticipating and preparing for extreme snow and ice events and more accurately target resources to the point of need.						solutions, service offerings, and analytics, cognitive and research capabilities. IBM is uniquely positioned to apply one, some, or all of these capabilities in a synergistic fashion to assist clients in both private and public sectors to respond to challenges of climate change.		solutions intended to respond to and capture opportunities including those discussed above. IBM also continues to be the leader in generating patents on a wide range of innovations across our operations.

CC6.1c

Please describe your inherent opportunities that are driven by changes in other climate-related developments

Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
Reputation	Increasingly, clients want to do	Increased demand for	Up to 1 year	Direct	Very likely	High	An inability to capture these	IBM's implements	There are no significant cost

Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	<p>business with environmentally responsible companies. This desire generally includes seeking suppliers that are addressing climate change in their operations and providing energy efficient products, services and solutions. Similarly, employees want to work for a company that is a leader in environmental protection. IBM's sustained commitment to environmental leadership and record of achievements enable the company to attract top talent, and lend credence to its energy, climate and environmental offerings. Our own operational results demonstrate IBM as an environmental leader, enable the</p>	<p>existing products/services</p>					<p>opportunities would result in lost talent, business opportunities and revenue.</p>	<p>ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.</p>	<p>risks, as these costs are embedded in IBM's current operational structure. In addition, IBM continues to invest significantly (\$5.7 B in 2016) research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above.</p>

Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	company to meet client expectations in this area and will continue to serve as a differentiator for IBM.								
Changing consumer behavior	IBM continues to expand its services and solutions and extend its deep process optimization, cognitive and analytics capabilities on a cloud platform. These platforms and capabilities are deployed as services and IT based products and solutions to drive optimized processes and systems in a variety of industries and public sectors.	Increased demand for existing products/services	1 to 3 years	Direct	Likely	Medium-high	An inability to capture these opportunities would result in lost talent, business opportunities and revenue.	IBM's implements ongoing and effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	There are no significant cost risks, as these costs are embedded in IBM's current operational structure. In addition, IBM continues to invest significantly (\$5.7 B in 2016) research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above.
Increasing humanitarian demands	IBM has developed analytic and cognitive	Premium price opportunities	1 to 3 years	Direct	More likely than not	Low-medium	An inability to capture these opportunities	IBM's implements ongoing and	There are no significant cost risks, as these

Opportunity driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact	Estimated financial implications	Management method	Cost of management
	capabilities that can assist with prioritizing and targeting aid in response to natural disasters.						would result in lost talent, business opportunities and revenue.	effective business processes to identify, analyze, and exploit emerging business opportunities which can be addressed with IBM's range of expertise and offerings.	costs are embedded in IBM's current operational structure. In addition, IBM continues to invest significantly (\$5.7 B in 2016) research activities. A portion of these research dollars were applied to the development of products and solutions intended to respond to and capture opportunities including those discussed above.

CC6.1d

Please explain why you do not consider your company to be exposed to inherent opportunities driven by changes in regulation that have the potential to generate a substantive change in your business operations, revenue or expenditure

CC6.1e

Please explain why you do not consider your company to be exposed to inherent opportunities driven by changes in physical climate parameters that have the potential to generate a substantive change in your business operations, revenue or expenditure

CC6.1f

Please explain why you do not consider your company to be exposed to inherent opportunities driven by changes in other climate-related developments that have the potential to generate a substantive change in your business operations, revenue or expenditure

Further Information

Module: GHG Emissions Accounting, Energy and Fuel Use, and Trading

Page: CC7. Emissions Methodology

CC7.1

Please provide your base year and base year emissions (Scopes 1 and 2)

Scope	Base year	Base year emissions (metric tonnes CO2e)
Scope 1	Sat 01 Jan 2005 - Sat 31 Dec 2005	196000
Scope 2 (location-based)	Mon 05 Jun 2017 - Mon 05 Jun 2017	
Scope 2 (market-based)	Sat 01 Jan 2005 - Sat 31 Dec 2005	1832000

CC7.2

Please give the name of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions

Please select the published methodologies that you use

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

CC7.2a

If you have selected "Other" in CC7.2 please provide details of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions

CC7.3

Please give the source for the global warming potentials you have used

Gas	Reference
PFCs	IPCC Second Assessment Report (SAR - 100 year)
SF6	IPCC Second Assessment Report (SAR - 100 year)
N2O	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	IPCC Fourth Assessment Report (AR4 - 100 year)
Other: Heat Transfer Fluids	IPCC Fourth Assessment Report (AR4 - 100 year)

CC7.4

Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data at the bottom of this page

Fuel/Material/Energy	Emission Factor	Unit	Reference
Diesel/Gas oil	0.07396	Other: Metric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015
Distillate fuel oil No 2	0.07396	Other: etric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015
Distillate fuel oil No 6	0.0751	Other: etric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015
Kerosene	0.0752	Other: etric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015
Liquefied petroleum gas (LPG)	0.06171	Other: etric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015
Natural gas	0.05306	Other: etric Tonnes CO2 per MMBtu	2015 Climate Registry Default Emission Factors, April 2015

Further Information

IBM has continued to use the Second Assessment emissions factors for PFCs to provide consistent year to year reporting of PFC emissions. With the divestiture of the IBM semiconductor manufacturing locations in 2015, PFCs, HCFCs and Heat Transfer Fluids (HTFs) represent just 1.2% of IBM's total scope 1 and 2 market-based emission.

Page: CC8. Emissions Data - (1 Jan 2016 - 31 Dec 2016)

CC8.1

Please select the boundary you are using for your Scope 1 and 2 greenhouse gas inventory

Operational control

CC8.2

Please provide your gross global Scope 1 emissions figures in metric tonnes CO₂e

133663

CC8.3

Please describe your approach to reporting Scope 2 emissions

Scope 2, location-based	Scope 2, market-based	Comment
We are reporting a Scope 2, location-based figure	We are reporting a Scope 2, market-based figure	An evaluation of the renewable electricity purchases against the newly published "quality criteria" for low-emitting energy consumption revealed that 84% of our renewable electricity purchases are supported with documentation that meets all quality criteria. The other 16% complies with all requirements except for being cancelled or redeemed by a REC tracking system on behalf of IBM. In these cases, the purchases were conducted in countries where such a REC tracking mechanism does not exist, hence RECs cannot be issued nor redeemed by any official entity, or the purchases were part of a governmental program to incentivize procurement of hydropower without the issuance of RECs. In all cases, the renewable attribute of IBM's procured renewable electricity is certain through the type of agreement that supports the purchase.

CC8.3a

Please provide your gross global Scope 2 emissions figures in metric tonnes CO2e

Scope 2, location-based	Scope 2, market-based (if applicable)	Comment
1485410	1155833	IBM's scope 2 emissions are calculated from the electricity and purchased commodities (steam, hot water and chilled water) consumed according to the methodologies provided by the Greenhouse Gas Protocol.

CC8.4

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

CC8.4a

Please provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure

Source	Relevance of Scope 1 emissions from this source	Relevance of location-based Scope 2 emissions from this source	Relevance of market-based Scope 2 emissions from this source (if applicable)	Explain why the source is excluded
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CC8.5

Please estimate the level of uncertainty of the total gross global Scope 1 and 2 emissions figures that you have supplied and specify the sources of uncertainty in your data gathering, handling and calculations

Scope	Uncertainty range	Main sources of uncertainty	Please expand on the uncertainty in your data
Scope 1	Less than or equal to 2%	Data Gaps Extrapolation Other: Published Emissions factors	About 10% of IBM's property portfolio is referred to as "the unreported space". As the majority of these operations are in triple net leases where utility costs are rolled up with other costs and not broken out and/or space that is shared with other tenants any fuel use is considered to be either the responsibility of the landlord or too small to be of consequence to the overall IBM scope 1 inventory. No attempt is made to estimate fuel use and associated GHG emissions for this space. However, the size of the unreported space, the fact that it is primarily office space, and the fact that many of the spaces are in temperate climates indicate that fuel use errors will be less than 2% of the total.
Scope 2 (location-based)	Less than or equal to 2%	Data Gaps Assumptions Extrapolation Other: Published Emissions factors	To estimate electricity use for locations that did not report into IBM's enterprise level energy management database - Utility Accountant (about 10% of IBM's property portfolio, termed "the unreported space" which represents approximately 3% of electricity use), an electricity use factor (MWh/square foot) is calculated by country from the reported data and applied to the "unreported space" square footage. Where reported space is dominated by data center space, data center locations may be appropriately excluded from the country specific factor to establish a more accurate estimate of the MWh per square foot consumed in office space in a given country.

Scope	Uncertainty range	Main sources of uncertainty	Please expand on the uncertainty in your data
Scope 2 (market-based)	Less than or equal to 2%	Data Gaps Assumptions Extrapolation Other: Published Emissions factors; Lack of RECs tracking mechanisms	To estimate the CO2 emissions associated with the electricity consumption taking into account their actual environmental attributes, we follow the market-based hierarchy in applying a 0 MT CO2/MWh to the electricity we procure from renewable sources, and by using supplier specific and residual mix emission factors where available, and other grid-average emission factors (sub-national or national) where no other data is available. This reduces the uncertainty of applying average emission factors for large quantities of electrical consumption. 16 percent of our procured renewable electricity during 2016 occurred in countries where a REC tracking mechanism does not exist, or where the purchases were part of a governmental program to incentivize procurement of hydropower without the issuance of RECs. In all cases, the renewable attribute of IBM's procured renewable electricity is certain through the type of agreement that supports the purchase. The fact that this small portion of our contracted renewable electricity is not supported by RECs that meet all of the quality criteria according to the Scope 2 Guidance does not compromise our ability to claim that IBM has procured 21.5% of its electricity consumption from renewable sources during 2015, exceeding the corporate goal of 20% by year-end 2020.

CC8.6

Please indicate the verification/assurance status that applies to your reported Scope 1 emissions

Third party verification or assurance process in place

CC8.6a

Please provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements

Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/section reference	Relevant standard	Proportion of reported Scope 1 emissions verified (%)
Annual process	Complete	Limited assurance	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC8.6a/IBM Verification Statement for 2016 GHG Emissions .pdf	Full document provides verification.	ISO14064-3	100

CC8.6b

Please provide further details of the regulatory regime to which you are complying that specifies the use of Continuous Emission Monitoring Systems (CEMS)

Regulation	% of emissions covered by the system	Compliance period	Evidence of submission

CC8.7

Please indicate the verification/assurance status that applies to at least one of your reported Scope 2 emissions figures

Third party verification or assurance process in place

CC8.7a

Please provide further details of the verification/assurance undertaken for your location-based and/or market-based Scope 2 emissions, and attach the relevant statements

Location-based or market-based figure?	Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/Section reference	Relevant standard	Proportion of reported Scope 2 emissions verified (%)
Market-based	Annual process	Complete	Limited assurance	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC8.7a/IBM Verification Statement for 2016 GHG Emissions .pdf	Full document provides verification.	ISO14064-3	100
Location-based	Annual process	Complete	Limited assurance	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC8.7a/IBM Verification Statement for 2016 GHG Emissions.pdf	Full document provides verification.	ISO14064-3	100

CC8.8

Please identify if any data points have been verified as part of the third party verification work undertaken, other than the verification of emissions figures reported in CC8.6, CC8.7 and CC14.2

Additional data points verified	Comment
Progress against emissions reduction target	In 2016, IBM achieved its 3rd generation CO2 emissions reduction goal: to reduce its CO2 emissions related to IBM's energy consumption by 35% against a 2005 baseline, by year end 2020, adjusted for acquisitions and divestitures. IBM's 2016 CO2 emissions were 38.1% below the 2005 baseline.
Emissions reduction activities	In 2016, IBM achieved energy conservation equivalent to 5.3% of the company's total energy consumption, versus an annual goal of at least 3.5%.
Renewable energy products	In 2016, IBM achieved its corporate goal to procure 20% of its electricity from renewable sources by year-end 2020. During 2016, IBM procured 21.5% of its electricity consumption from renewable sources.

CC8.9

Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

No

CC8.9a

Please provide the emissions from biologically sequestered carbon relevant to your organization in metric tonnes CO2

Further Information

In addition, we provide of our 2016 annual third-party verification (limited assurance) of our global Environmental Management System according to ISO 14001, which on page 3 provides an assessment of the accuracy of the energy bill entry process at the audited locations that encompass approximately 8% of our overall scopes 1 and 2 emissions (market and location based).

Attachments

[https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/ClimateChange2017/CC8.EmissionsData\(1Jan2016-31Dec2016\)/Summary of 2016 ISO 14001 Energy Management Audits.pdf](https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/ClimateChange2017/CC8.EmissionsData(1Jan2016-31Dec2016)/Summary of 2016 ISO 14001 Energy Management Audits.pdf)

Page: CC9. Scope 1 Emissions Breakdown - (1 Jan 2016 - 31 Dec 2016)

CC9.1

Do you have Scope 1 emissions sources in more than one country?

Yes

CC9.1a

Please break down your total gross global Scope 1 emissions by country/region

Country/Region	Scope 1 metric tonnes CO2e
Asia Pacific (or JAPA)	7614
Europe, Middle East and Africa (EMEA)	24382
Latin America (LATAM)	2921
Canada	7680
United States of America	91066

CC9.2

Please indicate which other Scope 1 emissions breakdowns you are able to provide (tick all that apply)

By GHG type

CC9.2a

Please break down your total gross global Scope 1 emissions by business division

Business division	Scope 1 emissions (metric tonnes CO2e)
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CC9.2b

Please break down your total gross global Scope 1 emissions by facility

Facility	Scope 1 emissions (metric tonnes CO2e)	Latitude	Longitude
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CC9.2c

Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 emissions (metric tonnes CO2e)
CO2	118343
HFCs	12952
N2O	0
PFCs	691
SF6	652
Other: Heat Transfer Fluids	1025

CC9.2d

Please break down your total gross global Scope 1 emissions by activity

Activity	Scope 1 emissions (metric tonnes CO2e)
----------	--

Further Information

IBM does not disclose or attempt to allocate GHG emissions on a business unit, facility, or activity level. Our businesses and mixed use of our facilities make such allocation not meaningful.

Page: CC10. Scope 2 Emissions Breakdown - (1 Jan 2016 - 31 Dec 2016)

CC10.1

Do you have Scope 2 emissions sources in more than one country?

Yes

CC10.1a

Please break down your total gross global Scope 2 emissions and energy consumption by country/region

Country/Region	Scope 2, location-based (metric tonnes CO2e)	Scope 2, market-based (metric tonnes CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low carbon electricity, heat, steam or cooling accounted in market- based approach (MWh)
Asia Pacific (or JAPA)	432340	391284	677987	50820
Europe, Middle East and Africa (EMEA)	387599	185786	1261621	571893
Latin America (LATAM)	62742	48774	237124	18220
Canada	24972	24909	283118	0
United States of America	577757	505080	1437580	141977

CC10.2

Please indicate which other Scope 2 emissions breakdowns you are able to provide (tick all that apply)

CC10.2a

Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2, location-based (metric tonnes CO2e)	Scope 2, market-based (metric tonnes CO2e)

CC10.2b

Please break down your total gross global Scope 2 emissions by facility

Facility	Scope 2, location-based (metric tonnes CO2e)	Scope 2, market-based (metric tonnes CO2e)

CC10.2c

Please break down your total gross global Scope 2 emissions by activity

Activity	Scope 2, location-based (metric tonnes CO2e)	Scope 2, market-based (metric tonnes CO2e)
----------	--	--

Further Information

IBM does not disclose or attempt to allocate GHG emissions by business unit, facility, or activity level. Our businesses and mixed use of our facilities make such allocation not meaningful.

Page: CC11. Energy

CC11.1

What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

CC11.2

Please state how much heat, steam, and cooling in MWh your organization has purchased and consumed during the reporting year

Energy type	MWh
Heat	54180
Steam	1018
Cooling	204517

CC11.3

Please state how much fuel in MWh your organization has consumed (for energy purposes) during the reporting year

525957

CC11.3a

Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Diesel/Gas oil	18272
Distillate fuel oil No 2	41577
Distillate fuel oil No 6	40988
Kerosene	1506
Liquefied petroleum gas (LPG)	719
Natural gas	358321
Motor gasoline	64574

CC11.4

Please provide details of the electricity, heat, steam or cooling amounts that were accounted at a low carbon emission factor in the market-based Scope 2 figure reported in CC8.3a

Basis for applying a low carbon emission factor	MWh consumed associated with low carbon electricity, heat, steam or cooling	Emissions factor (in units of metric tonnes CO2e per MWh)	Comment
Contract with suppliers or utilities, supported by energy attribute certificates	672288	0	An evaluation of the renewable electricity purchases against the scope 2 guidance published "quality criteria" for low-emitting energy consumption indicates that 2.7% of these purchases complies with all requirements except for being cancelled or redeemed by a REC tracking system on behalf of IBM. In this cases, the purchases were part of a governmental program to incentivize procurement of hydropower without the issuance of RECs. In all cases, the renewable attribute of IBM's procured renewable electricity is certain through the type of agreement that supports the purchase.
Energy attribute certificates, Renewable Energy Certificates (RECs)	1337	0	
Contract with suppliers or utilities, with a supplier-specific emission rate, not backed by electricity attribute certificates	61659	0	These purchases comply with all REC quality criteria except for being cancelled or redeemed by a REC tracking system on behalf of IBM. The purchases were part of a governmental program to incentivize procurement of hydropower without the issuance of RECs.
Direct procurement contract with a grid-connected generator or Power Purchase Agreement (PPA), supported by energy attribute certificates	47626	0	These purchases comply with all requirements except for being cancelled or redeemed by a REC tracking system on behalf of IBM. In this case the purchases were conducted in a geography without a REC tracking mechanism, hence the RECs cannot be issued nor redeemed by any official entity. The renewable attribute of IBM's procured renewable electricity is certain through the type of agreement that supports the purchase.
Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company	929	0	IBM consumed this on-site generated renewable electricity during 2016 but did not keep the Renewable Energy Certificates. This quantity has not been included into our renewable electricity procurement accounting.

CC11.5

Please report how much electricity you produce in MWh, and how much electricity you consume in MWh

Total electricity consumed (MWh)	Consumed electricity that is purchased (MWh)	Total electricity produced (MWh)	Total renewable electricity produced (MWh)	Consumed renewable electricity that is produced by company (MWh)	Comment
3637715	3637715	0	0	0	All of IBM's electricity consumption is purchased.

Further Information

IBM procured nearly 783,000 MWh of renewable electricity during 2016, which represented 21.5% of IBM's total energy consumption that year. An evaluation of the renewable electricity purchases against the newly published "quality criteria" for low-emitting energy consumption revealed that 84% of our renewable electricity purchases are supported with documentation that meets all quality criteria. The other 16% complies with all requirements except for being cancelled or redeemed by a REC tracking system on behalf of IBM. In these cases, the purchases were conducted in countries where such a REC tracking mechanism does not exist, hence RECs cannot be issued nor redeemed by any official entity, or the purchases were part of a governmental program to incentivize procurement of hydropower without the issuance of RECs. In all cases, the renewable attribute of IBM's procured renewable electricity is irrefutably certain through the type of agreement that supports the purchase.

Page: CC12. Emissions Performance

CC12.1

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

Decreased

CC12.1a

Please 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

Reason	Emissions value (percentage)	Direction of change	Please explain and include calculation
Emissions reduction activities	4.6	Decrease	Energy Conservation and efficiency projects detailed in 3.3a and 3.3b yielded a net avoidance of 83,000 metric tons CO2 emissions during 2016. 2015 reported market-based scope 1 and 2 emissions combined were 1,787,502 metric tons CO2. Calculation: $(83,000 \text{ MT CO}_2 / 1,787,502 \text{ MT CO}_2) * 100 = 4.6\%$.
Divestment	16.0	Decrease	The divestment of IBM's semiconductor manufacturing operations in July 2015 was responsible for significant decrease of our total scope 1 and scope 2 emissions year over year. The 2015 scope 1 and 2 emissions exclusively from the semiconductor manufacturing operations were 286,295 metric tons CO2. The total 2015 market-based scope 1 and 2 emissions were 1,787,502 metric tons CO2. Calculation: $(286,295 \text{ MT CO}_2 / 1,787,502 \text{ MT CO}_2) * 100\% = 16.0\%$
Acquisitions	0	No change	
Mergers	0	No change	
Change in output	0.6	Decrease	Decrease in energy consumption and CO2 emissions from changing operations in various business unit operations across IBM, such as data center closures resulting from data center consolidation.
Change in methodology	0	No change	
Change in boundary	0	No change	
Change in physical operating conditions	0	No change	
Unidentified	0	No change	
Other	6.7	Decrease	The increase in IBM's purchase of renewable electricity from 2015 to 2016 was responsible for the avoidance of 47,305 metric tons CO2. The decrease in CO2 emission factor for the grid delivered electricity IBM received avoided additional 72,754 metric tons CO2. The total 2015 market-based scopes 1 and 2 emissions were 1,787,502 metric tons CO2. Calculation: $[(47,305 \text{ MT CO}_2 + 72,754 \text{ MT CO}_2) / 1,787,502 \text{ MT CO}_2] * 100\% = 6.7\%$

CC12.1b

Is your emissions performance calculations in CC12.1 and CC12.1a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

CC12.2

Please describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tonnes CO2e per unit currency total revenue

Intensity figure =	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator: Unit total revenue	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
0.00001614	metric tonnes CO2e	79919000000	Market-based	8.0	Decrease	<p>The change was driven by a 27.9% decrease in CO2 emissions for IBM's operations in 2016 & a 2.2% decrease in revenue. Key drivers for the decrease in emissions were energy conservation actions e.g. virtualization & consolidation projects in data centers; optimization of heating, ventilation & air conditioning (HVAC) & central utility plants operations; & building monitoring & continuous commissioning of existing energy saving systems & use of renewables. IBM uses absolute metrics instead of intensity metrics (whether based on activity, production, financials, etc.) to measure its CO2 emissions reduction. IBM has diverse business activities & no one single indexed metric appropriately characterizes our programs & progress. (1) IBM has many facilities which support more than one operation including but not limited to software labs, consulting services, data center operations, data center services, hardware design, hardware manufacturing & for the first half of 2015, also semiconductor manufacturing. There is no effective methodology to segregate operations or to allocate the overhead energy use associated with centralized activities. (2) IBM's operations are not able to be divided into neatly differentiated "unit operations" for which an activity related metric would make sense. (3) The majority of IBM activities are based on knowledge transfer including but not limited to research, software labs, consulting services, hardware design, & data center services. For these operations, an activity related intensity is merely a measure of the efficiency of the office space & the number of people who work at home or are mobile. The true measure of worth is the energy efficiency offered</p>

Intensity figure =	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator: Unit total revenue	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
						through the services & products offered by IBM. (4) For IT hardware manufacturing & assembly, various parts of component manufacturing & assembly are subcontracted. Individual facilities make a multitude of products for a multitude of customers. An activity related metric provides no insight into the efficiency or attributes of the manufacturing processes. We do not believe an increase or decrease in an intensity metrics provide a meaningful correlation between IBM's emissions & activities given the diversity of our business & where / how our businesses are conducted. This notwithstanding, IBM is committed to climate protection, supported by goals & programs & demonstrated by results.

CC12.3

Please provide any additional intensity (normalized) metrics that are appropriate to your business operations

Intensity figure =	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator	Metric denominator: Unit total	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
4.7	metric tonnes CO2e	full time equivalent (FTE) employee	380300	Market-based	13	Decrease	The change was driven by a 27.9% decrease in CO2 emissions for IBM's operations in 2016 & a 2.2% decrease in revenue. Key drivers for the decrease in emissions were energy conservation actions e.g. virtualization & consolidation projects in data centers;

Intensity figure =	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator	Metric denominator: Unit total	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
							<p>optimization of heating, ventilation & air conditioning (HVAC) & central utility plants operations; & building monitoring & continuous commissioning of existing energy saving systems & use of renewables. IBM uses absolute metrics instead of intensity metrics (whether based on activity, production, financials, etc.) to measure its CO2 emissions reduction. IBM has diverse business activities & no one single indexed metric appropriately characterizes our programs & progress. (1) IBM has many facilities which support more than one operation including but not limited to software labs, consulting services, data center operations, data center services, hardware design, hardware manufacturing & for the first half of 2015, also semiconductor manufacturing. There is no effective methodology to segregate operations or to allocate the overhead energy use associated with centralized activities. (2) IBM's operations are not able to be divided into neatly differentiated "unit operations" for which an activity related metric would make sense. (3) The majority of IBM activities are based on knowledge transfer including but not limited to research, software labs, consulting services, hardware design, & data center services. For these operations, an activity related intensity is merely a measure of the efficiency of the office space & the number of people who work at home or are mobile. The true measure of worth is the energy efficiency offered through the services & products offered by IBM. (4) For IT hardware manufacturing & assembly, various parts of component manufacturing & assembly are subcontracted. Individual facilities make a multitude of products for a multitude of customers. An activity related metric provides no insight into the efficiency or attributes of the manufacturing processes. We do not believe an increase or decrease in an intensity metrics provide a meaningful</p>

Intensity figure =	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denominator	Metric denominator: Unit total	Scope 2 figure used	% change from previous year	Direction of change from previous year	Reason for change
							correlation between IBM's emissions & activities given the diversity of our business & where / how our businesses are conducted. This notwithstanding, IBM is committed to climate protection, supported by goals & programs & demonstrated by results.

Further Information

Page: CC13. Emissions Trading

CC13.1

Do you participate in any emissions trading schemes?

Yes

CC13.1a

Please complete the following table for each of the emission trading schemes in which you participate

Scheme name	Period for which data is supplied	Allowances allocated	Allowances purchased	Verified emissions in metric tonnes CO2e	Details of ownership
European Union ETS	Fri 01 Jan 2016 - Sat 31 Dec 2016	9950	0	932	Facilities we operate but do not own

CC13.1b

What is your strategy for complying with the schemes in which you participate or anticipate participating?

The EU ETS has had minimal impact on the operating costs at the 4 covered facilities in the United Kingdom. Because fuel usage is a small part of the operating expense of these facilities and the emissions from these facilities are an insignificant part of the overall national CO2 emissions for the UK, management of the EU ETS allocation has not had a material impact on facility operating costs. These facilities are also engaged in implementing energy conservation projects to meet IBM's energy conservation commitment. The expectation is that these conservation projects would drive reductions in fuel use and emissions at affected facilities.

CC13.2

Has your organization originated any project-based carbon credits or purchased any within the reporting period?

No

CC13.2a

Please provide details on the project-based carbon credits originated or purchased by your organization in the reporting period

Credit origination or credit purchase	Project type	Project identification	Verified to which standard	Number of credits (metric tonnes CO2e)	Number of credits (metric tonnes CO2e): Risk adjusted volume	Credits canceled	Purpose, e.g. compliance

Further Information

IBM does not purchase “emissions credits” to offset GHG emissions from its operations. One key reason for this is that the required expenditure for purchasing emissions credits is not justified given the opportunities we have to achieve actual emissions avoidance or reduction in various areas of our businesses. Achieving emissions avoidance or reduction, not merely offset, is essential toward stabilizing or reducing atmospheric CO2 concentration. Moreover, there remain concerns regarding the quality of offsets, as they can vary significantly depending on the issuing or certifying organization and reputation of such, the required verification and credibility thereof, and project type and location. Finally there remains significant difference in points of view concerning the real utility of pursuing carbon neutrality. IBM believes that investing in programs to reduce emissions from its operations and to make its products and solutions more energy efficient allows the company to generate the greatest business and climate protection benefit, and the company continues to find that there are strong opportunities in these areas. Put it another way, we prioritize the available resource / funding so that we can most effectively achieve GHG emissions avoidance or reductions in operations, find and procure economical renewable energy sources, and design and offer energy efficient products and services. We strongly believe our best investment is in directly reducing GHG emissions from IBM's operations and associated with the use of our products and solutions, as opposed to purchasing emissions credits. IBM does not currently generate emissions reductions credits from emissions reductions projects. IBM participated in the Chicago Climate Exchange GHG inventory and trading platform from 2003 to 2010 to develop an understanding of documentation, validation and trading of GHG credits, but was not an active participant in the exchange. IBM uses its internally generated emissions reductions from energy conservation projects to meet its corporate GHG reduction goals.

Page: CC14. Scope 3 Emissions

CC14.1

Please account for your organization's Scope 3 emissions, disclosing and explaining any exclusions

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
Purchased goods and services	Relevant, calculated	190000	These are the emissions associated with IBM data center operations in 3rd party co-location space. The emissions are calculated by multiplying the electricity consumed by these data centers in third party co-location space times the location specific emissions factor for that location.	100.00%	Some of IBM's data center operations are located in third party co-location space. IBM maintains an inventory of their electricity use and uses that inventory to calculate the CO2 emissions associated with electricity consumption for IBM operations at these locations.
Capital goods	Relevant, not yet calculated		No calculation was performed.		IBM has no plans to attempt to estimate embedded emissions associated with its purchase of capital goods. There is no rational basis on which to estimate or report the embedded emissions of our purchased capital equipment. This item would require gross assumptions to estimate the product level embedded GHG estimates for building materials, IT equipment, etc. This data is not available in any form that has any validity or basis in reality.
Fuel-and-energy-related activities (not included in Scope 1 or 2)	Relevant, calculated	36500	Lease Vehicle Emission Calculation: IBM car fleet data related to vehicle make and model, term and mileage, fuel type and fuel consumption are collected through our lease vehicle suppliers. All reported vehicles have been active at least one day during the reporting year and only the reporting year's mileage is reported. In some cases, the CO2 emissions associated with the lease car use are supplied directly by our suppliers. In all other cases, we calculate the CO2 emissions based on the car and fuel type, dividing	100.00%	In some countries, certain IBM employees are provided vehicles through a lease program. These vehicles may be used for business purposes as well as for personal use. Reported mileage is apportioned 50% to personal use and 50% to business use, and the business use if divided 50% between business use and 50% to commuting. 75% of the emissions, from personal use and commuting are reported as scope 3 emissions and the 25% of emissions associated with business related operations

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
			the mileage travelled by average mile per gallon for the car type and then calculating the CO2 emissions using the appropriate fuel emission factor.		are counted as scope 1 emissions. IBM continues its effort to move to more fuel-efficient lease vehicles by setting guidelines for smaller engines with lower emissions for vehicles that are offered to employees under this program.
Upstream transportation and distribution	Relevant, not yet calculated		No calculation was performed.		IBM's upstream suppliers manage their own logistics / shipping operations. There are a large number of suppliers and locations from which parts and components are sourced. It is appropriate that our suppliers managed transportation and packaging of components and parts to IBM as they are doing the same for multiple customers. Through its Worldwide Packaging Engineering organization, IBM focuses on working with our suppliers to reduce packaging volume and weight to make shipping more efficient by helping our suppliers improve their packaging, reducing the use of materials and fuel and reducing costs. Please see the discussion under Purchased Goods and Services; and the Protective Product packaging sections of the IBM Environmental Report for further explanation of our methodology and position.
Waste generated in operations	Relevant, not yet calculated		No calculation was performed.		IBM does not intend to estimate GHG emissions associated with waste disposal because there is no rational basis for credible assumptions, let alone generating an estimate.

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
					IBM has and publishes goals for hazardous waste reduction and recycling of non-hazardous wastes generated in its operations. IBM focuses its efforts on making its operations more efficient to reduce waste generation and increase recycling. These efforts deliver demonstrable emissions reductions. Please see the discussion under the Pollution Prevention section of the IBM Environmental Report for further discussion.
Business travel	Relevant, calculated	521000	These are the emissions from business air travel on commercial carriers and car rentals. The CO2 emissions from rental cars are directly provided by our suppliers, who multiply mileage driven by CO2 emission factor from the vehicle manufacturers to estimate total emissions. The CO2 emissions calculation for air travel is based on European standards as outlined in UNECE/EMEP Emission Inventory Guidebook (SNAP/CORINAIR). Fuel burn (in kg) is per aircraft and total is a combination of LTO activities (taxi, take out, take off, climb out) and CCD activities (climb, cruise, descent, approach, landing, taxi in). Methodology used for airline combustion tables: 1. Total amount of fuel used (in kilo tonnes) 2. Total number of LTO activities per aircraft (for each aircraft type fuel use factor is used) 3. Total number of CCD (subtracting total amount of fuel for LTO from total amount of fuel used) 4. Calculating emissions from LTO	100.00%	This item reports CO2 emission associated with IBM's airline travel and use of rental cars.

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
			activities per aircraft type (number of LTOs for each aircraft type is multiplied by the emission factor related to the particular aircraft type and pollutant) 5. Calculating emissions from CCD activities using the corresponding emission factor for the most common aircraft types used. 6. Calculating total emissions for LTO and CCD activities CO2 calculation: CO2 emissions / fuel burn ratio = 3.15 kg CO2/ kg fuel. Emissions are allocated per seat.		
Employee commuting	Relevant, calculated	127000	IBM estimates its CO2 emissions from employee commuters in the United States. This estimate was made using the WRI Combustion Calculator Tool, version 2.3 and the following assumptions: traditional employees commuted 235 days a year; mobile employees commuted 141 days a year; and home office employees commuted 47 days a year; with an average round trip of 25.4 miles using total vehicle distance traveled in miles; vehicle type (passenger car - gasoline - Year 2005 to present; CO2 emission factor of 0.392 MT CO2/1000 miles).	100.00%	Estimates of IBM commuter travel in the United States. This figure was calculated using IBM internal data on employee work type assignments and assumptions about the frequency with which the different work types drive to the office or a customer location. CO2 emissions were calculated by multiplying estimated commuter mileage times the appropriate emission factors.
Upstream leased assets	Not relevant, explanation provided		Not relevant.		IBM does not have a significant inventory of upstream leased assets.
Downstream transportation and distribution	Relevant, not yet calculated		No calculation was performed.		Logistics and shipping activities directly supporting IBM's operations are managed by a 4PL (4th party logistics) provider. IBM's logistic operations are too widely dispersed across

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
					<p>geographies, shippers and consolidated loads to allow credible estimates of CO2 emissions. For this reason, IBM does not presently have plans to try to determine the mileage, weight and GHG emissions associated with the transport of parts and components between suppliers and IBM's manufacturing and assembly locations. We do work to maximize the efficiency of our logistics operations for activities we can control. In 2016, 98 percent of IBM's spending on shipments of goods within the United States and from the U.S. to Canada and Mexico went through a SmartWay logistics provider. The remaining 2 percent are largely local carriers hired for local or one-off deliveries or support at an operating facility. IBM also voluntarily applies specific SmartWay requirements to its distribution operations globally. IBM has a packaging engineering organization which designs and/or improve the efficiencies of packaging for IBM products and packaging used to move components to IBM product assembly locations. These engineering efforts have reduced packaging volume and weight to make shipping more efficient by increasing shipping density. Efficient packaging also results from collaboration with the product design teams to increase product ruggedness and through the use of lighter, more environmentally preferable packaging</p>

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
					materials. All these results effectively reduce the CO2 emissions associated with product shipment, in addition to the direct reductions in packaging materials. The IBM Worldwide Packaging Engineering organization boasts a decades-long record of continually improving packaging solutions to reduce shipping weight and packaging volume and sharing our knowledge with our supplier network. Descriptions of these projects can be found in the IBM Environmental report in the Protective Product Packaging section.
Processing of sold products	Not relevant, explanation provided		No calculation was performed.		IBM divested virtually all operations that produce products for subsequent processing during 2015 as the result of the sale of its semiconductor manufacturing operations.
Use of sold products	Relevant, calculated	400000	Reporting Annual Estimated Emissions Associated with Products SOLD in 2016: IMPORTANT: The reported number only estimates the annual quantity of power used by products sold by IBM in 2016 and only reflect the stated assumptions. It does NOT include emissions of the entirety of our product installed base. The total estimated emissions are Metric Tons of CO2. Assumptions: 1. Scope: server and storage systems sold by IBM in 2016. 2. Maximum name plate power an average maximum name plate power use is assigned to each machine type. 3. Actual power use estimate: The assigned maximum power is	100.00%	IBM does not believe there is meaningful value to estimating and reporting downstream emissions associated with product use. Installed base quantity, configuration differences, customer use patterns, differences in applications, and the very different electricity CO2 emissions factor depending on where the electricity is sourced make any calculation highly uncertain at best. Environmental impacts, including energy requirements during the use phase of a product should be evaluated in the design process. Careful evaluation of the use conditions and the power

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
			discounted, considering the many product configurations that are sold and the fact that systems do not operate in a fully loaded mode at all times. 4. Cooling requirements: a. It is assumed that for every watt of power required to run a server or storage system, 0.5 watts of power is required for cooling. 5. Operating requirements: Servers and storage systems run 24 hours per day, 7 days per week, 365 days per year. 6. The GHG emissions factor for electricity is 0.39 Metric Tons CO2 per MWh. Estimated annual CO2 emissions during use phase of servers and storage systems sold in 2016: multiply the following: Number of Units sold in 2016; 0.39 MT CO2/MWh consumed; Discount factor; assigned average maximum name plate power; 8,760 hours of operation in 2016, Power Use Effectiveness factor of 1.5.		or fuel use will allow the designers to determine which hardware components and functions offer opportunities for reduced energy use and should be prioritized for improvements in energy efficiency. Moreover, the emission calculated for the products we sell become our client's scope 1 and scope 2 emissions. Since the ultimate goal for climate protection is for global societies to achieve demonstrable reductions in actual GHG emissions, we believe real results in GHG emissions reduction are directly achieved when each enterprise takes responsibility to address its own emissions and improve its energy efficiency.
End of life treatment of sold products	Relevant, not yet calculated		No calculation was performed.		IBM does not attempt to estimate GHG emissions associated with disposal of its products at end of life. There is no accepted standard or practice for how to determine when a product (in particular non consumer products) will reach end of life or the ways it will be reused and recycled. There are too many variables and too much uncertainty in establishing assumptions and the analysis to generate credible scope 3 data associated with product disposal. IBM focuses its resources on

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
					its product design activities to make systems upgrade-able and easy for of disassembly, to allow components to be reused or recycled at end of life, to minimize energy use over the life of the product, and to enable product end of life recycling. In 2016, IBM's Product End-of-Life Management (PELM) operations worldwide processed over 30,800 metric tons of end-of-life products and product waste. IBM's PELM operations reused or recycled approximately 97 percent of the total amount of product and product waste they processed and only 0.6% of the total processed material went to land fill. The remainder was incinerated for energy recovery.
Downstream leased assets	Not relevant, explanation provided		Not relevant.		IBM does lease equipment to clients. These emissions are included in the use of sold products.
Franchises	Not relevant, explanation provided		Not relevant.		IBM does not operate franchises.
Investments	Not relevant, explanation provided		Not relevant.		IBM's scope 3 emissions result from supplier activities and purchases to support its direct operations. IBM does not make significant investment outside of its own operations.
Other (upstream)	Not relevant, explanation provided		Not relevant.		There are no other upstream scope 3 emissions categories associated with IBM operations.

Sources of Scope 3 emissions	Evaluation status	metric tonnes CO2e	Emissions calculation methodology	Percentage of emissions calculated using data obtained from suppliers or value chain partners	Explanation
Other (downstream)	Not evaluated		Not relevant.		There are no other downstream scope 3 emissions categories associated with IBM operations.

CC14.2

Please indicate the verification/assurance status that applies to your reported Scope 3 emissions

Third party verification or assurance process in place

CC14.2a

Please provide further details of the verification/assurance undertaken, and attach the relevant statements

Verification or assurance cycle in place	Status in the current reporting year	Type of verification or assurance	Attach the statement	Page/Section reference	Relevant standard	Proportion of reported Scope 3 emissions verified (%)
Annual process	Complete	Limited assurance	https://www.cdp.net/sites/2017/84/9284/Climate Change 2017/Shared Documents/Attachments/CC14.2a/IBM Verification Statement for 2016 GHG Emissions.pdf	Page 2.	ISO14064-3	100

CC14.3

Are you able to compare your Scope 3 emissions for the reporting year with those for the previous year for any sources?

Yes

CC14.3a

Please identify the reasons for any change in your Scope 3 emissions and for each of them specify how your emissions compare to the previous year

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comment
Purchased goods & services	Change in boundary	64	Increase	IBM increased the number of its data centers in third-party co-location space.
Fuel- and energy-related activities (not		19	Increase	IBM continues to work with its auto leasing supplier to offer more fuel efficient vehicles. Use of more fuel efficient vehicles reduces the emissions. Part of the reason for this year's increase is the expansion of our reporting boundary based on the additional, more detailed

Sources of Scope 3 emissions	Reason for change	Emissions value (percentage)	Direction of change	Comment
included in Scopes 1 or 2)				information we were able to obtain from our rental and leased vehicle suppliers. Excluding the expanded boundary compared to the previous year, we would report an increase of 14% from 2015 to 2016. That said, we believe in general, comparing year to year emissions for the leased vehicle fleet has almost no value, due to the high level of uncertainty in the emissions estimate created by the extensive assumptions that have to be made regarding the percentage of personal use and the average emissions associated with a given vehicle.
Business travel	Change in output	0.2	Decrease	The total amount of flights decreased by 2% and the respective mileage decreased by 1.5% from 2015 to 2016. That said, we believe in general, comparing year to year emissions for business travel has almost no value due to the high level of uncertainty in the emissions estimate created by extensive assumptions that have to be made in determining business travel emissions.
Employee commuting	Emissions reduction activities	0.8	Decrease	IBM continues to enable employees to regularly work at home, reducing the amount of employee commuting. There was an estimated 1% reduction in employee commuting miles from 2015 to 2016. That said, we believe in general, comparing year to year emissions for commuting activities has almost no value, due to the high level of uncertainty in the emissions estimate created by the extensive assumptions that have to be made regarding number of employees commuting, the average commute and the average emissions associated with an average vehicle.
Use of sold products		8	Decrease	Emission reductions occurred due to a reduction in products sold, changes in product composition, and a reduction in the global average emissions factor for electricity.

CC14.4

Do you engage with any of the elements of your value chain on GHG emissions and climate change strategies? (Tick all that apply)

- Yes, our suppliers
- Yes, our customers

CC14.4a**Please give details of methods of engagement, your strategy for prioritizing engagements and measures of success**

The IBM Supply Chain and Procurement Organization maintains an Environmental Management System (EMS) which evaluates and addresses our intersections between the environment and supply chain management. Its execution is led by technical leaders responsible for specific areas including environmental regulatory compliance of procured hardware products; fulfillment; logistics; packaging; supply chain social responsibility and environmental management. These leaders interact with 30 procurement commodity councils to implement, sustain and continually improve Procurement's EMS across the organization globally. During 2016, we continued our focus on working with IBM's supply chain to foster greater energy efficiency and climate protection. IBM is committed to doing business with environmentally responsible suppliers. We require that all of our first tier suppliers—those firms with which we hold a direct commercial relationship—to establish and sustain a management system to address their social and environmental responsibilities—including their use of energy and scope 1 and scope 2 GHG emissions. They are also required to measure their performance, establish voluntary, quantifiable goals in this area, publicly disclose their performance against those goals, and cascade these requirements on to their suppliers who perform work that is material to the products, parts and/or services being supplied to IBM. Through the Electronic Industry Citizenship Coalition (EICC) Environmental Reporting system, IBM and other participating companies are gathering information to gain an understanding on how suppliers are addressing climate change and working to reduce GHG emissions. IBM has continued to work with its suppliers to help them build their capabilities through compliance to IBM's Supply Chain Social and Environmental Management System and other requirements for IBM's suppliers. We prioritize our interactions with suppliers as follows: those suppliers that ask for assistance, those with whom IBM has highest spend, and those whose operations have a greater intersection with the environment. We review all suppliers at some level in our program. The IBM procurement team has provided training and conducted assessments to evaluate supplier performance, and disclosure. 1. IBM made available a podcast on management system and provided many external sources of information to all suppliers to explain the EMS requirements, assist them in preparing energy and GHG emissions inventories, and the basic steps needed to conform to the requirements. 2. IBM executes an ongoing assessment program of suppliers prioritized by spend and type of product or service provided to IBM. The measure of success is that the supplier has a publicly reported energy use and GHG inventory and reduction plan. 3. IBM uses the EICC environmental reporting systems or suppliers' own websites to review suppliers' practice on disclosing energy use and GHG emissions. Client engagement: IBM supplies to a broad range of environmental surveys which include climate change topics. IBM also works extensively with its clients (private and public alike) to assist them in making their operations and systems more efficient as measured by energy efficiency, avoidance of carbon emissions, and reduced material use. We measure success based on the conformance of our suppliers with our requirements and the satisfaction of our clients.

CC14.4b

To give a sense of scale of this engagement, please give the number of suppliers with whom you are engaging and the proportion of your total spend that they represent

Type of engagement	Number of suppliers	% of total spend (direct and indirect)	Impact of engagement
Active engagement	5000	100%	<p>IBM currently engages with approximately 12,000 suppliers, and not 5,000 as shown in the field to the left (5,000 had to be entered because it is the highest value the system will accept). IBM communicated its Supply Chain Social and Environmental Management System (S&EMS) requirements to all of its suppliers globally. IBM has continued to work with its suppliers to help them build their capabilities to meet IBM's S&EMS and other environmental requirements, setting priority with those suppliers that ask for assistance, those with whom IBM has highest spend, and those whose operations have a greater intersection with the environment. The IBM procurement team has provided training and reviewed supplier performance, including validating that suppliers are disclosing their energy use and GHG emissions. 1. IBM made available a podcast on management system and provided many external sources of information to all suppliers to explain the EMS requirements, assist them in preparing energy and GHG emissions inventories, and the basic steps needed to conform to the requirements. 2. To-date, our review found suppliers corresponding to the majority of IBM's procurement spend have such a management system in place. Where suppliers are not meeting all of the requirements, we work with them as appropriate to bring their programs up to IBM's requirements. 3. IBM uses the EICC environmental reporting systems or suppliers' own websites to review suppliers' practice on disclosing energy use and GHG emissions. IBM's supplier EMS program rests on the foundational belief that real results in GHG emissions reduction are enabled by credible and actionable information about a company's energy use and GHG emissions and that individual companies must be accountable for their own operations and are best positioned to assess, implement and sustain real GHG reductions. Each enterprise must take responsibility to reduce energy use and GHG emissions.</p>

CC14.4c

Please explain why you do not engage with any elements of your value chain on GHG emissions and climate change strategies, and any plans you have to develop an engagement strategy in the future

Further Information

Module: Sign Off

Page: CC15. Sign Off

CC15.1

Please provide the following information for the person that has signed off (approved) your CDP climate change response

Name	Job title	Corresponding job category
Edan Dionne	Director of Corporate Environmental Affairs	Other: IBM Director (Executive Position)

Further Information

Module: ICT

Page: ICT1. Data center activities

ICT0.1a

Please identify whether "data centers" comprise a significant component of your business within your reporting boundary

Yes

ICT1.1

Please provide a description of the parts of your business that fall under "data centers"

IBM operates data centers (DCs) inclusive of a range of cloud and enterprise infrastructure that support its own operations, including product (software and hardware systems) development and testing, and client operations. These operations are supported by several hundred public and private cloud and enterprise data centers located around the globe. These data centers are located in facilities that IBM operates as well as in third party facilities where the facilities infrastructure and utility purchases are managed by the owner while IBM operates the IT equipment. IBM also operates data centers on behalf of its clients in client facilities. Data in this report is specific to IBM managed data centers where IBM operates both the IT equipment and facilities infrastructure. The hundreds of data centers that IBM operates range in vintage. Recently constructed IBM data centers in Belgium, Canada, New Zealand, and the U.S. use the latest energy efficiency innovations for DC operations. They include the analytics driven measurement and management system, such as Measurement and Management Technology (MMT) and Vigilant, to provide real time thermal monitoring and management in DCs, free cooling, variable speed fans, high efficiency chiller systems, and intelligent building control systems. IBM also invests heavily to achieve significant efficiency improvements in its existing DCs. IBM has installed MMT or Vigilant at the majority of its strategic DCs and IT labs. These innovative systems produce a real-time, detailed, three dimensional thermal map of the heat sources and sinks within a DC, allowing for

accurate identification and mitigation of hot spots and increased DC operating temperatures, with attendant reductions in cooling requirements and GHG emissions. In 2016, we completed over 340 projects at 97 existing DC locations that reduced energy use by over 25,800 MWh and associated CO2 emissions of 10,000 MT . From 2010 to 2016, IBM has shut down over 33% of the total number of computer room air conditioning (CRAC) units and raised the average DC raised floor temperature over 2.5oC in the DCs with MMT or Vigilant deployed. IBM continues to aggressively utilize virtualization technologies to consolidate workloads from servers and storage systems with low utilization onto single systems. We have virtualized thousands of applications and reduced energy use by more than 78,000 megawatt-hour (MWh) and associated CO2 emissions of 30,000 MT, in 2016. As of the end of 2016, IBM has 39 data centers in 18 countries, representing 70% of IBM's EU DC space, registered to the EU Data Center Code of Conduct. IBM has the largest portfolio of registered DCs from a single company under this program. The EU Data Center Code of Conduct is a voluntary initiative that aims to promote energy efficiency performance standards for DCs. IBM maintains energy efficiency leadership in DCs by deploying uniform practices across its global data center portfolio. IBM continues to expand its cloud computing offerings. IBM Bluemix Infrastructure and IBM's Cloud Managed Services operates over 55 data centers in 19 countries. Cloud computing is an efficient model that optimizes the use of virtualization technologies for providing IT services. It allows us to further improve utilization of IT equipment assets, better balance workloads, adjust operations and virtualize infrastructure in data centers to align processing and storage needs with power consumption. In response to ICT1.2: IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM will complete all of the questions in ICT1 with the exception of ICT1.2. We consider our data center specific electricity consumption and GHG emissions information to be business confidential. IBM's operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful.

ICT1.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the data centers component of your business

Business activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
Data centers					We consider our data center specific electricity consumption and GHG emissions information to be business confidential

ICT1.3

What percentage of your ICT population sits in data centers where Power Usage Effectiveness (PUE) is measured on a regular basis?

Percentage	Comment
59%	IBM has had an ongoing corporate wide effort to measure power usage effectiveness (PUE) at the data centers it operates. Presently approximately 59% of IBM data center space is collecting PUE data. Some data center space, particularly older data centers, does not have the necessary metering to provide a precise PUE estimate. The estimated PUE at these facilitates are indicative of the data center performance and

Percentage	Comment
	useful in assessing performance improvements but are not suitable for use in reporting and are not used in the calculation of the average corporate PUE reported in ICT1.4.

ICT1.4

Please provide a Power Usage Effectiveness (PUE) value for your data center(s). You can provide this information as (a) an average, (b) a range or (c) by individual data center - please tick the data you wish to provide (tick all that apply)

Average
Range

ICT1.4a

Please provide your average PUE across your data centers

Number of data centers	Average PUE	% change from previous year	Direction of change	Comment
52	1.69	1	Decrease	The average PUE value was generated from 52 data centers that report PUE and is representative of the average PUE of IBM's global data center inventory. The 52 data centers represent approximately 59% of our services data center space. As discussed below, IBM has been aggressively executing data center energy efficiency projects in its data centers over the past 5 years. IBM's average PUE reduced by 1% from 2015 to 2016. The IBM data center teams continue to take aggressive action to virtualize server, storage and network operations and do more work with less IT equipment and energy consumption. In 2016, we increased the number of virtualized images by more than 29 percent, the average number of images per virtualized server by 20 percent, and the number of virtualized servers by 4 percent — improving the overall efficiency of our installed base of servers. The overall performance of these data centers is equivalent to the average PUE of 1.7 as reported in the Uptime Institute 2014 Data Center Industry Survey of 1,000 Data center users, and performs favourably against the average PUE of 2.0 as reported by a Forrester Consulting Survey commissioned by Digital Realty Trust in its survey of 300 IT decision makers reported in February of 2014. There were no updates to these external reports in 2016.

ICT1.4b

Please provide the range of PUE values across your data centers

Number of data centers	PUE Minimum Value	% change of PUE Minimum Value from previous year	PUE Maximum Value	% change of PUE Maximum Value from previous year	Direction of change	Comment
52	1.39	1	2.7	15	Decrease	The range of PUE values was generated from 52 data centers that report PUE and is representative of the PUE range of IBM's global data center inventory. As discussed below, IBM has maintained a focused and aggressive effort in implementing data center energy efficiency projects in its data centers over the past 5 years. The minimum PUE value decreased slightly and the maximum PUE value decreased by 15% as the data center responsible for last year's maximum value was emptied and closed.

ICT1.4c

Please provide your PUE values of all your data centers

Data center reference	PUE value	% change from previous year	Direction of change	Comment
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ICT1.5

Please provide details of how you have calculated your PUE value

Green Grid, or Total Facility Power divided by IT Equipment Power

ICT1.6

Do you use any alternative intensity metrics to assess the energy or emissions performance of your data center(s)?

No

ICT1.6a

Please provide details on the alternative intensity metrics you use to assess the energy or the emissions performance of your data center(s)

ICT1.7

Please identify the measures you are planning or have undertaken in the reporting year to increase the energy efficiency of your data center(s)

Status in reporting year	Energy efficiency measure	Comment
Implemented	Server Virtualization	These numbers include server and storage consolidation activities. IBM is utilizing virtualization technologies to consolidate workloads from servers and storage systems with low utilization onto virtualized systems managing 10 or more images or applications, reducing annual energy use and cost by more than 78,000 MWh and avoiding 30,000 MT CO2 emissions. In 2016, we increased the number of virtualized images by more than 29 percent, the average number of images per virtualized server by 20 percent, and the number of virtualized servers by 4 percent — improving the overall efficiency of our installed base of servers.
Implemented	Cooling Efficiencies	In 2016, we completed over 340 projects at 97 existing DC locations that reduced energy use by over 25,800 MWh and associated CO2 emissions by 10,000 MT. From 2010 to 2016, IBM has shut down over 33% of the total number of computer room air conditioning (CRAC) units and raised the average DC raised floor temperature over 2.5oC in the DCs with MMT or Vigilant deployed. These projects included blocking cable and rack openings; rebalancing air flow; shutting down, upgrading and reprovisioning air flow from computer room air conditioning (CRAC) units; and increasing the chilled water temperature used to cool the data center floor. The automated, analytics based thermal management systems has been installed at IBM's data centers covering over 60% of our global raised floor energy consumption. These innovative technologies produce a real-time, detailed, three-dimensional thermal map of the heat sources and sinks within a data center which provide the information needed to take the actions discussion above.. The systems also offer the additional benefit of rebalancing a data center's thermal profile as equipment is removed or installed, enabling the early identification of developing problems to pro-actively mitigate their impacts.
Implemented	Server Consolidation	As servers are virtualized and images per server are increased, server infrastructure can be consolidated. These are two example projects from 2016. Collaborating with our client, IBM consolidated the IT equipment involving client workload from a large data center in UK into a smaller hardware footprint. The project reduced energy consumption by 3,900 MWh/year and

Status in reporting year	Energy efficiency measure	Comment
		avoiding an associated 1,900 MT CO2 emissions. We consolidated and removed 2,200 servers across 3 software labs in China, delivering 3,500 MWH in annualized savings and annual avoidance of associated 23,000 MT CO2 emissions.
Planned	Server Virtualization	IBM plans to further virtualize and consolidate server and storage applications over the next several years as IT hardware is refreshed and through working with our clients to continue to drive increased operational efficiencies. IBM is using automated datacenter workload management systems to optimize workload placement and server and storage equipment utilization to reduce the hardware footprint needed to deliver workloads and increase the workload delivered per unit of energy consumed.
Planned	Cooling Efficiencies	IBM anticipates that a planned upgrade of the automated datacenter thermal management system will offer the opportunity to reduce an additional 30,000 to 50,000 MWH/year of energy use reductions and 12,000 to 20,000 MT of CO2 avoidance. IBM is also exploring other data center cooling management systems, direct air free cooling, cold aisle containment technologies and other options for minimizing energy consumption for cooling systems.

ICT1.8

Do you participate in any other data center efficiency schemes or have buildings that are sustainably certified or rated?

Yes

ICT1.8a

Please provide details on the data center efficiency schemes you participate in or the buildings that are sustainably certified or rated

Scheme name	Level/certification (or equivalent) achieved in the reporting year	Percentage of your overall facilities to which the scheme applies
EU Code of Conduct	To-date IBM has achieved participant status for 39 of its data centers in 19 countries in the EU. These participant facilities represent over 70% of IBM's data center space in Europe.	21%
LEED	IBM's Leadership data centers in RTP NC, Boulder CO and Barrie Canada are LEED certified.	2%

ICT1.9

Do you measure the utilization rate of your data center(s)?

Yes

ICT1.9a**What methodology do you use to calculate the utilization rate of your data center(s)?**

IBM measures utilization using available tracking algorithms on the ICT equipment. We also use data center workload management and placement software, such as Cirba, which tracks the utilization of CPU, memory and I/O capacity and enables optimization of workload placements. Different system architectures and operating systems measure utilization using different algorithms; the data provides relative, not absolute, comparisons regarding system workloads and enables the identification of opportunities to consolidate onto a smaller hardware count to deliver a given workload.

ICT1.10**Do you provide carbon emissions data to your clients regarding the data center services they procure?**

Yes

ICT1.10a**How do you provide carbon emissions data to your clients regarding the data center services they procure?**

We can supply this information to clients upon their request. We provide general estimates of energy use and associated CO2 emissions for a client account, applying necessary assumptions. Where available / appropriate factors and necessary assumptions may include equipment involved and their power use, consideration of the range of product configurations and power management features, the PUE of the data center, and the MT CO2/MWH grid or location emissions factor for the procured electricity.

ICT1.11**Please describe any efforts you have made to incorporate renewable energy into the electricity supply to your data center(s) or to re-use waste heat**

IBM endeavors to procure renewable energy to power its data center operations whenever it is available and makes economic sense. IBM contracted for 783,000 MWH of renewable electricity in 2016, representing 21.5% of its global electricity purchases. Adding to the 19.1% the renewable electricity in our general utility purchases via the grid from both hydro and non-hydro sources, approximately 40.6% of IBM's electricity consumption came from renewable sources. Approximately one-third of IBM's global, strategic enterprise data centers and its cloud data centers receive some or all of their electricity from renewable generation sources, and when the quantity of renewable in our grid purchases are included almost 50% of our data centers power comes from renewable sources. For the IBM data centers

in co-location centers, approximately one-quarter of the consumed electricity from contracted and grid purchases is sourced from renewables. We are taking specific steps to contract for additional renewable electricity to increase this number over time. IBM also draws upon renewable or low-CO2 emitting electricity from on-site generating systems. Some examples: IBM contracted with the landlord of a leased IT lab location in Massachusetts to purchase electricity from a roof top solar panel array. The system supplies electricity directly to the facility and is estimated to deliver 5 percent to 10 percent of the location's annual electricity use. The system was fully operational in April 2013. IBM Zurich Research center has been pursuing research work in recovering heat from IT operations.

Further Information

Page: ICT2. Provision of network/connectivity services

ICT0.1b

Please identify whether "provision of network/connectivity services" comprises a significant component of your business within your reporting boundary

No

ICT2.1

Please provide a description of the parts of your business that fall under "provision of network/connectivity services"

ICT2.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the provision of network/connectivity services component of your business

Business activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
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ICT2.3

Please describe your gross combined Scope 1 and 2 emissions or electricity use for the provision of network/connectivity services component of your business as an intensity metric

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
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ICT2.4

Please explain how you calculated the intensity figures given in response to Question ICT2.3

ICT2.5

Do you provide carbon emissions data to your clients regarding the network/connectivity services they procure?

ICT2.5a

How do you provide carbon emissions data to your clients regarding the network/connectivity services they procure?

Further Information

Page: ICT3. Manufacture or assembly of hardware/components

ICT0.1c

Please identify whether "manufacture or assembly of hardware/components" comprises a significant part of your business within your reporting boundary

Yes

ICT3.1

Please provide a description of the parts of your business that fall under "manufacture or assembly of hardware/components"

IBM manufactures server and storage products. IBM assembles many of its products at IBM locations, using components procured from 3rd party suppliers. Some of IBM's products are assembled by 3rd party manufacturers. IBM procures the preponderance of the components for its products from 3rd party manufacturers. In response to ICT3.2: IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful.

ICT3.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the manufacture or assembly of hardware/components part of your business

Business activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
Manufacture or assembly of hardware/components				Meter or submeter reading	IBM does not provide electricity consumption or carbon emissions estimates for specific business units or locations, as it considers this information business confidential.

ICT3.3

Please identify the percentage of your products meeting recognized energy efficiency standards/specifications by sales weighted volume (full product range)

Product type	Standard (sleep mode)	Percentage of products meeting the standard by sales volume (sleep mode)	Standard (standby mode)	Percentage of products meeting the standard by sales volume (standby mode)	Standard (in use mode)	Percentage of products meeting the standard by sales volume (in use mode)	Comment
Servers	N/A		N/A		Energy Star	80%	IBM does not disclose product sales volumes in the interest of protecting business confidential information. As of May 2017, IBM has 9 ENERGY STAR certified Power® systems servers available on the market. These servers meet the U.S. EPA's requirements for power supply efficiency, idle power limits or power management capability, and data reporting as established in version 2 of the server requirements which went into effect in December of 2013. Note: Sleep and standby mode are not applicable to server products. Percentage of products meeting ENERGY STAR is an estimate.
Storage products	N/A		N/A		Energy Star	30%	IBM does not disclose product sales volumes in the interest of protecting business confidential information. The ENERGY STAR requirements for storage systems were effective in December of 2013. As of May 2017, IBM had six storage products certified to ENERGY STAR. IBM certified some or all configurations of four storage systems, Flash 840 and 900, XIV, V3700, and V5030 to the standard. IBM Storage systems are utilizing various software-based data management capabilities such as Easy Tier, thin provisioning and storage virtualization which can reduce the number of terabytes required to accomplish a given storage task. Note: Sleep and standby mode are not applicable to storage products. Percentage of products meeting ENERGY STAR is an estimate.

ICT3.4

Of the new products released in the reporting year, please identify the percentage (as a percentage of all new products in that product type category) that meet recognized energy efficiency standards/specifications

Product type	Standard (sleep mode)	Percentage of new products meeting the standard (sleep mode)	Standard (standby mode)	Percentage of new products meeting the standard (standby mode)	Standard (in use mode)	Percentage of new products meeting the standard (in use mode)	Comment
Servers	N/A		N/A		Energy Star	0%	IBM released only one new server with 4 processor sockets or less in 2016, the S822 LC. This server is a high performance computing server and is exempt from the ENERGY STAR requirements. As of May 2017, IBM had 9 ENERGY STAR qualified Power® server systems available on the market. Server products do not have sleep, standby or in use mode criteria. ENERGY STAR sets idle power standards for one and two sockets managed servers and 2 socket resilient servers. The idle limit is handled as an active idle value and is not represented as a "stand by" mode. The percentage of new products certified to ENERGY STAR is an estimate.
Storage products	N/A		N/A		Energy Star	10%	IBM certified a subset of the configurations of the V5030 server in 2016. Storage products do not have a sleep or standby mode. The percentage of new products certified to ENERGY STAR is an estimate.

ICT3.5

Please describe the efforts your organization has made to improve the energy efficiency of your products

As of May 2017, IBM has 9 Power® systems servers certified to the version 2 ENERGY STAR® Computer Server Requirements. These servers meet the United States EPA's requirements for power supply efficiency, idle power limits or power management capability, and data reporting. A list of IBM ENERGY STAR qualified servers may be found on the IBM ENERGY STAR pages. IBM's products & services are key components to make operations and systems more efficient and avoid GHG emissions in the public and private sectors of the economy. Some examples – (1) One client implemented an IBM Power Systems S822L server solution to perform complex time- and computational-intensive workloads. Compared to a competing x86-based solution, IBM reduced computing time by 40 hours (40 percent) while reducing energy consumption by 40 percent (6 MWh/year). The reduced energy consumption avoided 3 metric tons (MT) of CO2 emissions for each S822L HPC deployed. (2) Another client installed two IBM Power Systems E880 servers and six IBM FlashSystem 820 storage products to replace a legacy IT system. The system delivered up to 90 percent faster production planning through improved computational and storage performance, which enabled the client to speed up deliveries to customers. At the same time, the energy consumption of the IT equipment was reduced by over 450 MWh/year, avoiding 210 MT of CO2/year. (3) Energy use reductions and efficiency improvements are also achieved through the improved utilization capabilities of IBM Power Systems servers. A cloud services client selected the IBM Power Systems S812L server because it could host twice the number of virtual environments as a competing x86-based server. Deployment of the Power Systems server reduced the server count by half and energy consumption by approximately 40 percent while offering improved reliability, serviceability

and performance. The improved efficiency saves 3 MWh/year and avoids associated CO2 emissions of 1 MT. Similar productivity and energy efficiency improvements can be achieved across the thousands of IBM Power Systems that IBM sells each year. A data center running 100 servers avoids 130 to 380 MT of CO2/yr. POWER® systems & System z servers can be run at up to 85% & 95% utilization, delivering more workload per unit energy consumed. One client, using a workload management automation tool, consolidated and optimized software from its legacy server and storage systems onto an IBM z13 server, reducing overall energy use in its data center by 40 percent — saving approximately 45 MWh/year of electricity consumption and avoiding 18 MT of associated CO2 emissions. IBM storage products offer a range of capacity optimization methods (COMs) such as compression, data de-duplication, thin provisioning, & tiered storage which enable up to 95% of the available storage capacity to be utilized. Using COMs a current generation IBM storage system, a single storage product can do the work of 2 to 5 previous generation products, reducing energy demand & CO2 emissions by 20 to 80 percent. Client Examples: (1) One client implemented an IBM flash storage solution to replace a large disk storage system. The solution integrated a new IBM FlashSystem V9000 and SAN controller to existing IBM XIV and Storwize V7000 storage products using IBM Spectrum Virtualize™ software and VersaStack solutions to integrate the hardware, maximize performance and minimize the system electricity consumption and hardware footprint. The integration of the FlashSystem storage improved system performance by 57 percent while reducing floor space 98 percent, energy use by over 60 MWh/year, and associated CO2 emissions by 23 MT. (2) Another client consolidated six high-end storage racks onto two IBM Storwize V7000 storage products using IBM Spectrum Virtualize software to centralize storage management and optimize capacity use. The consolidation boosted storage capacity by 150 percent and performance by 200 percent, while reducing occupied floor space by 75 percent and energy consumption by 55 percent. The reduced energy consumption represents over 5 MWh/year and associated CO2 emissions of 2 MT.

In 2016, IBM expanded its range of flash based storage systems. Flash storage reduces energy use by 60% or more compared to disk drives and significantly improves server and storage performance by minimizing the latency associated with data transfer within the data center. (f) IBM offers virtualization & consolidation services which enable multiple applications to be supported on a single server or storage product reducing data center energy use & space requirements by 10 to 80%. IBM's energy efficient products and data center service offerings enable customers to perform more IT work per unit of energy consumed, reducing their data center hardware footprint and their energy use across their IT operations and avoiding CO2 emissions associated with the avoided electricity use.

ICT3.6

Please describe the GHG emissions abatement measures you have employed specifically in your ICT manufacturing operations

Not applicable.

ICT3.7

Do you provide carbon emissions data to your clients regarding the hardware/component products they procure?

Yes

ICT3.7a

How do you provide carbon emissions data to your clients regarding the hardware/component products they procure?

IBM does not believe that a representative or credible estimate can be made of carbon emissions embedded in an IBM product. IBM commissioned a study by Carnegie Mellon University to estimate the embedded carbon emissions of an IBM server product and the associated uncertainty in the estimate. http://www.ce.cmu.edu/~greendesign/research/CMU_IBM_ExecSum_12032010.pdf The study determined "Uncertainty ranges from around +15% for the production and delivery phase to around +35% for cradle to grave carbon footprint, including the product's use phase and logistics associated with delivery of products. However, given limitations in available data to access uncertainty associated with temporal variability and technological specificity, it is likely that true uncertainty is much larger. Given the relatively long lifetime and continuous use of servers, the use phase was dominant, representing around 94% (88%--97%) is the range when considering the uncertainty in the embedded carbon estimates) of the server's total product carbon footprint." If a customer would insist on an embedded carbon emissions estimate for a product we would provide them an estimate in line with the analysis done in the CMU study.

Further Information

Page: ICT4. Manufacture of software

ICT0.1d

Please identify whether "manufacture of software" comprises a significant component of your business within your reporting boundary

Yes

ICT4.1

Please provide a description of the parts of your business that fall under "manufacture of software"

IBM offers a wide range of business software products and offers an unmatched software portfolio which is both broad and deep in its capabilities to solve real business needs. IBM software solutions include business analytics (helps organizations better understand, anticipate and shape business outcomes), Watson cognitive computing (enhances, scales and accelerates human expertise), collaboration solutions (including enterprise messaging and email, virtual meetings, information repositories, data exchange, and application design and development), industry solutions (including commerce, enterprise content and marketing management, and focused industry sector solutions), cognitive solutions, which apply machine learning to derive unprecedented insights from your data – both structured and unstructured, and security systems (software that enables organizations to build a strong security posture that helps reduce costs, improve service, manage risk, and enable innovation), information management software (integrates data and content to deliver information that is always available, always complete and always right), Rational software (software delivery project management), Tivoli software (provides smarter solutions and the expertise needed to design, build and manage a dynamic infrastructure that enables improved service, reduction of cost and management of risk), websphere (Software for Service-oriented Architecture environments that enables dynamic, interconnected business processes, and delivers highly effective application infrastructures for all business situations) and a range of development tools for cloud and mobile applications (including Bluemix, DevOps and others). Individually, or in combination, these solutions help organizations to be more efficient and effective. IBM software is sold by IBM both as standalone software and as appliances and integrated systems by business partners and value add retailers, and as software as a service from the cloud platform. Due to the complexity and many different software products sold

by IBM, software is distributed through a variety of delivery systems including cloud and electronic delivery. In response to ICT4.2 and ICT4.3: IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful. For ICT4.4, our broad software portfolio does not enable an estimation of the % of software delivered electronically.

ICT4.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the software manufacture component of your business

Business activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
Software manufacturing				Meter or submeter reading	IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful. IBM provides electronic procurement for some of its software, but the wide range in size and complexity of the software solutions does not always make electronic procurement feasible and there is no way to assess all of IBM's software products to get a percentage of the products delivered electronically. In addition, many products are directly available on a cloud platform as software as a service. The majority of IBM's systems and software manuals can be accessed electronically.

ICT4.3

Please describe your gross combined Scope 1 and 2 emissions for the software manufacture component of your business in metric tonnes CO2e per unit of production

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
	metric tonnes CO2e	Unit of production				IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful.

ICT4.4

What percentage of your software sales (by volume) is in an electronic format?

ICT4.5

Do you provide carbon emissions data to your clients regarding the software products they procure?

Yes

ICT4.5a

How do you provide carbon emissions data to your clients regarding the software products they procure?

We can supply this information to clients upon their request. We provide estimates of energy use and associated CO2 emissions for a specific software package development, applying necessary assumptions. Where available, appropriate factors and necessary assumptions may include equipment involved and their power use, consideration of the range of product configurations and power management features, the PUE of the data center, and the MT CO2/MWH grid or location emissions factor for the procured electricity.

Further Information

IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful. IBM provides electronic procurement for some of its software, but the wide range in size and complexity of the software solutions does not always make electronic procurement feasible and there is no way to assess all of IBM's software products to get a percentage of the products delivered electronically. In addition, many products are directly available on a cloud platform as software as a service. The majority of IBM's systems and software manuals can be accessed electronically.

Page: ICT5. Business services (office based activities)

ICT0.1e

Please identify whether "business services (office based activities)" comprise a significant component of your business within your reporting boundary

Yes

ICT5.1

Please provide a description of the parts of your business that fall under "business services (office based activities)"

IBM has a broad range of consulting services, systems and hardware product design, software design and research activities which occur at its facilities. In response to ICT5.2 and ICT5.3. IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful. ICT5.4: IBM does not provide intensity metrics for its operations, as we do not believe that intensity metrics provide a representative look at our operations.

ICT5.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the business services (office based activities) component of your business

Business activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
Business services (office based activities)				Meter or submeter reading	IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting multiple business units and diverse business activities, making allocating energy consumption or GHG emissions by location or activity less than meaningful.

ICT5.3

Please describe your gross combined Scope 1 and 2 emissions for the business services (office based activities) component of your business in metric tonnes per square meter

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
	metric tonnes CO2e	Square meter				IBM does not provide intensity metrics for its operations, as we do not believe that intensity metrics provide a representative look at our operations. We perform benchmarking of our office facilities based on kWh/ft2 and \$/ft2 factors both against the internal distribution of office property performance by location and region and against external benchmarks. Using this approach, we have driven significant reductions in our median kWh/ft2 and \$/ft2 metric values over the past 4 years. Given that our CO2 emissions have been reduced year to year for the past 4 years, this intensity figure has decreased.

ICT5.4

Please describe your electricity use for the provision of business services (office based activities) component of your business in MWh per square meter

Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
	MWh	Square meter				IBM does not provide intensity metrics for its operations, as we do not believe that intensity metrics provide a representative look at our operations. We perform benchmarking of our office facilities based on KWh/ft2 and \$/ft2 factors both against the internal distribution of office property performance by location and region and against external benchmarks. Using this approach, we have driven significant reductions in our median KWh/ft2 and \$/ft2 metric values over the past 4 years.

Further Information

IBM does not provide energy use or GHG emissions information for individual locations or specific business units, activities, or operations. IBM operations are widely interconnected, with many locations supporting more than one business units or business activities.

Page: ICT6. Other activities

ICT0.1f

Please identify whether "other activities" comprise a significant component of your business within your reporting boundary

No

ICT6.1

Please provide a description of the parts of your business that fall under "other"

ICT6.2

Please provide your absolute Scope 1 and 2 emissions and electricity consumption for the identified other activity component of your business

Activity	Scope 1 emissions (metric tonnes CO2e)	Scope 2 emissions (metric tonnes CO2e)	Annual electricity consumption (MWh)	Electricity data collection method	Comment
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ICT6.3

Please describe your gross combined Scope 1 and 2 emissions for your defined additional activity using an appropriate activity based intensity metric

Activity	Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
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ICT6.4

If appropriate, please describe your electricity use for your defined additional activity using an appropriate activity based intensity metric

Activity	Intensity figure	Metric numerator	Metric denominator	% change from previous year	Direction of change from previous year	Reason for change	Comment
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Further Information

CDP