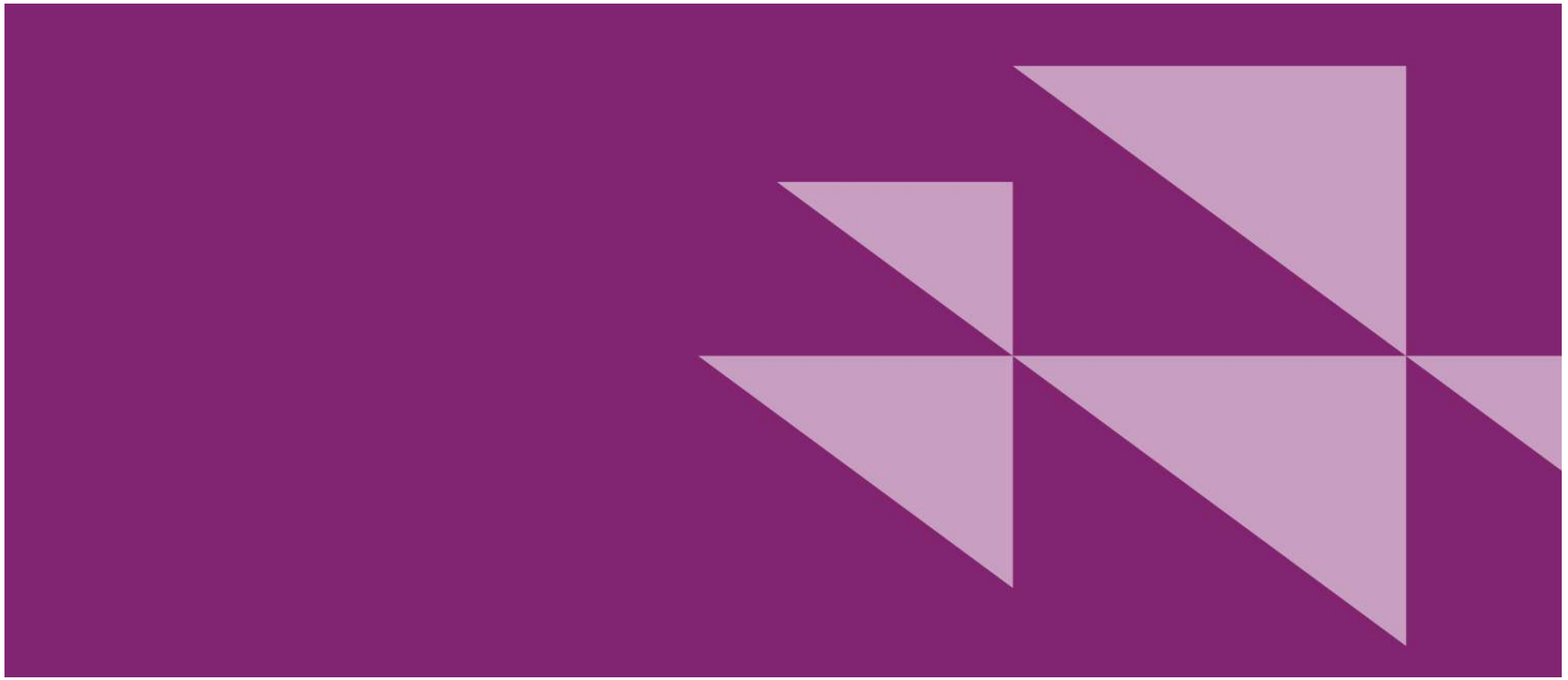
CDP Climate Change Questionnaire 2019



C0. Introduction

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

Bayer is a life science company and a global leader in health care and nutrition. Our innovative products support efforts to overcome the major challenges presented by a growing and aging global population. Guided by our corporate purpose “Bayer: Science for a better life,” we help to prevent, alleviate and treat diseases. We are also making an important contribution to providing a reliable supply of high-quality food, feed and plant-based raw materials, while at the same time promoting the sustainable use of natural resources. Our business activities therefore also support the attainment of the United Nations Sustainable Development Goals. We aim to bolster profitability and create value for our customers, shareholders and employees. Around the world, the Bayer brand stands for trust, reliability and quality. Across our various businesses, our activities are guided by our corporate values of Leadership, Integrity, Flexibility and Efficiency, or LIFE for short. Our value culture ensures a common identity throughout the enterprise across national boundaries, management hierarchies and cultural differences.

The management structure of the Bayer Group comprises three divisions – Pharmaceuticals, Consumer Health and Crop Science – and the Animal Health business unit, which are also our reporting segments. The corporate functions, Business Services and the service company Currenta support the operational business. We operate sites around the world, and some are used by multiple segments. As of December 31, 2018, the Bayer Group comprised 420 consolidated companies in 90 countries. Bayer’s interest in Covestro AG stood at 7.5% as at the end of the reporting period. Therefore, Covestro is no longer a reportable segment.

On June 7, 2018, Bayer completed the acquisition of the Monsanto Company, St. Louis, Missouri, United States (Monsanto), for US$63 billion, including debt. The divestments to BASF required to fulfill the antitrust conditions were completed on August 1, 2018, for all businesses earmarked for divestment excluding the vegetable seed business, which was divested as of August 16, 2018. The closing of these transactions led to the hold separate order being lifted and enabled the integration of Monsanto into the Bayer Group to begin.

As in our previous CDP reports, we are reporting according to the operational control approach to provide an accurate picture of Bayer’s life science businesses. Covestro and Currenta are therefore not included in this year’s CDP report as we do not exercise full operational control over these businesses.

Certain statements contained in this report may constitute “forward-looking statements”. Actual results could differ materially from those projected or forecasted in the forward-looking statements. Factors that could cause actual results to differ materially include those discussed in Bayer’s public reports (available on the Bayer website www.bayer.com). Bayer assumes no obligation to update the information in this communication, except as otherwise required by law. Readers are cautioned not to place undue reliance on these forward-looking statements that speak only as of the date.

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

Start date	End date	Indicate if you are providing emissions data for past reporting years
01/01/2018	12/31/2018	No

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

Country
Argentina Belgium Brazil China Germany India Italy Mexico Spain United States of America

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

Currency
EUR

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

Operational control

C1. Governance

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

Yes

(C1.1a) Identify the position(s) of the individual(s) (do not include any names) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Chief Sustainability Officer (CSO)	The highest level of responsibility for climate-related issues lies with the member of the Board of Management responsible for Human Resources, Technology and Sustainability. As CSO he is RESPONSIBLE FOR THE GROUP-WIDE SUSTAINABILITY PROGRAM INCL. CLIMATE-RELATED TARGETS AND MEASURES. The position was selected to ensure that climate-related risks and opportunities are identified at group-level and climate-related targets and measures are driven Group-wide. As the same Board member is responsible for technology, ENERGY EFFICIENCY AND CLIMATE PROTECTION INITIATIVES CAN GO HAND IN HAND. The CSO is the superior of the Head of Corporate Health, Safety, and Sustainability. Relevant topics in the field of sustainability incl. climate-related topics are discussed during their regular meetings. The implementation of our CLIMATE-RELATED TARGETS (e.g. our energy efficiency or emission reduction initiatives) is a KEY ELEMENT OF THE ANNUAL PERFORMANCE OBJECTIVES of both.

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled - some meetings	• Reviewing and guiding strategy • Reviewing and guiding major plans of action • Reviewing and guiding risk management policies • Reviewing and guiding annual budgets • Setting performance objectives • Monitoring implementation and performance of objectives • Monitoring and overseeing progress against goals and	i) WHO BRIEFS THE BOARD ON WHAT: Climate-related strategic decisions are brought up in board discussions by the Head of Corporate Health, Safety, Sustainability (CHS) or the CSO as needed. In addition, the CHS Head informs the board about environmental KPIs incl. climate-related KPIs and target achievement in the context of the annual Board meeting dedicated to the approval of our Annual Report (AR). The CSO and the CFO are informed several times by the AR taskforce during the reporting cycle from Aug to Feb. The Head of CHS monthly reports HSE KPIs to the CSO. ii) CONTRIBUTION TO BOARD OVERSIGHT: The governance mechanisms selected contribute to an informed view of the Board on climate-related issues and ensure a coherent and Group-wide response, if needed. EXAMPLE 1 (Governance mechanisms "Monitoring implementation and performance of objectives" / "progress against goals and targets"): Through the reporting of climate-related KPIs described above, the Board can ensure a Group-wide response in case of any deviations of CO2 emissions or energy efficiency KPIs from the required values.

	targets for addressing climate-related issues	EXAMPLE 2 (Governance mechanisms “Reviewing and guiding annual budgets” / “major plans of action” / “risk management policies” / “strategy”): Through the integration of climate-related issues in major investment decisions, the regular review of climate-related risks, and the integration of climate-related issues in the review of strategic decisions or R+D priorities, the Board can ensure e.g. an adequate inclusion of climate risks and opportunities in our business, sustainability or risk management strategy. E.g. all capital expenditures above €10 million undergo an ecological assessment; CAPEX above €20 million go into the Board.

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

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Sustainability Officer (CSO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly

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

i) POSITION IN THE CORPORATE STRUCTURE:
As member of the Board of Management responsible for Human Resources, Technology and Sustainability, the Chief Sustainability Officer directly reports to the CEO and is the direct superior of the Head of Corporate Health, Safety & Sustainability leading the Group-wide Health, Safety, and Sustainability function. In addition, the Chief Sustainability Officer sponsors the Sustainable Development Committee as the highest-level management committee with responsibility for climate-related issues.
ii) RATIONALE FOR WHY RESPONSIBILITY LIES WITH THAT POSITION:
As part of Bayer’s corporate strategy, sustainability is firmly established at Board level. Board-level as well as management-level responsibility for the Group’s sustainable orientation lies with the Chief Sustainability Officer. This Board Member who is responsible for Sustainability is also responsible for Technology and Manufacturing, therefore decisions about PRODUCTION TECHNOLOGY, ENERGY EFFICIENCY AND CLIMATE PROTECTION INITIATIVES CAN GO HAND IN HAND. This Board Member is one of 3 corporate directors on the board. This POSITION WAS SELECTED on management-level for oversight of all climate-related issues TO ENSURE THAT CLIMATE-RELATED TARGETS AND MEASURES ARE MONITORED AND DRIVEN ON GROUP-LEVEL to ensure a comprehensive and cohesive approach to climate protection.
iii) DESCRIPTION OF RESPONSIBILITIES:
The Chief Sustainability Officer carries direct responsibility for the GROUP-WIDE SUSTAINABILITY PROGRAM INCL. CLIMATE-RELATED TARGETS AND MEASURES. The current status of climate-related targets and measures is discussed by the Chief Sustainability Officer during the regular meetings with the Head of Corporate Health, Safety & Sustainability (CHS). New climate-related targets are proposed by the Corporate Health, Safety & Sustainability function, endorsed by the Sustainable Development Committee, which is sponsored by the Chief Sustainability Officer and approved by the Board. The Sustainable Development Committee also draws up INITIATIVES, MANAGEMENT SYSTEMS AND CORPORATE POLICIES under the sponsorship of the Chief Sustainability Officer.

During the OFFICIAL SIGN-OFF PROCESS OF THE ANNUAL REPORT, the CSO is responsible for all content within his area of responsibility. As the Board member responsible for Human Resources, Technology and Sustainability, the CSO is RESPONSIBLE FOR THE ENTIRE NON-FINANCIAL SECTION OF OUR INTEGRATED ANNUAL REPORT. For example, in Bayer's Annual Report 2018, he was responsible for SIGNING-OFF our non-financial group targets including OUR TARGET TO REDUCE SPECIFIC GREENHOUSE GAS EMISSIONS by 20% between 2015 and 2020. He was further responsible to sign-off the description of our CLIMATE-RELATED MEASURES AND KEY PERFORMANCE INDICATORS (e.g. GHG emissions and energy) described in the chapter Environmental Protection.
iv) POSITION'S SPECIFIC CLIMATE-RELATED MONITORING PROCESS
The Chief Sustainability Officer is continuously informed about the status of climate-related targets and measures during his regular meetings with the Head of Corporate Health, Safety & Sustainability, who monitors all relevant topics in the field of sustainability and environment, including climate-related targets and measures. The CHS head is the direct superior of the Head of Corporate Sustainability and Business Stewardship, who is responsible for the day-to-day management of climate-related targets and measures, their monitoring, reporting and verification of related milestones. Additionally, as sponsor of the Sustainable Development Committee which meets quarterly, the Chief Sustainability Officer is informed of all Sustainable Development Committee decisions.
The monitoring process is also closely related to our reporting process. As the Board member responsible for Human Resources, Technology and Sustainability, the CSO is directly responsible for our climate-related reporting. For example, in 2018, he was responsible for signing off the climate-related sections in our Integrated Annual Report and Bayer's 2018 response to the CDP Climate request.

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

Yes

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Who is entitled to benefit from these incentives?	Types of incentives	Activity incentivized	Comment
Chief Sustainability Officer (CSO)	Monetary reward	Efficiency target	Bayer remunerates employees in accordance with a transparent and fair system that includes fixed and variable salary components. The variable component is determined by the company performance, the divisions, corporate functions and business services performance and by the individual employee's achievements. The Board Member responsible for Human Resources, Technology and Sustainability receives the majority of his remuneration as a variable income component consisting of short-term and long-term incentives. The performance of Board Members of Bayer AG is evaluated individually with regard to the performance in their respective areas of responsibility. This Board Member is ACCOUNTABLE FOR THE AREA OF SUSTAINABILITY. His individual target attainment is determined by the Supervisory Board. If applicable, Board Members are incentivized on the attainment of sustainability KPIs, e.g. indicators on sustainable supply chain management, plant and process safety, ENERGY EFFICIENCY, product stewardship, etc.
Executive officer	Monetary reward	Efficiency target	The Head of Corporate Health, Safety and Sustainability is directly reporting to the Board Member responsible for Sustainability. As part of his variable income component he receives financial incentives that are directly linked to the success of our climate-related targets. Performance indicators include agreed milestones and set TARGETS with respect to our energy efficiency as well as emission reduction targets.

Executive officer	Monetary reward	Efficiency target	The Head of Corporate Sustainability and Business Stewardship, reporting to the Head of Corporate Health, Safety and Sustainability, receives financial incentives that are directly linked to the success of our climate-related targets as a part of his variable income component. Performance indicators include agreed milestones and set TARGETS with respect to our energy efficiency as well as emission reduction targets.
Environment/ Sustainability manager	Monetary reward	Efficiency project	Managers from Bayer's Corporate Sustainability and Business Stewardship (SBS) department receive financial incentives related to climate protection. For example, the annual performance targets of the department heads for SBS Business Stewardship as well as SBS Strategy and Performance Management include the IMPLEMENTATION OF CLIMATE-RELATED TARGETS as a key measure.
Energy manager	Monetary reward	Energy reduction target	Bayer's GHG EMISSION REDUCTION TARGETS are cascaded down through the organization and translated into energy efficiency targets for energy/site managers. These energy efficiency targets form part of the performance indicators within their variable income component. According to the implementation strategy of ISO 50001, Energy Managers receive their short-term incentives dependent, amongst other, on the DEGREE OF ENERGY MANAGEMENT SYSTEM IMPLEMENTATION.
All employees	Monetary reward	Efficiency project	Bayer has implemented the Bayer Ideas Pool, an employee suggestion program, which honours improvement ideas from employees with monetary bonus payments. The Ideas Pool also acknowledges ideas that lead to ENERGY SAVINGS and thus incentivizes ideas for ENERGY EFFICIENCY AND CO2 REDUCTION, which helps Bayer achieve its GHG EMISSIONS TARGETS.
All employees	Recognition (non-monetary)	Other, please specify: Climate-related projects	Bayer has introduced the worldwide innovation platform "WeSolve" to strengthen the innovation culture in all business areas and to enhance worldwide collaboration. All Bayer employees globally can contribute to this platform to develop solutions, including those referring to CLIMATE PROTECTION. Innovation coaches accompany the process starting from the submission of the idea until the finding of the solution. This process refers to all challenges, including climate-related topics.

C2. Risks and opportunities

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

Time horizon	From (years)	To (years)	Comment
Short-term	0	1	
Medium-term	1	5	
Long-term	5	10	

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

Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

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

Frequency of monitoring	How far into the future are risks considered?	Comment
Six-monthly or more frequently	>6 years	

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

i) RISK IDENTIFICATION: To support the fullest possible identification of risks, the Bayer Group maintains a Risk Universe that reflects the potential risk categories of Bayer as a life science company. The Bayer Risk Universe also expressly accounts for risks of a nonfinancial nature that are linked with our business activity or business relationships, products and services. These may include risks pursuant to the CSR Directive Implementation Act that relate to environmental, employee and social issues, as well as human rights, and corruption and bribery (compliance).
The Bayer Group has implemented a holistic and integrated risk management system designed to ensure the continued existence and future target attainment of the Group through the early identification, assessment and treatment of risks. The Bayer Group's risk management system is aligned to internationally recognized standards and principles such as the ISO 31000 risk management standard.
All relevant risks worldwide, incl. climate change-related risks, are recorded and monitored at an early stage in our risk management system. We regard risks as negative deviations from projected or target values for potential future developments. The risks are monitored CONTINUOUSLY by the risks owners and the risk portfolio is reviewed REGULARLY by the Bayer Risk Committee. Our HSE and Sustainability managers monitor climate-related legislative changes and academic publications.
Potential risks and opportunities are reported to the Head of Corporate Health, Safety & Sustainability and the Head of Corporate Sustainability & Business Stewardship, who are accountable for the identification and evaluation of climate-related opportunities and risks. Industrial marketing managers CONTINUOUSLY monitor market developments and indicate upcoming opportunities to the R&D departments, considering climate-related customer and market needs in R&D (e.g. reg. the need of adaptation to climate change in agriculture). The identified opportunities and risks are updated at REGULAR conferences and incorporated into strategic and operational planning.
Climate-related risks that apply to individual facilities are evaluated within our HSE management process. Potential physical risks related to climate change are covered and monitored by Bayer`s Emergency Response System (BayERS), which is a mandatory element of the integrated HSE management system at Bayer`s production sites. Additionally, all risks worldwide, incl. climate change-related risks on asset level, that could significantly impact the achievement of our financial and nonfinancial objectives, are recorded and monitored at an early stage in our risk management system.
ii) RISK ASSESSMENT: Risks are classified as high, medium or low to assess their materiality regarding the overall risk portfolio. Impact is rated according to quantity and/or quality. The quantitative assessment reflects the possible loss of cash flows. Risks are evaluated with regard to their

potential impact and likelihood of occurrence, taking into account established mitigation measures, in a 5x5 matrix. The likelihood of occurrence is assessed on a scale ranging from very unlikely (<10%), unlikely (10%-30%), possible (30-50%), likely (50-70%), very likely (>70%) over A PERIOD OF 10 YEARS. The potential impact is determined on a scale from moderate (>€150-250 mio), medium (>€250-750 mio), significant (>€750-1,500 mio), major (>€1,500-2,500 mio) to severe (>€2,500 mio).
A qualitative assessment is based on criteria such as the impact on our strategy or reputation, the potential loss of stakeholder confidence, and the potential violation of sustainability principles. The higher rating, qualitatively or quantitatively, determines the overall assessment. The likelihood of occurrence is calculated BASED ON A PERIOD OF 10 YEARS. Bayer identifies and prioritizes sustainability-related opportunities and risks, incl. those related to climate change, by considering the expectations of important stakeholders. These are matched up with an internal assessment, deriving the relevant fields of action for Bayer. The findings are documented in a materiality matrix, which includes different fields of actions, e.g. climate protection rated very high in terms of both: stakeholder relevance and relevance for Bayer.
Risks with a potential impact of >€4,000 million are separately examined by the Bayer Risk Committee to determine their potential to endanger the company's continued existence. A report on the risk portfolio is submitted to the Board of Management and the Audit Committee of the Supervisory Board AT LEAST ONCE A YEAR.
iii) DEFINITION OF SUBSTANTIVE FINANCIAL IMPACT: Bayer defines a risk as having a SUBSTANTIVE FINANCIAL IMPACT, if the identified risk is relevant for the respective risk owner and/or function. E.g. with regard to our Product Supply Function, a potential impact of €7 million Cash Flow is regarded to be substantive and monitored in the database.

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

Risk type	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	i) EXAMPLE: Bayer considers the risk from current regulation, e.g. the impact of cap and trade schemes like the EU ETS, in which Bayer participates. Current legislative discussions in the EU are expected to further increase carbon prices. In this respect, the EU Emissions Trading Scheme (ETS) is the main regulatory framework that poses a risk to the European industry. Current trends in certificate price appear to be consistent with the regulator's aim for a much higher certificate price in order to effectively realize steering of energy generation according to climate requirements. In light of this risk, the EU ETS could influence Bayer directly through our own energy generation facilities participating in the EU ETS and indirectly, through our supply chain with regard to energy supply, as we expect the prices for our purchased energy to rise. Between 2018 and 2021, Bayer expects total costs of EUR 25-50 million due to the possible continuous tightening of the EU ETS. We expect this impact to remain low. As life science company we don't have any energy-intensive production in the EU. ii) INCLUSION IN RISK ASSESSMENT: Our Energy Managers, Sustainability Managers and our Legal team constantly monitor climate-related legislative changes and developments as well as interventions of the EU in the EUA (European Emission Allowances) market and analyze their potential impact on Bayer. Potential risks are reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, who are accountable for the identification and evaluation of climate-related risks. Also, Enterprise Risk Management is informed about relevant risks.
Emerging regulation	Relevant, always included	i) EXAMPLE: Due to the recent developments in climate and energy politics and also as a consequence of the Paris Agreement, it is almost certain that the regulatory pressure will increase on a national, an EU and an international level. One example of a new cap and trade scheme that could potentially affect Bayer in the coming years is the Chinese national carbon trading scheme, which was launched in December 2017. ii) INCLUSION IN RISK ASSESSMENT: Our Energy Managers, Sustainability Managers and our Legal team constantly monitor climate-related legislative changes and developments and

		analyze their potential impact on Bayer. Potential risks are reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, who are accountable for the identification and evaluation of climate-related risks. Also, Enterprise Risk Management is informed about relevant risks.
Technology	Relevant, sometimes included	i) EXAMPLE: In terms of risks, technology could potentially have an impact on our competitiveness via an increase of operational costs or via effects on our reputation. Examples are current developments in technology in the field of mobility, such as E-Mobility or hydrogen fuel cells. A large part of Bayer's fleet consists of diesel fuel vehicles which are now being prohibited in some cities providing another incentive to consider alternatives. We already have E-Mobility pilot projects underway. We are building up an infrastructure of charging stations. Bike sharing and car sharing for all employees are also launched. ii) INCLUSION IN RISK ASSESSMENT: Our Sustainability Managers constantly monitor and analyze technological changes and technical developments that could affect Bayer and analyze their potential impact. Potential risks are reported to the Head of Corporate Health, Safety and Sustainability (CHS) and the Head of Corporate Sustainability and Business Stewardship (CS+BS), who are accountable for the identification and evaluation of climate-related risks. Also, we constantly analyze the potential of emerging technologies such as carbon capture and storage in terms of their potential to help us mitigate climate-related risks and help increase our cost position and reduce GHG emissions.
Legal	Relevant, always included	i) EXAMPLE: Bayer AG (BAG) considers the risk from climate-related litigation, e.g. due to issues resulting from the interpretation of climate-related regulations. One potential issue that might lead Bayer to litigate is due to a revision to the Renewable Energy Sources Act (EEG). This EEG revision that became effective at the start of 2017 declared that energy generation via capacity layer models is not subject to the burden-free self-generation. For existing facilities an option for "amnesty" exists, if several conditions are met. The burden of prove lies with the participants in the capacity layer model. If the Federal Network Agency does not accept the arguments delivered by the participants EEG-savings of the past (since 2014) and future savings are at risk. Bayer is a participant in a capacity layer model together with other consortium partners since 2008. In light of the new interpretation the 2017 EEG has applied to capacity layer models, this risk of retroactive EEG apportionment payments could influence BAG's direct operations. Based on a timeframe of 4 years (2014-2018) for which potential retroactive payments could become relevant, BAG calculates the financial impact of this risk to be about EUR 100 Million. Bayer has already endeavoured to meet all conditions stipulated for amnesty of existing plants but amnesty is not yet confirmed. The transmission system operator (TSO) has contacted BAG in order to obtain more insights into the contractual framework. ii) INCLUSION IN RISK ASSESSMENT: The manager responsible for monitoring climate-related legislation identified the risk from the changed interpretation of the EEG law regarding capacity layer models in January 2017 and analyzed the risk together with Bayer's legal team. The risk was evaluated as about as likely as not in terms of likelihood and relevant in terms of potential impact. The risk was reported to the CHS Leadership Team, the responsible Board Member and Accounting. Based on a thorough analysis relevant options to address the risk were derived and presented to the Board and other relevant bodies in order to achieve endorsement for the proposed path forward. To reduce the magnitude of this climate-related regulatory risk BAG decided to conduct an analysis including the involvement of external law firms and external expertise to assess the situation and help BAG plead its position.
Market	Relevant, always included	i) EXAMPLE: Bayer considers potential market risks, which could potentially affect the demand for our products e.g. through the impact of climate-related reputation. Worldwide, investors, NGOs and the public increasingly focus on how companies are dealing with environmental issues such as climate. Currently, there is no indication that climate-related reputation risks might increase for Bayer. E.g., in 2018 Bayer's inclusion in the FTSE4Good was confirmed – further strengthening Bayer's reputation. In 2018 Bayer was again evaluated by CDP as one of the leading international companies in the area of climate protection. Bayer also monitors market risks regarding an interruption of supply e.g. due to climate change-related extreme weather events. E.g., for one supplier in Japan, the risk of natural disasters is relatively high. Bayer closely monitors this risk and validates that we have further suppliers, located in other countries which could supply Bayer in case of a disruption. For Bayer, climate-related supply chain risks are low due to our sustainability-oriented supplier management and diversified supplier base. Currently, there is no indication that risks due to climate change-related weather extremes increase relevantly at supplier sites. ii) INCLUSION IN RISK ASSESSMENT: Our Sustainability Managers constantly monitor our sustainability-related performance incl. climate-related issues. We analyze the sustainability performance of our peers in order to better understand potentially emerging reputational risks. Potential risks are reported to the Heads of CHS and CS+BS, who are accountable for the identification and evaluation of climate-related risks. Also, Enterprise Risk Management is informed about relevant risks. Bayer's supply chain transparency tool provides a strong visibility of our supply network. A natural disaster index indicates the risk related to extreme

		weather events. Through a large database of online sources, the system detects earliest indicators of company-specific risks and monitors those. Real-time alerts on potentially disrupting events containing details of potentially affected materials and products allow Bayer a proactive risk assessment. We are continuously improving our sub-tier transparency to also monitor risks concerning the suppliers of our suppliers.
Reputation	Relevant, always included	i) EXAMPLE: Bayer considers potential risks arising from climate-related reputation which could potentially affect the demand for our products or our access to capital. Worldwide, investors, NGOs and the public are increasingly focusing on how companies are dealing with environmental issues such as climate change and how they are integrating these topics into their business strategies and transparent communication. Currently, there is no indication that climate-related reputation risks might increase for Bayer. E.g., in 2018 Bayer's inclusion in FTSE4Good (Europe, Global and Environmental Leaders Europe 40), an important sustainability index, was confirmed – further strengthening Bayer's reputation. Bayer also continues to be listed on the MSCI World Low Carbon Target Index, the STOXX® Europe Sustainability Index and the STOXX® Global ESG Impact index. In addition, in 2018 Bayer was again evaluated by CDP as one of the leading international companies in the area of climate protection. ii) INCLUSION IN RISK ASSESSMENT: Our Sustainability Managers constantly monitor our sustainability-related performance incl. climate-related issues. Also, we analyze the sustainability performance of our peers in order to better understand potentially emerging reputational risks. Potential risks are reported to the Heads of CHS and CS+BS, who are accountable for the identification and evaluation of climate-related risks. Also, Bayer identifies and prioritizes sustainability-related risks, including those related to climate change, by analyzing the expectations of important stakeholders. These are matched up with an internal assessment, thereby deriving the relevant fields of action for Bayer. The findings are documented in a materiality matrix. It encompasses the changing priorities of external and internal stakeholders in relation to the relevance for Bayer and its stakeholders on a scale ranging from low to very high. It includes different fields of actions, e.g. climate protection (rated very high in terms of stakeholder relevance and very high in terms of relevance for Bayer in the materiality matrix).
Acute physical	Relevant, sometimes included	i) EXAMPLE: Bayer considers potential acute physical risks in the form of climate change-related extreme weather events, such as cyclones, hurricanes or floods affecting our production facilities. An increase of such weather events affecting our facilities could result in increased operational and capital cost and disruption in our production. Currently, there is no indication that risks due to climate change-related weather extremes increase at our sites ii) INCLUSION IN RISK ASSESSMENT: Bayer observes these risks for all sites worldwide considering the past 50 and the next 10 years. The potential impact is evaluated regularly based on external research and our risk reporting: For example, we evaluated external studies such as a Global Insight study on weather developments and the 5th IPCC report, we analyzed risks reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, and we discussed potential risks with our divisions.
Chronic physical	Relevant, sometimes included	i) EXAMPLE: Bayer considers chronic physical risks due to climate change-related changes in precipitation extremes, such as droughts. A potential increase of droughts affecting our production facilities could result in increased operational and capital cost and disruption in our production. An increase of droughts affecting our customers could lead to a reduction in demand for our products, such as seeds and crop protection products, in the affected regions. Currently, there is no indication that risks due to a climate-related increase in droughts increase at our sites. Neither is there an indication yet, that demand will be significantly affected in the near future due to droughts related to climate change. From a production standpoint we manage risk from drought by mainly contracting on irrigated hectares and geographical allocation by spreading production hectares in different regions. This can also include winter production (counter season). ii) INCLUSION IN RISK ASSESSMENT: Bayer observes the risks of climate-related droughts considering the past 50 and the next 10 years. The potential impact is evaluated regularly based on external research and our risk reporting: For example, we evaluated external studies such as a Global Insight study on weather developments and the 5th IPCC report, we analyzed risks reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, and we discussed potential risks with our divisions.
Upstream	Relevant, always included	i) EXAMPLE: Bayer considers the risk type "interruption of supply" to be caused from disruption to the operations of suppliers due to climate change-related extreme weather events such as floods, cyclones or hurricanes. Bayer monitors suppliers and the risk of extreme weather events which might affect them. With the help of a supply chain transparency tool, such risks are identified for individual suppliers e.g. for one supplier located in Japan, the risk of natural disasters is relatively high. Bayer closely monitors this risk and validates that we have further suppliers, located in other countries which could supply Bayer in case of a disruption.

		For Bayer, climate-related supply chain risks are low due to our sustainability-oriented supplier management and our diversified supplier base. Currently, there is no indication that risks due to climate change-related weather extremes increase relevantly at supplier sites. ii) INCLUSION IN RISK ASSESSMENT: Our supply chain is designed at both global and regional level according to clear, sustainability-oriented criteria and standards. Bayer regards adherence to these standards as a crucial value-adding factor and an important lever for minimizing risks. A 4-step management process is established throughout the Group to improve sustainability practices, assess and decrease risks in the supply chain, comprising the elements awareness-raising and supplier selection, evaluation and development. Throughout 2019 we start to integrate legacy Monsanto suppliers into our 4-step management process. Since March 2017, Bayer Procurement has started placing more emphasis on risk assessment regarding extreme weather events. The supply chain transparency tool which Bayer is now using provides a strong visibility of our supply network, incl. sub-tier suppliers. It allows Bayer to get important information on its global supply chain in order to better assess its vulnerability to natural disasters and other risks. A natural disaster index indicates the risk related to extreme weather events, e.g. floods, cyclones or hurricanes. Through a large database of online sources, the system detects earliest indicators of company-specific risks and monitors those. Real-time alerts on potentially disrupting events containing details of the event as well as potentially affected materials and products allow Bayer a proactive risk assessment.
Downstream	Relevant, sometimes included	i) EXAMPLE: Bayer considers downstream risks due to climate change-related changes in precipitation extremes, such as droughts. A potential climate-related increase of droughts affecting our customers could lead to a reduction in demand for our products, such as seeds and crop protection products, in the affected regions. There is no indication yet, that demand will be significantly affected in the near future due to droughts related to climate change. ii) INCLUSION IN RISK ASSESSMENT: Bayer observes the risks of droughts considering the past 50 and the next 10 years. The potential impact is evaluated regularly based on external research and our risk reporting: For example, we evaluated external studies such as a Global Insight study on weather developments and the 5th IPCC report, we analyzed risks reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, and we discussed potential risks with our divisions.

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

i) MANAGEMENT PROCESS
RISKS:
The Bayer Group has implemented a holistic and INTEGRATED RISK MANAGEMENT SYSTEM designed to ensure the continued existence and future target attainment of the Group through the early identification, assessment and treatment of risks. The Bayer Group's risk management system is aligned to internationally recognized standards and principles such as the ISO 31000 risk management standard of the International Organization for Standardization.
All relevant risks worldwide, incl. climate change-related risks, are recorded and monitored at an early stage in our risk management system. We regard risks as negative deviations from projected or target values for potential future developments. The risks are monitored CONTINUOUSLY by the risks owners and the risk portfolio is reviewed REGULARLY by the Bayer Risk Committee.
Our risk management process consists of risk identification, assessment, treatment, reporting as well as process monitoring and improvement. Risks, including climate-related risks are identified by risk owners in the operational divisions and functions, assessed according to their potential impact and likelihood. We assess risks using a long-term perspective e.g. likelihood of occurrence based on a PERIOD OF 10 YEARS. Risks are classified in a 5x5 matrix of likelihood and potential qualitative and quantitative impact. Risk owners decide on a targeted risk level and define a risk management strategy and risk management measures. REGULARLY the Risk Committee is informed about the risk landscape and the status/progress of the mitigation activities.
OPPORTUNITIES:

We identify climate-related opportunities as part of the ANNUAL strategic planning cycle, during which the divisions analyze all factors that may positively affect the development of our business. The core phase of our strategic planning process starts with a comprehensive market analysis. The divisions build on this by analyzing their market environments to identify opportunities including climate-related opportunities. Climate-related opportunities are also identified by management and employees through DAILY OBSERVATION of internal processes and markets.
ii) CASE STUDIES:
PHYSICAL OPPORTUNITY:
Vector-control solutions: Since about 20 years Crop Science regularly analyzes the market for vector-control products in the context of Bayer's annual strategic planning cycle. The analysis includes, e.g., the market potential for bed nets and indoor residual spray as well as trends impacting the vector-control market. One of the relevant trends is the development of funding for vector-control solutions. Another relevant trend is the expected climate change-related geographic expansion of vector-borne diseases such as malaria, dengue fever, chikungunya and Zika. Crop Science identified the latter as one potential driver of growing demand for vector-control solutions as it could result in another 40 to 60 million people globally being exposed to the risk of vector-borne diseases like malaria. In 2013, analyses showed the resistance in mosquitoes to have increased significantly and the decision was taken in Bayer's Portfolio Review Meeting to develop new insecticide resistance-breaking substances for control of both malaria and dengue vectors. In late 2018 Fludora®Fusion received WHO approval, first ever product combining two active ingredients from two differents chemical classes, is now available for malaria prevention indoor residual spray campaigns, mainly in Africa.
TRANSITIONAL RISK:
Regulatory risk from change of EEG law interpretation: The manager responsible for monitoring climate-related legislation identified the risk from the changed interpretation of the EEG law regarding capacity layer models in January 2017. Subsequently he analyzed the risk together with Bayer's legal team. The risk was evaluated as about as likely as not in terms of likelihood and relevant in terms of potential impact. The risk was then reported to the CHS Leadership Team and the responsible Board Member as well as to Accounting. Based on a thorough analysis relevant options to address the risk were derived and presented to the Board and other relevant bodies in order to achieve endorsement for the proposed path forward. To reduce the magnitude of this climate-related regulatory risk BAG decided to conduct a thorough analysis including the involvement of external law firms and external expertise to assess the situation and help BAG plead its position. In a first meeting with the TSO a comprehensive introduction to the consortium agreement was presented by all consortium partners.

Risk disclosure

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

Yes

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

Risk 1 Indirect risk from cap & trade schemes – Part 1

Identifier	Where in the value chain does the risk driver occur?	Risk type	Primary climate-related risk driver	Type of financial impact driver	Company- specific description	Time horizon
Risk 1	Supply Chain	Transition Risk	Policy and legal: Increased pricing of GHG emissions	Increased operating costs (e.g., higher compliance costs, increased insurance premiums)	i) CLEAR DESCRIPTION: Legislative discussions in the EU are expected to further increase carbon prices. The EU Emissions Trading System (ETS) is the main regulatory framework that poses a risk to the European industry. Within the 3rd trading phase (2013-2020), the EU ETS might trigger an increase in electricity prices caused by the expected rise in carbon prices. This is expected due to measures such as the decision not to sell 900 million carbon allowances (EUA) within the 3rd phase of the EU ETS or the market stability reserve, activated in January 2019. These instruments will most likely lead to a further increase in carbon prices through the reduction in the number of EUA on the market. In the long-term, a further impact on the ETS factor is expected from the framework for the EU Roadmap 2030. Further price increases are likely to occure due to recent developments in climate and energy politics and also as a consequence of the Paris Agreement. Current trends in EUA price appear to be consistent with the regulator's aim for a much higher EUA price in order to effectively realize steering of energy generation according to climate requirements. Bayer obtained free EUA according to the carbon leakage rating of the industry branches, for sites where Bayer is running own CHP facilities. For the 4th trading period (2021-2030) the rating has been revised and certain areas of Bayer's activities are not considered at risk in terms of carbon-leakage any more. This means that Bayer will be exposed to market risks in terms of procurement of EUA, whereas it has obtained free EUA in the past. ii) EFFECT ON BAYER: In light of this risk, the EU ETS could influence Bayer directly and indirectly: directly by runinning own CHP facilities with less free EUA (expected financial impact amounts 2.5m€ p.a. depending on market prices of EUA) and indirectly through our supply chain with regard to energy supply, as we expect the prices for our purchased energy to rise. Between 2018 and 2021, Bayer expects total costs of EUR 25-50 million due to the possible continuous tightening of the EU ETS. We expect this impact to remain low. As life science company we don't have any energy-intensive production in the EU.	Medium-term

Risk 1 Indirect risk from cap & trade schemes – Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
More likely than not	Low	Yes, an estimated range		25,000,000	50,000,000

Risk 1 Indirect risk from cap & trade schemes – Part 3

Explanation of financial impact	Management method	Cost of management	Comment
i) DESCRIPTION: The potential impact of this risk is increased prices for our purchased energy due to a continuous tightening of the EU ETS. ii) CALCULATION: Between 2018 and 2021, Bayer expects total costs of EUR 25-50 million due to the possible continuous tightening of the EU ETS. This calculation is based on internal emission regulations of the respective sites and the assumption that an increase in the price of emission allowances will initially rise to € 30 per ton during this period. We assume that the political decision makers are aiming for a certificate price of around EUR 40 for the needs-based management of energy production. Overall, the indirect impact of the EU ETS should remain relatively low as Bayer has invested heavily in energy efficiency measures in the past.	To reduce the magnitude of climate-related regulatory risks Bayer AG is investing in energy efficiency in its own operations and is engaged in a constructive dialogue with policy makers. EXAMPLES: a) Bayer AG is implementing more efficient production processes, thereby reducing emissions in its own operations. FOR EXAMPLE, efficiency measures in 2018 included process optimizations in several sites e.g. reducing pump pressure, improved pipe management, reduction of leakage, reducing centrifuge running-time or the installation of a closed cooling system. b) Furthermore, Bayer is closely monitoring the policy debate concerning the EU ETS and other regulatory frameworks worldwide. This allows Bayer to anticipate regulatory trends which can help to reduce the magnitude of climate-related regulatory risks. IMPLEMENTATION STATUS: a) In 2018, Bayer implemented energy efficiency and emissions reduction projects that resulted in an overall reduction of 5,501 metric tons in CO2 emissions. b) Implemented and ongoing. COST CALCULATION: a) The total investment costs for the energy efficiency and emissions reduction initiatives of BAG that were implemented in 2018 amount to EUR 4.4 million. b) In 2018 the costs incurred at our liaison offices in Europe for human resources, material and projects totaled approx. EUR 1.31 million in Berlin, Germany and EUR 3.3 million in Brussels, Belgium. Bayer's EU lobbying work also included climate-related discussions.	9,010,000	

Risk 2 Direct Risk from cap & trade schemes – Part 1

Identi-fier	Where in the value chain does the risk driver occur?	Risk type	Primary climate-related risk driver	Type of financial impact driver	Company- specific description	Time horizon
Risk 2	Direct operations	Transi-tion risk	Policy and legal: Increased pricing of GHG emissions	Increased operating costs (e.g., higher compliance costs, increased insurance premiums)	i) CLEAR DESCRIPTION: Legislative discussions in the EU are expected to further increase carbon prices. The EU Emissions Trading System (ETS) is the main regulatory framework that poses a risk to the European industry. Within the 3rd trading phase (2013-2020), the EU ETS might trigger an increase in electricity prices caused by the expected rise in carbon prices. This is expected due to measures such as the decision not to sell 900 million carbon allowances (EUA) within the 3rd phase of the EU ETS or the market stability reserve, activated in January 2019. These instruments will most likely lead to a further increase in carbon prices through the reduction in the number of EUA on the market. In the long-term, a further impact on the ETS factor is expected from the framework for the EU Roadmap 2030. Further price increases are likely to occure due to recent developments in climate and energy politics and also as a consequence of the Paris Agreement. Current trends in EUA price appear to be consistent with the regulator's aim for a much higher EUA price in order to effectively realize steering of energy generation according to climate requirements. Bayer obtained free EUA according to the carbon leakage rating of the industry branches, for sites, where Bayer is running own CHP facilities. For the 4th trading period (2021-2030) the rating has been revised and certain areas of Bayer's activities are not considered at risk in terms of carbon-leakage any more. This means that Bayer will be exposed to market risks in terms of procurement of EUA, whereas it has obtained	Medium -term

					free EUA in the past. ii) EFFECT ON BAYER: In light of this risk, the EU ETS could influence Bayer directly and indirectly. Directly by runinning own CHP facilities with less free EUA (expected financial impact amounts 2.5m € p.a. depending on market prices of EUA). Between 2018 and 2021, Bayer expects total costs of € 5-12 million due to the possible continuous tightening of the EU ETS. We expect this impact to remain low. As life science company we don't have any energy-intensive production in the EU.	

Risk 2 Direct Risk from cap & trade schemes – Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
More likely than not	Low	Yes, an estimated range		5,000,000	12,000,000

Risk 2 Direct Risk from cap & trade schemes – Part 3

Explanation of financial impact	Management method	Cost of management	Comment
i) DESCRIPTION: The potential implications of this risk are increased prices for EUA for our own energy generation plants due to a continuous tightening of the EU ETS. ii) CALCULATION: Between 2018 and 2021, Bayer expects total costs of EUR 5-12 million due to the possible continuous tightening of the EU ETS (based on an expected financial impact of EUR 2.5m p.a. depending on market prices of EUA). This calculation is based on internal emission regulations of the respective sites and the assumption that an increase in the price of emission allowances will initially rise to € 30 per ton during this period. We assume that the political decision makers are aiming for a certificate price of around EUR 40 for the needs-based management of energy production. Overall, the direct impact of the EU ETS should remain relatively low as Bayer has invested heavily in energy efficiency measures in the past.	To reduce the magnitude of climate-related regulatory risks Bayer AG is investing in energy efficiency in its own operations and is engaged in a constructive dialogue with policy makers. EXAMPLES: a) Bayer AG is implementing more efficient production processes, thereby reducing emissions in its own operations. FOR EXAMPLE, efficiency measures in 2018 included process optimizations in several sites e.g. reducing pump pressure, improved pipe management, reduction of leakage, reducing centrifuge running-time or the installation of a closed cooling system. b) Furthermore, Bayer is closely monitoring the policy debate concerning the EU ETS and other regulatory frameworks worldwide. This allows Bayer to anticipate regulatory trends which can help to reduce the magnitude of climate-related regulatory risks. IMPLEMENTATION STATUS: a) In 2018, Bayer implemented energy efficiency and emissions reduction projects that resulted in an overall reduction of 5,501 metric tons in CO2 emissions. b) Implemented and ongoing. COST CALCULATION: a) The total investment costs for the energy efficiency and emissions reduction initiatives of BAG that were implemented in 2018 amount to EUR 4.4 million. b) In 2018 the costs incurred at our liaison offices in Europe for human resources, material and projects totaled approx. EUR 1.31 million in Berlin, Germany and EUR 3.3 million in Brussels, Belgium. Bayer's EU lobbying work also included climate-related discussions.	9,010,000	

Risk 3 Risk from change of EEG law interpretation– Part 1

Identi-fier	Where in the value chain does the risk driver occur?	Risk type	Primary climate-related risk driver	Type of financial impact driver	Company- specific description	Time horizon
Risk 3	Direct operations	Transi-tion risk	Policy and legal: Increased pricing of GHG emissions	Increased operating costs (e.g., higher compliance costs, increased insurance premiums)	i) CLEAR DESCRIPTION: The most relevant regulation for energy supply and chemical production in Germany is the Renewable Energy Sources Act (EEG), aiming for an increase in the use of renewable energies in electricity generation. An EEG revision that became effective at the start of 2017 declared that energy generation via capacity layer models is not subject to the burden-free self-generation. For existing facilities an option for "amnesty" exists, if several conditions are met. The burden of prove lies with the participants in the capacity layer model. If the Federal Network Agency does not accept the arguments delivered by the participants EEG-savings of the past (since 2014) and future savings are at risk. ii) EFFECT ON BAYER: Bayer is a participant in a capacity layer model together with other consortium partners since 2008. In light of the new interpretation the 2017 EEG has applied to capacity layer models, this risk of retroactive EEG apportionment payments could influence BAG's direct operations. Based on a timeframe of 4 years (2014-2018) for which potential retroactive payments could become relevant, BAG calculates the financial impact of this risk to be about EUR 100 million. Bayer has already endeavored to meet all conditions stipulated for amnesty of existing plants but amnesty is not yet confirmed. The transmission system operator (TSO) has contacted BAG in order to obtain more insights in the contractual framework.	Medium-term

Risk 3 Risk from change of EEG law interpretation – Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
About as likely as not	Medium-low	Yes, a single figure estimate	100,000,000		

Risk 3 Risk from change of EEG law interpretation – Part 3

Explanation of financial impact	Management method	Cost of management	Comment
i) DESCRIPTION: The potential financial impact reflects the cumulative risk of potential retroactive EEG apportionment payments. ii) CALCULATION: The calculation of the potential financial impact of this risk is based on the extent of BAG's own energy generation via a capacity layer model and the timeframe of 4 years (2014-2018) for which potential retroactive payments could become relevant. Taking those variables into account BAG calculates the financial impact of this risk to be about EUR 100 million.	To reduce the magnitude of this climate-related regulatory risk BAG is conducting a thorough analysis of the regulatory framework and its interpretation as well as its own situation and options. This includes the involvement of external law firms and external expertise to assess the situation and help BAG plead its position. CASE DETAILS: To address this risk BAG has made adequate provisions in the balance sheet. Also, since the start of its participation in the capacity layer model, which is now being contested in terms of EEG apportionment exemption, BAG has endeavored to provide full transparency to the authorities. These efforts for transparency include informing the responsible transmission system operator about the specifics of the set-up for own energy generation at the beginning of the capacity layer model in 2008 and full disclosure of all requested details regarding the set-up until now. IMPLEMENTATION STATUS: Implemented and ongoing. COST CALCULATION: The total costs for external counsel in this matter come up to about EUR 0.4 million until now. BAG expects additional cost in the future.	400,000	

Opportunity disclosure

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

Yes

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

Opportunity 1 – Part 1

Identifier	Where in the value chain does the opportunity occur?	Opportunity type	Primary climate-related opportunity driver	Type of financial impact	Company-specific description	Time horizon
Opp 1	Customer	Products and services	Development of new products or services through R&D and innovation	Increased revenue through new solutions to adaptation needs (e.g., insurance risk transfer products and services)	i) CLEAR DESCRIPTION: The agricultural business is strongly tied to the climate. Droughts and precipitation extremes can have severe effects on harvest yields. A climate change-induced change in the frequency of these extreme weather events can lead to an increased demand for products with the capacity to adapt to extremer conditions. ii) EFFECT ON BAYER: This increasing demand is especially relevant for existing Crop Science (CS) products as well as for CS products in early research phases. Bayer is investing in research alleviating the agronomical consequences of changing weather patterns, primarily related to an increased occurrence of extreme weather events such as floods, droughts, heat, cold or storms. These factors cause abiotic stress to plants and are responsible for high yield losses. By using biological and modern plant breeding approaches to reduce biotic and abiotic stress influences, Bayer is developing technologies that respond to these challenges. One example is the insecticide ConfidorTM Stress ShieldTM which improves the resilience of crops against other abiotic stresses such as increased salinity. Bayer recently launched in Bangladesh a flooding resistant hybrid rice and is working on salinity resistant varieties that allow growing this crop in densely populated low land deltas that are invaded by rising sea level and typhoons. Bayer is also engaged in developing dry seeded rice, a new cropping system that reduces water requirements where water availability is becoming limiting. A further example is the fungicide NativoTM which protects crops against fungal infections as well as against drought and heat-related stress. There is also a need for easy and safe application of crop protection products for farmers especially in areas with growing water and soil scarcity. We see an opportunity to serve these needs with an optimized irrigation that enables an optimal use of fertilizers as well as crop protection products through water, decreased labor cost and thus increased resource efficiency.	Long-term

Opportunity 1- Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
Virtually certain	Low	Yes, a single figure estimate	95,000,000		

Opportunity 1- Part 3

Explanation of financial impact	Strategy to realize opportunity	Cost to realize opportunity	Comment
Financial implications apply to Crop Science as a whole affecting sales of EUR 19.3 billion in 2018 (on a pro-forma basis), of which crop protection has a major impact with €9.5 billion. The global seed and crop protection market as a whole expanded slightly in 2018, growing by around 2%. For Crop Science, we expect sales growth of ~4% (Fx & portf. adj.) for FY 2019. This expected growth is, amongst others, influenced by the climate. A continued growth of the crop protection demand by 1 % (compared to 2018) would translate into EUR 95 million additional revenues.	To exploit these opportunities Bayer works on solutions supported by breeding, trait and biological solutions. IMPLEMENTED EXAMPLES: a) Bayer implemented its strategy to achieve sustainable wheat production and established 7 globally integrated wheat breeding centers in 3 key regions. At these 7 breeding stations we focus on the development of Hybrid Wheat, an approach which has not yet been delivered at scale. Today the commercial wheat seed worldwide is dominated by open-pollinated varieties (OPV's). The benefit of hybrid wheat would be to provide higher yield levels, often with similar input levels (e.g. fertilizer). Research showed that hybrids can reduce the variability in yield levels by 50% compared to OPV`s, during stress conditions. b) To improve irrigation practices, Bayer is comparing current crop protection programs against programs with strong drip delivery component to determine benefits for the grower. We will also work with extension officers from various universities. DripByDrip is to be installed on all new Bayer ForwardFarms. c) Together with Ginkgo Bioworks Bayer formed a new company in 2017 focusing on transformational beneficial microbes for plants. The initial activities will focus on nitrogen fixation for non-legumes, minimizing agriculture's environmental impact. COSTS amount to EUR 68.1 million incl. EUR 100,000 spent since 2015 on DripByDrip trials and a EUR 68 million investment into the Ginkgo Joint Venture.	68,100,000	DETAILS ON COST CALCULATION: In 2018, Crop Science invested EUR 1,950 million (2017: EUR 1,166 million) in R+D, which was 37% of R+D spending in the Bayer Group and equivalent to approx. 13% of Crop Science sales. a) Due to confidentiality reasons, Crop Science cannot publish the cost with regards to the wheat breeding centers. b) So far Crop Science has spent EUR 100,000 since 2015 on DripByDrip trials. c) The Bayer LifeScience Center will invest 80 million USD (about EUR 68 million) over the next 4-5 years into the Ginkgo Joint Venture.

Opportunity 2 – Part 1

Identi-fier	Where in the value chain does the opportunity occur?	Opportunity type	Primary climate-related opportunity driver	Type of financial impact driver	Company-specific description	Time horizon
Opp2	Customer	Products and services	Development of new products or services through R&D and innovation	Increased revenue through new solutions to adaptation needs (e.g., insurance risk transfer products and services)	i) CLEAR DESCRIPTION: According to UNEP experts, a potential increase in the mean temperature level as a result of global climate change could promote the reproduction and spread of mosquitoes. This could result in another 40 to 60 million people globally being exposed to the risk of vector-borne diseases like malaria. Every year, malaria afflicts some 250 million people and causes almost 1 million deaths. Therefore, demand for products to treat and control insect borne diseases such as malaria and dengue could rise in affected regions. ii) EFFECT ON BAYER: In light of an expected climate change-related geographic expansion of vector-borne diseases such as malaria, dengue fever, chikungunya and Zika, we expect a growing demand for Bayer vector control solutions. Scientists from Bayer are currently developing new insecticide resistance-breaking substances for control of dengue vectors and recently introduce an approved WHO breakthrough innovation for malaria prevention. These could crucially help stem the spread of malaria and dengue fever into the climate change-affected regions of our planet. In early 2019 Bayer introduced Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs.	Medium-term

Opportunity 2 – Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
Virtually certain	Low	Yes, a single figure estimate	60,000,000		

Opportunity 2 – Part 3

Explanation of financial impact	Strategy to realize opportunity	Cost to realize opportunity	Comment
Future financial implications may benefit Bayer's Environmental Science business with full year 2018 sales of EUR 955 million. Future financial implications for Bayer will be affected by an increase in demand for Indoor residual Spray which is the primary target of our innovation with potential sales of about EUR 60 million.	To increase likelihood and impact of the described opportunities, Bayer is involved in research partnerships and provides products for vector control. CASE STUDY: Bayer works on joint projects with the Innovative Vector Control Consortium (IVCC), a registered charity in the field of product development and information systems for vector control, formed in 2005 with a grant by the Bill and Melinda Gates Foundation. The Consortium and Bayer currently work on a project targeting a new insecticidal active ingredient that is particularly effective against resistant mosquito strains. This effort has recently progressed into a new development phase. Assuming successful progress through further phases, a new and unique solution effective in controlling insecticide-resistant mosquitoes could be available for use alongside other important tools to improve the impact of malaria control programs. This could also be important in stemming the spread of malaria and dengue into climate change-affected regions of our planet. Bayer made an important contribution to malaria protection by providing Ficam™, produced in Africa, e.g. in Ethiopia and other African countries for indoor residual spraying against malaria vectors. In early 2019 Bayer introduced Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs. COSTS: Our contribution of laboratories is worth approx. EUR 400,000.	400,000	DETAILS ON COST CALCULATION: Within this partnership with IVCC, Bayer opened its library of substances (one of the biggest worldwide and worth some EUR 20 million) representing a major contribution to the IVCC partnership. Bayer also contributes with a state-of-the-art research environment, for example, with laboratories worth approx. EUR 400,000.

Opportunity 3 – Part 1

Identifier	Where in the value chain does the opportunity occur?	Opportunity type	Primary climate-related opportunity driver	Type of financial impact driver	Company-specific description	Time horizon
Opp3	Direct operations	Markets	Other	Other, please specify: increased access to capital	i) CLEAR DESCRIPTION: Worldwide, investors, NGOs and the public are increasingly focusing on how companies are dealing with environmental issues such as climate change and how they are integrating these topics into their business strategies and transparent communication. Strong company performance in these areas can lead to reputational benefits, e.g., attracting investors that take SRI (Socially Responsible Investment) criteria into account. ii) EFFECT ON BAYER: Bayer's positioning as a solution provider in the area of climate protection and adaptation to climate change provides reputational opportunities by contributing to our overall reputation. For example, in 2018 Bayer's inclusion in FTSE4Good (Europe, Global and Environmental Leaders Europe 40), an important sustainability index, was confirmed – further strengthening Bayer's reputation. Bayer also continues to be listed on the MSCI World Low Carbon Target Index, the STOXX® Europe Sustainability Index and the STOXX® Global ESG Impact index. In addition, in 2018 Bayer was again evaluated by CDP as one of the leading international companies in the area of climate protection and was therefore included in CDP's A-List. The opportunities resulting from reputation as an opportunity driver, e.g., affecting Bayer's market capitalization, are already being captured today and are set to grow further as climate awareness continues to rise. For example, a 1% increase in Bayer's stock price would increase the company's market capitalization by around EUR 565 million. Given Bayer's global marketing and sales presence, these opportunities are relevant for Bayer across all major markets. Bayer's commitment to finding solutions for climate change has and will have a positive effect on Bayer's reputation and brand value. Bayer expects to continue to leverage its improved reputation and brand across all divisions.	Medium-term

Opportunity 3 – Part 2

Likelihood	Magnitude of impact	Are you able to provide a potential financial impact figure?	Potential financial impact figure (currency)	Potential financial impact figure – minimum (currency)	Potential financial impact figure - maximum (currency)
Virtually certain	Low	Yes, a single figure estimate	565,000,000		

Opportunity 3 – Part 3

Explanation of financial impact	Strategy to realize opportunity	Cost to realize opportunity	Comment
According to various studies, there is a positive correlation between the sustainability performance and the stock price. An increase of Bayer's stock price by 1% would increase the company's market capitalization by around EUR 565 million (based on year-end 2018 market capitalization).	To seize reputational opportunities, Bayer demonstrates its sustainability commitment in climate solutions/community projects. IMPLEMENTED EXAMPLES: a) With the Bayer ForwardFarming initiative, Bayer cooperates with farmers to demonstrate innovative crop solutions and services for sustainable agriculture. The knowledge platform strives to increase the exchange of know-how, highlight improvements in sustainable agriculture, and facilitate communication between stakeholders. By the end of 2017 the ForwardFarming network expanded to 12 farms, 8 of them in Europe. b) Bayer introduced a new weed control technology (Sakura (pyroxasulfone)) to control critical resistance weeds and to ensure continued use of minimum tillage systems across more than 2.5 Mha of Australia. Together with various partners e.g. universities we updated/distributed integrated weed control practice programs to farmers including e.g. new web tools to maximise adoption. c) Cotton has always been in focus with regard to the environment. Bayer Bollguard 3® Cotton, first introduced in 2015 in Australia, allows introduction of true minimum till practices to the cotton industry. This not only reduces or removes the need for carbon intensive cultivation, but also increases water use efficiencies. COSTS include 25,000 AUD for the weed control project (b) and EUR 100,000 for a market survey on cotton (c). Due to confidentiality reasons, costs on our Forward Farming initiative cannot be disclosed.	125,000	DETAILS ON COST CALCULATION: a) Due to confidentiality reasons, Crop Science cannot publish the costs with regards to our Forward Farming initiative. b) $25,000 AUD c) We spent some EUR 100,000 in a market survey at spinners' level in order to find out more about their needs and priorities.

Comment to 2.4:

All sales figures used to estimate financial implications are based on pro-forma sales including sales of the acquired business in 2018 as if both the acquisition and the associated divestments had already taken place as of January 1, 2018 (see Bayer's Annual Report 2018 with the corresponding figures).

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

Area	Impact	Description
Products and services	Impacted for some suppliers, facilities, or product lines	DESCRIPTION OF IMPACT/RATIONALE: This area of our business is impacted for some product lines BECAUSE in some product lines we are already introducing new products with regard to the climate change-related opportunities we have identified. This is true, for example, for our new vector-control solutions. In light of an expected climate change-related geographic expansion of vector-borne diseases such as malaria, dengue fever, chikungunya and Zika, we expect a growing demand for Bayer vector-control solutions. Bayer already made an important contribution to malaria protection by providing Ficam™, produced in Africa which reduces our carbon footprint, e.g. in Ethiopia and other African countries for indoor residual spraying against malaria vectors. In early 2019 Bayer introduced Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs. MAGNITUDE OF IMPACT: Overall, climate change is only one of several aspects influencing our decisions in the affected product lines. ACCORDINGLY, THE IMPACT OF OUR CLIMATE CHANGE-RELATED OPPORTUNITIES ON THIS AREA OF OUR BUSINESS IS LOW.
Supply	Not	DESCRIPTION/RATIONALE:

chain and/or value chain	impacted	This area of our business is not impacted BECAUSE we have not identified climate change-related physical risks, such as an increase of extreme weather events like floods or hurricanes that could disrupt our supply chain. Also, Bayer proactively addresses any, not only climate change-related, potential effects of extreme weather events via a thorough risk assessment and transparency along our supply chain to ensure that there is no impact on our supply chain in the future. For Bayer, climate-related supply chain risks are low due to our sustainability-oriented supplier management and our diversified supplier base. Currently, there is no indication that risks due to climate change-related weather extremes increase relevantly at supplier sites. Bayer monitors suppliers and the risk of extreme weather events which might affect them. With the help of a supply chain transparency tool, such risks are identified for individual suppliers. For example, for a certain supplier located in Japan, the risk of natural disasters is relatively high. Thus, Bayer closely monitors this risk and ensures that we have further suppliers, located in other countries which could supply Bayer in case of a disruption due to an extreme weather event. Since March 2017, Bayer Procurement has started placing more emphasis on risk assessment regarding extreme weather events. The supply chain transparency tool which Bayer is now using provides a strong visibility of our supply network, including sub-tier suppliers. It allows Bayer to get important information on its global supply chain in order to better assess its vulnerability to natural disasters and other risks. Through these deep insights, Bayer improves its business continuity and minimizes negative impacts on the business. The tool enables risk assessments for each individual supplier regarding environmental, financial, safety and labor regulations. A natural disaster index indicates the risk related to extreme weather events, such as floods, cyclones or hurricanes. Through a very large database of online sources, the system detects earliest indicators of company-specific risks and monitors those. Real-time alerts on potentially disrupting events containing details of the event as well as potentially affected materials and products allow Bayer a proactive risk assessment.
Adaptation and mitigation activities	Impacted	DESCRIPTION OF IMPACT/RATIONALE: This area of our business is impacted BECAUSE in 2007 Bayer launched the Climate Program, which was a game changer to bundle our expertise in providing climate change mitigation and adaptation solutions, to improve our CO2 footprint and to increase awareness of climate change issues. Company-wide communication and implementation has fostered broad resource efficiency initiatives. For example, setting GHG emission-reduction targets and driving initiatives to achieve them have become an integral part of Bayer's sustainability strategy. As part of our Bayer Climate Program we have been able to continuously improve our energy efficiency, primarily by focusing on production and process innovations and introducing energy management systems. Despite significantly expanding production, we reduced our absolute greenhouse gas emissions significantly between 1990 and 2015, namely by more than 20% We have documented our successes in the CDP reports and in 2018 were again awarded leadership status, thus reaffirming the top rating of the previous years. As a pure life science company too, we want to continue making positive contributions to protecting the climate and managing the effects of climate change on several levels. This includes reducing our production-related emissions with targets related to improving energy efficiency and lowering specific greenhouse gas (GHG) emissions. One major business decision relevant for 2018 to improve Bayer's carbon footprint and reduce the exposure to climate-related regulatory risks was the adjustment of our target for GHG emissions in 2016: to achieve a 20% reduction in specific GHG emissions by 2020 compared to 2015. This adjusted target, which we have already achieved in 2018, better reflects our contribution to climate protection and takes into account our new corporate focus as a Life Science company. Energy efficiency initiatives in 2018 included, e.g., improvements of HVAC operations, adaption of compressor operation and installation of LED lights. MAGNITUDE OF IMPACT: Overall, climate-related risks and opportunities are important drivers of adaptation and mitigation activities. ACCORDINGLY, THE IMPACT OF OUR CLIMATE CHANGE-RELATED OPPORTUNITIES AND RISKS ON OUR ADAPTATION AND MITIGATION ACTIVITIES IS HIGH.
Investment in R&D	Impacted for some suppliers, facilities, or product lines	DESCRIPTION OF IMPACT/RATIONALE: This area of our business is impacted for some product lines BECAUSE for some product lines, e.g., in the area of cereal crops we have already made investment decisions in new technologies (e.g wheat breeding and trait research) on the basis of the threat of climate change to develop genetics better able to mitigate these threats. In addition, we consider chemical and biological solutions which could contribute to this mitigation in addition to any intrinsic pest, weed or disease activity. One further example of an impact of the climate-related opportunities on our investment in R+D is the joint venture Bayer decided to form with Ginkgo Bioworks in September of 2017. The new company will focus on transformational beneficial microbes for plants. The initial activities will focus on nitrogen fixation for non-legumes, minimizing agriculture's environmental impact. Environmental benefits of the proposed technology are a reduction of the emission of nitrous oxide (greenhouse gas) from nitrogen fertilizers and of the consumption of fossil fuels for the production of nitrogen fertilizer and the application of fertilizer. Fertilizer nitrogen has become a major input in crop production and is critical for global food supply. N-fixation for non-legumes remains a key challenge in terms of efficiency and environmental impact. The Bayer Life Science Center will invest 80 million USD (about EUR 68 million) over the next 4-5 years into the Ginkgo Joint Venture. MAGNITUDE OF IMPACT: Overall, climate change is only one of several aspects influencing our decisions regarding investment in R+D. Accordingly, the IMPACT OF OUR CLIMATE-CHANGE-RELATED OPPORTUNITIES ON OUR INVESTMENT IN R+D IS LOW.
Operations	Not impacted	DESCRIPTION OF IMPACT/RATIONALE: This area of our business is not impacted BECAUSE we have not identified climate change-related physical risks, such as an increase of extreme weather events like floods or hurricanes due to climate change that could impact our operations. We analyzed Bayer's exposure to climate change-related physical risks globally and found that we do not expect physical climate parameters to change in such a way in the next 10 years to have the potential to generate a substantive negative impact on our assets. Bayer observes these risks for all sites worldwide considering the past 50 and the next 10 years. The potential impact is evaluated regularly based on external research and

		our risk reporting: For example, we evaluated external studies such as a Global Insight study on weather developments and the 5th IPCC report, we analyzed risks reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, and we discussed potential risks with our divisions.

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

Area	Relevance	Description
Revenues	Not yet impacted	RATIONALE: This area of our financial planning process has not yet been impacted, BECAUSE the climate-related impacts of the opportunities we have identified have a timeframe of more than 3 years whereas the financial budget that is developed during our financial planning cycle and approved in our Operational Planning Conference only has a time horizon of 3 years. For example, although we are already putting new vector-control solutions on the market, we do not expect an impact on our revenues due to the CLIMATE CHANGE-RELATED promotion of the reproduction and spread of mosquitoes and the vector-borne diseases they can transmit within the next 3 years. POTENTIAL IMPACT: In the future, we expect the opportunities identified and reported in this CDP report to be considered in our projections for the development of our markets and businesses in those product lines that are affected by these climate change-related opportunities. For example, we expect an impact on the revenues from our new vector-control solutions DUE TO THE CLIMATE CHANGE-RELATED promotion of the reproduction and spread of mosquitoes and the vector-borne diseases they can transmit. This will affect, e.g, Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs, which Bayer introduced in early 2019. Overall, in the near future climate change will still be a comparatively MINOR DRIVER of the expected development of our revenues for these product lines. POTENTIAL TIMESCALE OF IMPACT: The opportunities we have identified in our Crop Science division have a MEDIUM- OR LONG-TERM TIMEFRAME of impact on our revenues depending on the individual affected product lines.
Operating costs	Impacted for some suppliers, facilities, or product lines	DESCRIPTION OF IMPACT/RATIONALE: This area of our financial planning process has been impacted for some facilities, BECAUSE the regulatory risks we have identified have been implicitly considered in our projections for the development of our energy cost within the financial budget that is developed during our financial planning cycle and approved in our Operational Planning Conference with a time horizon of 3 years. Relevant in this context are the direct and indirect risks from current legislative discussions in the EU which are expected to further increase carbon prices. In this respect, the EU Emissions Trading Scheme (ETS) is the main regulatory framework that poses a risk to the European industry. The EU ETS could influence Bayer indirectly, through our supply chain with regard to energy supply, as we expect the prices for our purchased energy to rise and also directly, through our own energy generation facilities participating in the EU ETS. Current trends in certificate price appear to be consistent with the regulator's aim for a much higher certificate price in order to effectively realize steering of energy generation according to climate requirements. Consequently, these risks have a timeframe of 1-3 years. In light of this risk, the EU ETS could influence Bayer directly through our own energy generation facilities participating in the EU ETS and indirectly, through our supply chain with regard to energy supply, as we expect the prices for our purchased energy to rise. Between 2018 and 2021, Bayer expects total costs of EUR 25-50 million due to the possible continuous tightening of the EU ETS. We expect this IMPACT TO REMAIN LOW. MAGNITUDE OF IMPACT: As life science company we don't have any energy-intensive production in the EU. In 2018, less than 5 percent of our total operational spend was on energy. Accordingly, THE IMPACT OF THE CLIMATE CHANGE-RELATED REGULATORY RISKS ON OUR PROJECTED OPERATING COST IS LOW.
Capital expenditures / capital allocation	Impacted for some suppliers, facilities, or product lines	DESCRIPTION OF IMPACT/RATIONALE: This area of our financial planning process has been impacted for some product lines, BECAUSE the opportunities we have reported in this CDP report have already factored into some strategic decisions in the affected Crop Science product lines. Preparing for the annual Strategy Conference, the Division develops an expenditure plan using a bottom-up process on the basis of individual projects incl. projects driven in part by the climate change-related opportunities. In the Strategy Conference the divisions present their strategic options including the development of the CapEx

		portfolio over the current and 2 subsequent years, taking into consideration the CapEx planning. The new investment budgets are approved during the Operational Planning Conference. Several projects in the affected product lines have already been initiated. E.g., Bayer is investing in research alleviating the agronomical consequences of changing weather patterns, primarily related to an increased occurrence of extreme weather events. These factors cause abiotic stress to plants and are responsible for high yield losses. Bayer is developing technologies that respond to these challenges. One example is the insecticide ConfidorTM Stress ShieldTM which improves the resilience of crops against other abiotic stresses such as increased salinity. We have launched recently in Bangladesh a flooding resistant hybrid rice and are working on salinity resistant ones that allow growing this crop in densely populated low land deltas that are invaded by rising sea level and typhoons. We are also engaged in developing dry seeded rice, a new cropping system that reduces water requirements where water availability is becoming limiting. Another example is the joint venture Bayer decided to form with Ginkgo Bioworks in September of 2017. The initial activities will focus on nitrogen fixation for non-legumes, minimizing agriculture's environmental impact. The Bayer Life Science Center will invest 80 million USD over the next 4-5 years into the Ginkgo Joint Venture. MAGNITUDE OF IMPACT: Overall, climate change is only one of many aspects influencing our strategic investment decisions in the affected product lines. Accordingly, THE IMPACT OF OUR CLIMATE CHANGE-RELATED OPPORTUNITIES ON OUR CAPITAL EXPENDITURE/ALLOCATION IS LOW.
Acquisitions and divestments	Not yet impacted	RATIONALE. This area of our financial planning process has not yet been impacted BECAUSE we consider a multitude of factors in our acquisition decisions and climate change-related aspects have not yet been a significant driver for these complex decisions. POTENTIAL IMPACT: It is possible but unlikely that the regulatory risks we have identified could impact acquisition decisions in the future. If regulators decided to tighten carbon regulation including cap and trade schemes and carbon taxes to a much larger extent than is currently expected these aspects might be considered as part of our due diligence for transactions involving production facilities. The MAGNITUDE OF IMPACT WOULD BE LOW as carbon regulation will only be one component of relevant regulation and one of many factors that need to be evaluated. POTENTIAL TIMESCALE OF IMPACT: The timeframe of the regulatory risks regarding carbon price regulations we have identified and reported in this CDP report is 1-3 years. The potential impact described above would only be applicable to a TIMEFRAME OF MORE THAN 3 YEARS.
Access to capital	Not impacted	DESCRIPTION/RATIONALE: This area of our financial planning process is not impacted BECAUSE our considerations regarding our access to capital have not changed due to any of the risks or opportunities we identified and reported in this CDP report. During our financial planning cycle we consider our access to capital in light of the capital requirements for planned acquisitions. Many factors have an influence on our access to capital but climate change-related aspects have no significant influence in this regard and we do not expect that to change in the foreseeable future. Also, as life science company we don't have any energy-intensive production in the EU so that any energy cost increase has only a low impact on our business. In 2018, less than 5 percent of our total operational spend was on energy.
Assets	Not impacted	DESCRIPTION/RATIONALE: This area of our financial planning process is not impacted BECAUSE we have not identified climate change-related physical risks, such as an increase of extreme weather events like floods or hurricanes that could impact our assets. We analyzed Bayer's exposure to climate change-related physical risks globally and found that we do not expect physical climate parameters to change in such a way in the next 10 years to have the potential to generate a substantive negative impact on our assets. Bayer observes these risks for all sites worldwide considering the past 50 and the next 10 years. The potential impact is evaluated regularly based on external research and our risk reporting: For example, we evaluated external studies such as a Global Insight study on weather developments and the 5th IPCC report, we analyzed risks reported to the Head of Corporate Health, Safety and Sustainability and the Head of Corporate Sustainability and Business Stewardship, and we discussed potential risks with our divisions.
Liabilities	Not impacted	DESCRIPTION/RATIONALE: This area of our financial planning process is not impacted BECAUSE we are not aware of any liabilities that have been influenced by climate change aspects in the past and we do not expect any impact of climate change-related aspects on liabilities in the future. None of the risks or opportunities we have identified and reported in this CDP report has an impact on our liabilities.

C3. Business strategy

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

Yes

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

Yes, qualitative

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

i) PROCESS
The Bayer Climate Program was a game changer to bundle our expertise in providing climate change mitigation and adaptation solutions, to improve our CO2 footprint and to increase awareness of climate change issues. Company-wide communication and implementation has fostered broad resource efficiency initiatives. FOR EXAMPLE, setting GHG EMISSION REDUCTION TARGETS and driving initiatives to achieve them have become an integral part of Bayer's sustainability strategy.
Climate change also influences Bayer's strategy through the annual Strategy Conference process, requiring divisions to explain how global megatrends incl. climate change, affect business. The CHS Leadership Team regularly discusses climate-related risks, opportunities and the progress of the climate-related targets and initiatives. The Head of the CHS Leadership Team regularly briefs the responsible Board Member about relevant decisions. The process of setting climate-related goals begins with the Corporate Health, Safety & Sustainability function proposing targets. These need to be endorsed by the Sustainable Development Committee, which meets quarterly and is sponsored by the CSO. The targets are approved by the Board. These processes ensure that climate change aspects are considered in the further development of our business strategy. FOR EXAMPLE, following the PARIS AGREEMENT potential contributions of Bayer to reaching a 2-degree-scenario were discussed. As a result, we adjusted our GHG targets.

ii) STRATEGY CHANGES AND LINK TO EMISSIONS REDUCTION TARGET
One important change in operational practices was the development of the Bayer Climate Check used to identify CO2 savings potentials in production plants. All divisions have adopted processes to implement the savings. Pharmaceuticals and Consumer Health established an energy management system, achieving ISO 50001 certification for all German production sites. A SharePoint platform for information and knowledge exchange and monitoring of energy-saving projects has been applied. Crop Science started to focus on energy management and optimization through the ISO framework and has certified its major European production sites against ISO 50001 or ISO 14001 since 2014.
Climate change also influenced our communication strategy: targets and measures have become an integral part of Bayer's Annual Report.
The Bayer Climate Program refocused our core business on climate-related growth areas: Crop Science invested significantly in climate-related R&D and is still working on the marketing of climate-related solutions that help plants cope with external stress factors, e.g. flooding. In all crops where we have a breeding program, we strive to develop seeds that will perform at a high level in a variety of abiotic environments. Our researchers are working

to increase in particular the yield potential of crop plants, but also quality potential, e.g. by improving the profile of rapeseed oil. In the area of vector control, we develop solutions with resistance-breaking properties for controlling mosquitoes that can transmit malaria, dengue fever or Zika. In early 2019 Bayer introduced Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs. Also, Bayer set more ambitious GHG REDUCTION AND ENERGY EFFICIENCY TARGETS following the Paris Agreement: an improvement of 10% in energy efficiency and a 20% reduction in specific greenhouse gas emissions by 2020 compared with 2015.

iii) ASPECTS INFLUENCING THE STRATEGY
Bayer looks at 3 climate change aspects: 1) additional business opportunities through current / new solutions for climate change mitigation and adaptation; 2) improving Bayer's carbon footprint and related cost position; 3) strengthening Bayer's reputation and safeguarding our license to operate. EXAMPLES: Climate-related mid- to long-term weather trends influence our Crop Science business and are considered when formulating crop strategies. Bayer has set ambitious GHG EMISSION REDUCTION TARGETS to increase energy efficiency and to reduce exposure to climate-related regulatory risks.

iv) BUSINESS DECISIONS RELEVANT FOR 2018
One major business decision relevant for 2018 to improve Bayer's carbon footprint and reduce the exposure to climate-related regulatory risks was the definition of our target for GHG emissions. We are aiming to achieve a 20% reduction in specific GHG emissions by 2020 compared with 2015. Correspondingly, business decisions to reduce emissions in 2018 included, e.g., process optimizations in several plants leading to CO2 reductions e.g. through the reduction of steam, the installation of LEDs / more efficient lightning systems in several sites, or the optimization of energy efficency control systems.
To exploit climate-related business opportunities and reduce agriculture’s carbon footprint Bayer decided to join forces with Ginkgo Bioworks. Bayer formed a new company focusing on transformational beneficial microbes for plants. The initial activities focus on nitrogen fixation minimizing agriculture’s environmental impact. In the area of vector control, Bayer introduced Fludora® Fusion, the first product to combine two modes of action for use in malaria indoor residual spray programs in early 2019. Other decisions relevant for 2018 contained the launch of rice seed with high flood tolerance and research partnerships, e.g. with IPK Gatersleben evaluating wheat plants with altered carbon assimilation allocation and partitioning; the New Mexico Consortium to further develop carbon concentrating mechanism and optimized antenna size for increased radiation use efficiency; and with UCSD to manipulate gas exchange and CO2 regulation of stomatal conductance and density. We initiated a partnership with the aerospace technology company Planetary Resources to develop new digital farming applications and to improve the efficiency of existing products based on field-zone specific satellite data. Bayer intends to create new agricultural products and improve existing ones leading to higher yields and also more efficient and more environmentally compatible deployment of resources.
A strategic advantage from our focus on climate solutions arises from climate-smart agricultural solutions which have the potential to avoid emissions such as our biological seed treatment product Acceleron. Under Acceleron, roots grow bigger. Due to bigger roots nutrient availability increases through more efficient uptake with less release of nutrients into the environment and less fertilizer needs. This results in less GHG emissions from fertilizer production, application and runoff/degradation. Through increased plant biomass and better soil health, soil carbon sequestration and humus enrichment increase. Another example is Joyn Bio. The project is to engineer microbes that can provide plants with biological nitrogen fertilizer, to reduce the use of chemical nitrogen fertilizer and its impact on the environment.

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

Climate-related scenarios	Details
RCP 2.6	IDENTIFICATION OF SCENARIOS: Our HSE and Sustainability managers constantly monitor climate-related academic publications and analyze potential impacts of new insights on Bayer. The scenario RCP 2.6 was identified in the 5th IPCC report. While the report analyzes the consequences of two different scenarios (RCP 2.6 and RCP 8.5) we focused on the RCP 2.6 scenario because the projected levels of global mean temperature increase do not diverge substantially for these two scenarios over the time horizons we considered. We did not alter any of the inputs, assumptions or analytical methods used in the RCP 2.6 scenario as we based our analysis on the scenario's consequences as stated in the 5th IPCC report. TIME HORIZONS: In our scenario analysis we considered a timeframe of up to 10 years. This timeframe of up to 10 years is relevant to our organization BECAUSE it coincides with Bayer's long-term perspective as defined in this year's CDP question C2.1. AREAS CONSIDERED: In this scenario analysis we considered climate change-related physical risks to our sites worldwide including, e.g., extreme weather events. SUMMARY OF RESULTS: Bayer identified 2 relevant drivers of physical risks to our sites: changes in (1) weather extremes and (2) precipitation patterns. The scenario analysis was part of a larger evaluation of the potential impact of those two drivers, which also included, e.g., an analysis of risks reported to Head of Corporate, Health, Safety and Sustainability. (1) Bayer operates several sites exposed to the risks of hurricanes or flooding. An evaluation of the last 50 years showed that there were no changes related to our sites' exposure to weather-related risks and there is no indication of a climate change-induced increase of their exposure in the near future based on our scenario analysis. Since the carve-out of Covestro we have even less risk with regard to weather extremes. (2) Even though water shortages due to a change in precipitation patterns could present a risk for water supply at certain sites, Bayer is not significantly affected by this risk. Since the carve-out of Covestro, the risk diminished even more. Water shortages due to climate change are not expected. Summing up, based on the scenario analysis and our accompanying analyses we don`t expect significant changes due to climate change in the next 10 years to have the potential to generate substantive negative change in our costs or revenues. IMPACT ON OBJECTIVES/STRATEGY: Despite significantly expanding production, we reduced our absolute greenhouse gas emissions significantly between 1990 and 2015, namely by more than 20%. Although the scenario analysis did not account for physical risks to our sites we want to continue making positive contributions to protecting the climate and managing the effects of climate change on several levels. This includes reducing our production-related emissions with targets related to improving energy efficiency and lowering specific greenhouse gas (GHG) emissions. In addition, we are investigating further potential ways to lower greenhouse gas emissions along the value chain, such as the question of whether state-of-the-art cultivation methods and innovative solutions for precision agriculture contribute to a lower CO2 footprint in agriculture. FOR EXAMPLE, following the Paris Agreement potential contributions to reaching a 2-degree-scenario were discussed at Bayer. As a result, we adjusted our GHG targets to achieve a 20% reduction in specific GHG emissions by 2020 compared with 2015. Furthermore, we committed ourselves to setting a science-based target within this year, underlining our endeavors in the area of climate protection.

C4. Targets and performance

(C4.1) Did you have an emissions target that was active in the reporting year?

Intensity target

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

Target reference number	Scope	% emissions in Scope	Targeted % reduction from bas year	Metric	Base year	Start year
Int 1	Scope 1+2 (market-based)	100	20	Other, please specify: kg CO2e per TEUR external sales	2015	2015

Normalized base year emissions covered by target (metric tons CO2e)	Target year	Is this a science-based target?	% of target achieved	Target status	Please explain	% change anticipated in absolute Scope 1+2 emissions	% change anticipated in absolute Scope 3 emissions
55.7	2020	No, but we anticipate setting one in the next 2 years	100	Achieved	The target was already achieved in 2018 with specific CO2e emissions of 42.0 kg CO2e / €1,000 external sales (representing a 25 % reduction against the base year).	10	0

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

Target	KPI – Metric numerator	KPI – Metric denominator (intensity targets only)	Base year	Start year	Target year
Energy productivity	kWh	Per TEUR external sales	2015	2015	2020

KPI in baseline year	KPI in target year	% achieved in reporting year	Target Status	Please explain	Part of emissions target	Is this target part of an overarching initiative?
143	129	100	Achieved	We aim at improving our energy efficiency by 10% by 2020. Target attainment in 2018 was a 12% improvement (126 kWh / €1,000 external sales).	Though this target can contribute to our emission intensity target (Int1), there is no directly proportional relationship between both targets. Changes to the energy mix will lead to different developments of the two targets. We consider both targets meaningful and report them separately in our Annual Report.	No, it's not part of an overarching initiative

Comment for C4.1b

Our nonfinancial targets through 2020 will cease to apply in the current form from the end of 2018 as they pertain only to the Bayer Group excluding the acquired agriculture business in the second half of 2018. In view of the portfolio changes, we conducted a new materiality analysis in fall 2018 that will serve as the basis for new, ambitious Group targets that will be defined in 2019. We will need to fundamentally realign our targets in view of the integration of the acquired agriculture business and the impact it has on our enterprise.

Emissions reduction initiatives

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

Yes

(C4.3a) Identify the total number of initiatives 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 tons CO2e (only for rows marked *)
Under investigation	3	465
To be implemented*	0	0
Implementation commenced*	4	3,251
Implemented*	56	5,501
Not to be implemented	1	1

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

Activity type	Description of activity	Estimated annual CO2e savings (metric tons CO2e)	Scope	Voluntary/ Mandatory	Annual monetary savings (unit currency, as specified in C0.4)	Investment required (unit currency, as specified in C0.4)	Payback period	Estimated lifetime of the initiative	Comment
Energy efficiency: Building fabric	Insulation	271	Scope 2 (market-based)	Voluntary	17,000 €	1,215,000 €	> 25 years	11-15 years	In 2018, several projects have been implemented with insulation improvements e.g. through the reconstruction of roofs.
Energy efficiency: Building services	Lighting	286	Scope 2 (market-based)	Voluntary	78,795 €	733,879 €	4-10 years	6-10 years	In 2018, several projects have been implemented to change office lighting bolts to LED and to modify the timing of common areas lighting schedules.
Energy efficiency: Building services	HVAC	658	Scope 2 (market-based)	Voluntary	235,000 €	53,000 €	< 1 year	6-10 years	In 2018, several projects have been implemented with HVAC-Optimizations e.g. improving the HVAC control in a warehouse.
Energy efficiency: Building services	HVAC	2,013	Scope 2 (market-based)	Voluntary	15,551 €	1,017,000 €	4-10 years	16-20 years	In 2018, several projects have been implemented with HVAC-Optimizations e.g. adapted operation of HVAC.
Energy efficiency: Processes	Process optimization	350	Scope 1	Voluntary	75,000 €	40,000 €	<1 year	6-10 years	In 2018, one project has been implemented in which two Calendria Evaporators have been conversed to Double Effect Evaporation for steam reduction in the waste water treatment plant.
Energy efficiency: Processes	Process optimization	1,862	Scope 2 (market-based)	Voluntary	173,135 €	400 €	1-3 years	16-20 years	In 2018, several projects have been implemented with Process Optimizations and reduction of operating materials e.g. reducing pump pressure, adapting the compressor operation, improved pipe management or reducing leakage.

Energy efficiency: Processes	Process optimization	4	Scope 2 (market-based)	Voluntary	3,000 €	900,000 €	>25 years	>30 years	One project has achieved energy savings through the reduction of running-time of the centrifuge.
Energy efficiency: Processes	Cooling technology	30	Scope 2 (market-based)	Voluntary	24,187€	260,421€	4-10 years	16-20 years	In 2018, several projects have been implemented concerning the Optimization of cold store/ refrigerent cooling systems to reduce electricity consumption.
Energy efficiency: Processes	Waste water treatment	17	Scope 2 (market-based)	Voluntary	9,400 €	175,000 €	4-10 years	16-20 years	In 2018, one project has been implemented to improve the wastewater treatment facility (construction of a buffer tank).
Low carbon energy installation	Solar PV	8	Scope 2 (market-based)	Voluntary	2,100 €	24,402 €	11-15 years	16-20 years	In 2018, one project has been implemented in which a Solar panel was installed above the administration building to generate electricity.

Comment (C4.3b):

To simplify reporting, we have consolidated different projects concerning the same activity in one row. Due to confidentiality reasons we cannot disclosure all internal costs, therefore in some cases monetary savings and required investments include partial data.

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

Method	Comment
Employee engagement	Most global production plants with 85% of energy consumption are staffed with Site Energy Officers who are in charge of managing energy efficiency tasks and the energy management systems. We are also lowering emissions in nonproductive areas. These include our Sustainable Fleet initiative and infrastructure of charging stations. Bike sharing and car sharing for all employees have also been launched. At some sites public transport season tickets are available at reduced rates.
Internal incentives/recognition programs	Emission reduction activities are also driven by energy targets within individual performance targets that are set to determine the variable salary component as part of our short-term incentive program. Also, emission reductions are driven by our internal employee ideas pool, which rewards ideas for improving energy efficiency.

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

Yes

(C4.5a) 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 these low-carbon product(s) or do they enable 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	Comment
Company-wide	Bayer has introduced several technologies to decrease the carbon footprint of crops by reducing the inputs used during crop production and increasing the yield. Among these new technologies, Climate FieldViewTM digital agriculture platform provides farmers with centralized field data management, visualization and reporting that creates actionable agronomic insights for data-driven decisions to optimize fertility and seeding management. The Nitrogen Management Tool (NMT) which is part of the Climate FieldViewTM digital agriculture platform is a decision support system which helps to reduce the nitrogen fertilizer application. Nitrogen fertilizers have an energy-intensive production process which mostly consumes fossil fuels and application of nitrogen fertilizers induces nitrous oxide, dinitrogen and ammonia emissions from soil as well as nitrate leaching. Among soil emissions, N_2O has the highest global warming potential (GWP) which is nearly 300 times more than GWP of CO_2. In most cases, nitrogen fertilizers are applied in excess of crop needs such that almost half of the N fertilizer is taken up by crops during growing season and the other half is prone to loss.	Avoided emissions	Other, please specify: Cradle-to-farm gate life cycle assessment (LCA)	0	The methodology of this study followed the ISO 14040 methods for conducting an attributional LCA. Total net carbon dioxide reductions of 33.3 kgCO2/tonne corn or 0.059 tCO2/ha. Across the 7.45 million ha assumed to adopt Nitrogen Management Tool (NMT) this would result in a total annual carbon dioxide savings of 2.7 million tonnes. Since NMT is part of the FieldViewTM offering we do not calculate revenue for this specific element.
Company-wide	The introduction of the US corn seed treatment (inoculant) containing spores of the naturally occurring soil fungus called Penicillium bilaiae (P.b.).P.b is found to reduce the impact of corn production in all investigated categories,	Avoided emissions	Other, please specify: life cycle assessment (LCA)	20	Use of *P.b.* in US corn production provides significant environmental benefits with no trade-offs. By extrapolation of the base case results for Minnesota and North Dakota, it is estimated that the *P.b.* inoculant could reduce GHG

	particularly for global warming and eutrophication where reductions of 9-15% are observed (base case results for Minnesota and North Dakota). More modest improvements (2-4%) are estimated for the remaining impact categories. In terms of global warming, the impact of producing one ton of corn was reduced by 33-39 kg CO2e (base case results) when applying the P.b. inoculant.				emissions by 3.8 million t CO2e if applied on all US corn fields. This product is part of our crop protection portfolio with sales of EUR 9.5 billion in 2018 (on a pro-forma basis). As we cannot disclose the share of revenue of individual products, we have provided the share of revenue of the crop protection business of BAG Group sales (based on pro-forma sales).

C5. Emissions methodology

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

Scope	Base year start	Base year end	Base year emissions (metric tons CO2e)	Comment
Scope 1	01/01/2015	12/31/2015	910,000	
Scope 2 (location-based)	01/01/2015	12/31/2015	970,000	
Scope 2 (market-based)	01/01/2015	12/31/2015	960,000	

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

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

C6. Emissions data

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Gross global Scope 1 emissions (metric tons CO2e)	Start date	End Date	Comment
1,510,000	01/01/2018	12/31/2018	

(C6.2) Describe your organization's 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	

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

Scope 2, location-based	Scope 2, market-based (if applicable)	Start date	End Date	Comment
1,480,000	1,400,000	01/01/2018	12/31/2018	

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

No

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

Sources of Scope 3 emissions	Evaluation status	Metric tons CO2e	Emissions calculation methodology	% emissions calculated using data obtained from suppliers or value chain partners	Explanation
Purchased goods and services	Relevant, calculated	9,271,000	Emissions from purchased goods and services are calculated based on a complete list ("spend map") of all purchased goods and services that do not fall into other CDP categories (e.g. energy for site operations is not included since already reported under Scope 2). The purchases are converted into GHG emissions by PwC's ESCHER (Efficient Supply Chain Emissions Reporting) tool. The ESCHER tool is based on a recognized macroeconomic input-output analysis extended by GHG emissions to determine indirect GHG emissions in a company's supply chain, e.g. indirect emissions from purchased goods and services.		
Capital goods	Not relevant, explanation provided				Bayer does not calculate and report Scope 3 emissions associated with capital goods, as they are not particularly relevant to our organization. Bayer evaluates annually on a corporate level all Scope 3 categories according to a goal definition which was developed in 2012 with a group of Bayer Scope 3 emission experts in line with the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. As set out in our goal definition, Bayer reports on all Scope 3 emissions which help to track the performance in emissions reduction and on other significant Scope 3 emissions regarding stakeholder interests. The Scope 3 Category Capital goods remains currently not relevant to Bayer due to the fact that Bayer does not have any significant influence over the Scope 3 emissions from capital goods and is thus not able to prepare and set any meaningful emission reduction goals in this category. In addition, emissions from capital goods are not deemed as especially important by our

					stakeholders.
Fuel-and-energy-related activities (not included in Scope 1 or 2)	Relevant, calculated	598,000	In this category, Bayer considers emissions resulting from (A) Upstream emissions of purchased fuels, (B) Upstream emissions of purchased electricity+steam (E+S), and (C) Transmission+Distribution (T+D) losses. (i)Data types and sources: (A) Bayer retrieved the energy content (TJ) per fuel type from its Bayer site information system (BaySIS). The corresponding emission factors were taken from the "GaBi ts" Product Sustainability Software database. This year fuels from vehicle fleet are included. (B) The amount of purchased E+S was retrieved from BaySIS. The respective energy efficiency factors were provided by the German Federal Environment Agency. To derive the share of different fuel types used in production of E+S, the energy mix outlined by the IEA Key World Energy Statistics 2018 was used. The emission factors of the different fuel types were taken from "GaBi ts". (C) For T+D losses of electricity, national transmission and distribution losses induced emissions published by the IEA were used. The amount of electricity purchased was retrieved from BaySIS. T+D losses for steam were calculated based on the Scope 2 emissions associated with purchased steam retrieved from BaySIS using a loss factor of 7.5%, provided by the Federal Environmental Agency. (ii) Methodologies, assumptions and allocation methods: The methodology used is based on the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. (A) The respective energy content (TJ) generated (by fuel type) was multiplied by the associated Scope 3 emission factors. (B) The purchased amounts of E+S were divided by the respective energy generation efficiency factors to estimate the total amount of fuel used for their generation. For the fuel share of electricity production, the energy mix by the IEA Key World Energy Statistics 2018 was used. To calculate the associated Scope 3 emissions, Bayer multiplied each primary energy source by the respective emission factor supplied by "GaBi ts" database and added up the results.(C) T+D losses associated with purchased electricity were calculated by multiplying the amount of purchased electricity with specific T+D-related emissions per kWh for each country where electricity was purchased. T+D losses related to purchased steam were calculated by applying the grid related loss factor to Scope 2 emissions associated with purchased steam.		
Upstream transportation and distribution	Relevant, calculated	507,000	i) Data types and sources: All in and outbound transport and logistic based emissions from up- and downstream "paid by" Bayer (including legacy Monsanto shipments from the period of June to December 2018) have been calculated. The calculations were based on mass-related transport data taken from SAP Business Warehouses (Bayer) and SAP, JDA TMS (legacy Monsanto) and other data sources for the respective divisions globally. Bayer used the CEFIC Recommended		

			Emission Factors (Measuring and Managing CO2 Emissions of European Chemical Transport, Edinburgh, 2010) and commercial tools (e.g., Google Geo Tools) for distance calculations enabling accurate assumptions in the relevant mode of transports. In terms of distance, legacy Monsanto is utilizing JDA TMS for exact distance calculation for road transportation, and commercial tools (e.g., Google Maps) to enable accurate distance estimation for other transportations out of JDA TMS. ii) Methodologies, assumptions and allocation methods: Bayer used the CEFIC methodology and the GHG Protocol Standard to calculate upstream transportation emissions by multiplying metric tons of transported goods from our SAP and JDA systems by the calculated distance per shipment (based on ZIP based geo-data based distance computing or calculated or estimated with a commercial tool) to obtain ton-km associated with transport operations (mode of transport). This figure was then multiplied by default average emission factors [g CO2/ton-km] for the specific mode of transport. General Remark: A fundamental analysis of in- and outbound and up- and downstream logistic processes concluded that for category 9, reliable data for emissions between our gate and the end consumer are only available for emissions from the transportation and logistics process that Bayer pays for. As Bayer reports strictly on the GHG Protocol Corporate Value Chain Accounting and Reporting standard, all of these emissions need to be reported under category 4. A logistic expert group of all Bayer sub- and service groups therefore decided to focus on category 4 emission reporting integrating action items like “air to ship” and “intermodal transport operation improvement” to reduce emissions and increase cost efficiency. At Legacy Monsanto, 6 % of category 4 data are provided by suppliers.		
Waste generated in operations	Relevant, calculated	237,000	(i) Data types and sources: Bayer separates emissions resulting from waste treated by third parties into (A) incineration, (B) landfill, (C) recycling and (D) other. In addition, as of 2012, Bayer also calculates emissions from waste water treatment (E). The amount of waste treated by third parties for the different treatment methods is retrieved from our site information system BaySIS. The combustion factor for incineration (A) was calculated as a weighted average of waste-specific emission factors on production sites contributing most to this category. These site-specific emission factors were based on carbon content of waste to be incinerated by third parties. The emission factors for waste from landfill (B), other (D) and for wastewater (E) were calculated using Bayer-specific assumptions according to the IPCC guidelines. (C) In line with the IPCC, Bayer uses an emissions factor of 0 for recycled waste. (ii) Methodologies, assumptions and allocation methods: The methodology used is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting		

			Standard. Using the average data method, the emissions are calculated by applying associated emission factors to each waste treatment category. (A) To calculate the CO2e emissions associated with incineration, the total amount of waste in this category was multiplied by the average carbon content related combustion emissions factor. (B) To calculate the CO2e emissions resulting from waste treated in landfills, the total amount of waste in this category was multiplied by the dedicated emissions factor. (C) Emissions from recycling are treated as 0. (D) The small amount of waste which does not fall into categories (A), (B) or (C) is conservatively calculated using the same methodology as for incinerated waste (A). (E) A site-specific analysis of the share of waste water treated by third parties was performed based on information from BaySIS. Emissions from waste water treatment were calculated according to IPCC guidelines based on the water's effluent concentrations of organic carbon (resulting in methane emissions) and nitrogen (resulting in nitrous oxide emissions) which were retrieved from BaySIS.		
Business travel	Relevant, calculated	146,000	(i) Data types and sources: We calculated GHG emissions for 3 main modes of transport: (A) Air travel (B) Rental cars (C) Train travel. (A) Air travel emissions were calculated according to the DEFRA methodology. Data (flight miles, departure/arrival destinations, passenger class) were supplied by our global travel agencies. (B) Rental cars: emissions were calculated based on data supplied by the 4 largest rental car companies: Europcar, Sixt, National and Hertz covering 86% of Bayer's global rental car travel. (C) Rail: Deutsche Bahn AG provided Bayer with the CO2 footprint of its business trips by rail in Germany. Data from other rail carriers was not made available to Bayer. (ii) Methodologies, assumptions and allocation methods: The methodology used is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. (A) To calculate air travel emissions, flight data from travel agencies were imported into the Business Travel Analyzer tool and clustered according to travel distance (domestic, intracontinental, intercontinental) and service class (economy, premium economy, business, first). Miles traveled in each cluster were multiplied by the corresponding DEFRA emission factor. For data consistency reasons, DEFRA factors without radiative forces were used. Our data covered 99.5% of the total worldwide spend for flights by Bayer employees, the remaining 0.5% were extrapolated according to expenditure. Bayer's total air travel emissions amount to approx. 139,000 t CO2e. (B) Rental car emissions covering 86% of Bayer's global rental car travel were provided by Bayer's providers Europcar, Sixt, National and Hertz. The data was extrapolated according to expenditure to cover 100% of Bayer's rental car travel amounting to approx. 6,000 t CO2e. (C) The total emissions from train travel amounting to approx. 1,000 t		

			CO2e were calculated as a sum of emissions provided by Deutsche Bahn and an estimation for the rest of world. For the latter, we estimated passenger-kilometers proportionally to the number for Germany based on coverage and then multiplied the result with the newest emission factor available from the European Environmental Agency for 2014. Altogether, total emissions caused by business travel in 2018 amount to approx. 146,000 t CO2e.		
Employee commuting	Relevant, calculated	85,000	(i) Data types and sources: The calculation of CO2e emissions associated with employee commuting is based on national statistical data, e.g. from the United States Department of Transportation, the German Federal Environmental Agency and the Federal Statistical Office of Germany. The national statistical data includes information on commuting distances, modes of transport and associated CO2e emission factors. Furthermore, Bayer uses internal HR data to determine the number of commuting employees. (ii) Methodologies, assumptions and allocation methods: The methodology used is based on the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. We calculate the Scope 3 emissions associated with employee commuting separately for four different regions: Europe (including Africa and Middle East), North America, LATAM and APAC. For each individual region we multiply different and statistically derived modes of transport used for the commute by related emission factors. The calculations for Europe are based on statistical data for Germany. The calculations for North America are based on statistical data for the United States of America. LATAM and APAC are estimated proportionally to emissions calculated for Europe. All regional data are added together to reach a global figure for Bayer's total Scope 3 emissions associated with employee commuting. To avoid double-counting, we do not report emissions arising from commuting to the work-place of employees that drive a company car or a leased car in this category. The emissions associated with company cars are reported as Scope 1 emissions and the emissions associated with leased cars are reported in the Scope 3 category "upstream leased assets".		
Upstream leased assets	Relevant, calculated	7,000	(i) Data types and sources: Car fleet emissions were calculated based on the data retrieved from our fleet management tool. With this tool, details of the Bayer car fleet are gathered and managed. The tool can be used to manage emissions of the Bayer fleet and to compare emissions of different vehicles, countries and departments. Emission developments can be analyzed in detail and it is possible to identify influencing factors to reduce emissions. The tool includes information on CO2 emission factors for most vehicles, as well as most vehicles' running distance. The CO2 emission factors are provided by the lessor on the basis of vehicle manufacturer data, while the running		

			distances (mileage) were measured for the vehicles. (ii) Methodologies, assumptions and allocation methods: The methodology used is based on the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Leased assets represented in this category belong to Bayer's car fleet. In particular, we report emissions associated with employee and allowance cars (cars that are leased by employees for private purposes) as well as pharmacy cars in the category "upstream leased assets". In order to calculate the emissions from upstream leased assets, we multiplied the annual running distance [km] of each employee, allowance and pharmacy car by its specific CO2-emission factor [g CO2e/km]. For cars, where specific information on running distance or emission factors was unavailable, we used country based averages derived from the available data in our fleet management tool. To avoid double counting, Bayer does not consider emissions from company cars in the calculation for emissions from upstream leased assets, as these emissions are already included in Bayer's reported Scope 1 emissions.		
Down-stream transporta-tion and distribution	Not relevant, explanation provided				Bayer does not report Scope 3 emissions under category 9, "Downstream transportation and distribution" as this category is considered not relevant for Bayer's Scope 3 inventory which is in line with Bayer's Scope 3 goal definition. A fundamental analysis of in- and outbound and up- and downstream logistic processes concluded that for category 9, reliable data for emissions between our gate and the end consumer are only available for emissions from the transportation and logistics process that Bayer pays for. As Bayer reports strictly on the GHG Protocol Corporate Value Chain Accounting and Reporting standard, all of these emissions need to be reported under category 4. A logistic expert group of all Bayer sub- and service groups therefore decided to focus on category 4 emission reporting integrating action items like "air to ship" and "intermodal transport operation improvement" to reduce emissions and increase cost efficiency. At the same time it was decided that Bayer does not calculate and report Scope 3 emissions for category 9 with Transportation and distribution of sold products processed by 3rd parties and not paid by Bayer due to the limited availability of reliable data. This is in line with our goal definition for

					reporting Scope 3 emissions according to the GHG Protocol Corporate Value Chain Accounting and Reporting standard. As set out in our goal definition, Bayer reports on all Scope 3 emissions which helps to track the performance in emission reduction and on other significant Scope 3 emissions regarding stakeholder interests. As the limited data availability for the Scope 3 Category Downstream Transportation and Distribution does not allow Bayer to set and track meaningful emission reduction goals, this category is considered not relevant for Bayer's Scope 3 inventory and thus set to "not material for Bayer".
Processing of sold products	Not relevant, explanation provided				Bayer does not calculate and report Scope 3 emissions associated with processing of sold products, as this category is considered not relevant for Bayer's Scope 3 inventory according to Bayer's Scope 3 goal definition. Bayer adheres to the recommendation of the "Guidance for Accounting + Reporting Corporate GHG Emissions in the Chemical Sector Value Chain of the WBCSD", which states that "Chemical companies are not required to report Scope 3, category 10 emissions, since reliable figures are difficult to obtain, due to the diverse application and customer structure". In addition, within Bayer's goal definition for reporting Scope 3 emissions according to the GHG Protocol Corporate Value Chain Accounting and Reporting standard, Bayer decided to consider those categories as relevant for Bayer's Scope 3 inventory, which allow Bayer to pursue serious emission reduction activities. Discussions on a corporate level concluded that the overall data set of reliable data does not allow any continuous emission track performance analysis in this category nor currently an option to develop an emission reduction action and target plan. In line with our goal definition, this category is therefore considered "not relevant" for Bayer's Scope 3 inventory.

Use of sold products	Not relevant, explanation provided				Bayer does not report emissions from the use of sold products since this category is considered not relevant for Bayer's Scope 3 inventory. An analysis of Bayer's product portfolio regarding products containing propellant gases and/or fertilizers showed that Bayer does not sell fertilizers and the used propellant gases are non-GHGs, i.e. the propellant gases do not have a global warming potential according to IPCC AR 4+5. Therefore, no relevant amounts of GHG during the use of sold products are expected.
End of life treatment of sold products	Relevant, calculated	471,000	To calculate emissions from end-of-life treatment of sold products, only packaging materials were considered, since products of Bayer's Life Science businesses (pharmaceuticals, crop protection products, seeds, animal health products) are consumed and/ or metabolized and do not undergo a dedicated end-of-life treatment. Emissions from end-of-life treatment of packaging are calculated based on the quantities of packaging materials, which are obtained from Bayer's spend map. To calculate emissions from end-of-life treatment of sold packaging materials, packaging materials were clustered, then quantities were multiplied with material-specific emission factors obtained from "GaBi ts" database.		
Down-stream leased assets	Not relevant, explanation provided				Scope 3 emissions resulting from downstream leased assets are not reported because this category is not applicable to Bayer.
Franchises	Not relevant, explanation provided				Scope 3 emissions resulting from franchises are not reported because this category is not applicable to Bayer.
Invest-ments	Not relevant, explanation provided				Scope 3 emissions resulting from investments are not reported because this category is not applicable to Bayer.
Other (upstream)					
Other (downstrea					

m)					

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

No

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

Intensity figure	Metric numerator (Gross global combined Scope 1 and 2 emissions)	Metric denomi-nator	Metric denominator: Unit total	Scope 2 figure used	% change from previous year	Direction of change	Reason for change (2400 characters)
0.0000416	1,370,000	Unit total revenue	32,915,000,000	Market-based	10	Decreased	In 2018 Bayer's total CO2 emissions (excluding Currenta and the newly acquired agricultural business to ensure comparability to previous reports) decreased by approximately 13%. In the same period net external sales (excluding Currenta and the newly acquired agricultural business) decreased by approximately 3%. Therefore, Bayer had a decrease of total specific emissions expressed in metric tons CO2e per unit total revenue of approximately 10 % in 2018 compared to 2017. Part of this decrease is due to EMISSION REDUCTION ACTIVITIES. In 2018, emission reduction activities had a positive impact on our emissions performance. Emission reduction activities included e.g. process emissions reductions and energy efficiency activities related to processes, building fabric and building services. These activities included e.g. the reduction of pump pressure, improved pipe management, reduction of leakage, reducing centrifuge running-time or the installation of a closed cooling system in our sites. HVAC optimizations and changing of lighting systems also had a big influence. Overall Bayer implemented energy efficiency and emissions reduction projects that resulted in an overall reduction of 5,501 metric tons in CO2 emissions in 2018.
13.94	1,370,000	full time equiva-lent (FTE) employee	98,246	Market-based	15	Decreased	In 2018 Bayer´s specific emissions (excluding Currenta and the newly acquired agricultural business to ensure comparibility to previous reports) expressed in metric tons CO2e per FTE were 13.94. In 2018 Bayer's total CO2 emissions (excluding Currenta and the newly acquired agricultural business to ensure comparability to previous reports) decreased by approximately 13%. In the same period Bayer´s overall number of FTEs (excluding Currenta and the newly acquired agricultural business) increased by approximately 2%. Therefore, in 2018, Bayer (excluding Currenta and the newly acquired agricultural business) had a decrease of total specific emissions expressed in metric tons CO2e per FTE of approximately 15 %. Part of this decrease is due to EMISSION REDUCTION ACTIVITIES. In 2018, emission reduction activities had a positive impact on our emissions performance. Emission

							reduction activities included e.g. process emissions reductions and energy efficiency activities related to processes, building fabric and building services. These activities included e.g. the reduction of pump pressure, improved pipe management, reduction of leakage, reducing centrifuge running-time or the installation of a closed cooling system in our sites. HVAC optimizations and changing of lighting systems also had a big influence. Overall Bayer implemented energy efficiency and emissions reduction projects that resulted in an overall reduction of 5,501 metric tons in CO2 emissions in 2018.

C7. Emissions breakdown

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

Yes

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type providing the used global warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons in CO2e)	GWP Reference
CO2	1,460,000	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	4,000	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	7,000	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	18,000	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	0	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	0	IPCC Fourth Assessment Report (AR4 - 100 year)
NF3	0	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify: CCl3F2,CCl2F2,CHClF2,CH3Cl,CH3Br, CCl4	21,000	IPCC Fourth Assessment Report (AR4 - 100 year)

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

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	880,000
Germany	152,000
India	50,000
Brazil	46,000
Belgium	53,000
China	6,000
Argentina	28,000
Mexico	20,000
Spain	7,000
Italy	8,000
Other, please specify: Rest of World	260,000

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

By business division

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

Business division	Scope 1 emissions (metric tons CO2e)
Pharmaceuticals	181,000
Consumer Health	25,000
Crop Science	1,108,000
Others	196,000

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

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons 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)
United States of America	706,000	700,000	1,526,000	0
Germany	537,000	443,000	2,049,000	1,500
India	41,000	41,000	121,000	0
Brazil	18,000	17,000	0	0
Belgium	4,000	2,000	0	0
China	40,000	40,000	0	0
Argentina	19,000	18,000	0	0
Mexico	24,000	24,000	0	0
Spain	10,000	18,000	0	0
Italy	9,000	12,000	0	0
Other, please specify: Rest of the world	72,000	85,000	281,000	3,500

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

By business division

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

Business division	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Pharmaceuticals	223,000	209,000
Consumer Health	84,000	90,000
Crop Science	1,172,000	1,100,000
Others	1,000	1,000

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

Increased

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

Reason	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change		
Other emissions reduction activities	104,752	Decreased	6.6	i) Calculation: In 2018, 0.104752 million t CO2e were reduced due to “other emissions reduction activities”. Our total Scope 1 and Scope 2 emissions in the previous year were 1.58 million t CO2e, therefore we arrived at a reduction of 6.6% through (-0.104752 / 1.58) * 100 = -6.6% (i.e. a 6.6% decrease in emissions). ii) Explanation: One major driver for our emissions reduction in 2018 was the reduction at our site in Institute, West Virginia. One reason for the reduction was the discontinuation of our methylisocyanate-based chemistry-related production at the site and the associated worldwide reduction of our operational activities in this business area. Other emission reduction activities included e.g. process emissions reductions and energy efficiency activities related to processes, building fabric and building services. Activities to improve energy efficiency in processes included e.g. the reduction of pump pressure, improved pipe management, reduction of leakage, reducing centrifuge running-time or the installation of a closed cooling system in our sites. HVAC optimizations and changing of lighting systems also had a big influence.
Divestment	104,011	Decreased	6.58	i) Calculation: Last year the divestment of several sites led to a decrease of 0.104011 million t CO2e (-

				0.104011 / 1.58 * 100 = -6.58%). ii) Explanation: In 2018 Bayer sold six Crop Science sites completely and two sites partly due to the regulatory requirements regarding the acquisition of the Monsanto company. In addition, two sites from the Consumer Health and Pharmaceuticals division were divested. This led to a total reduction of 6.58 % due to divestment.
Acquisitions	1,626,861	Increased	103	i) Calculation and Explanation: Last year the acquisition of the Monsanto company led to an increase of 1.626861 million t CO2e (1.626861 / 1.58 * 100 = 103%). ii) Explanation: In 2018 Bayer acquired the Monsanto company. This led to an increase of 103 % due to acquisition.
Mergers				
Change in output				
Change in methodology				
Change in boundary				
Change in physical operating conditions				
Unidentified				
Other				

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

Market-based

C8. Energy

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

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

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

Activity	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

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

Activity	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	0	4,171,000	4,171,000
Consumption of purchased or acquired electricity	N/A	5,000	2,559,000	2,564,000
Consumption of purchased or acquired heat	N/A	0	0	0
Consumption of purchased or acquired steam	N/A	0	1,224,000	1,224,000
Consumption of purchased or acquired cooling	N/A	0	189,000	189,000

Consumption of self-generated non-fuel renewable energy	N/A	0	0	0
Total energy consumption	N/A	5,000	8,143,000	8,148,000

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

Fuel application	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	Yes
Consumption of fuel for co-generation or tri-generation	Yes

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

Fuels	Heating value	Total MWh consumed by the organization	MWh consumed for self-generation of electricity	MWh consumed for self-generation of heat	MWh consumed for self-generation of steam	MWh consumed for self-generation of cooling	MWh consumed self-cogeneration or self-trigeneration	Comment
Anthracite Coal	LHV	98,000	0	98,000	0	0	0	
Natural gas	LHV	2,841,000	279,000	1,326,000	678,000	0	558,000	
Other, please specify: Liquid fuels, waste, other primary energy	LHV	1,232,000	5,000	1,096,000	50,000	0	81,000	Other includes liquid fuels, waste, and other primary energy sources

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

Fuel	Emission factor	Unit	Emission factor source	Comment
Anthracite Coal	0.1	metric tons CO2 per GJ	IPCC Guidelines for National Greenhouse Gas 2006	Our sites use individual emission factors to calculate the emissions released through the burning of fuels. If specific emissions factors are not available, sites use the standard emission factor reported in this row.
Natural gas	0.06	metric tons CO2 per GJ	IPCC Guidelines for National Greenhouse Gas 2006	Our sites use individual emission factors to calculate the emissions released through the burning of fuels. If specific emissions factors are not available, sites use the standard emission factor reported in this row.
Other	0.08	metric tons CO2 per GJ	IPCC Guidelines for National Greenhouse Gas 2006	Our sites use individual emission factors to calculate the emissions released through the burning of fuels. If specific emissions factors are not available, sites use the standard emission factor reported in this row.

(C8.2e) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

Energy Carrier	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	93,000	93,000	0	0
Heat	0	0	0	0
Steam	945,000	945,000	0	0
Cooling	0	0	0	0

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

Basis for applying a low-carbon emission factor	Low-carbon technology type	Region of consumption of low-carbon electricity, heat, steam or cooling	MWh consumed associated with low-carbon electricity, heat, steam or cooling	Emission factor (in units of metric tons CO2e per MWh)	Comment
Energy attribute certificates, Guarantees of Origin	Hydropower	Europe	1,500	0	In 2018, two sites purchased low-carbon electricity, both from hydropower.
Energy attribute certificates, Guarantees of Origin	Hydropower	Latin America	3,500	0	In 2018, two sites purchased low-carbon electricity, both from hydropower.

C9. Additional metrics

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

Description	Metric value	Metric numerator	Metric denominator (intensity metric only)	% change from previous year	Direction of change	Please explain
Waste	578,000	tons		5%	Increased	
Other, please specify: Waste used for conversion into energy	1,000	teraJ		83%	Increased	

C10. Verification

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

Scope	Verification/assurance stats
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

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

Scope	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 emissions verified (%)
Scope 1	Annual process	Complete	Reasonable assurance	Bayer Annual Report 2018; Verification Letter_ Bayer+CUR _CDP	1) Bayer Annual Report 2018: Independent Auditor's Report on Reasonable and Limited Assurance: p.259ff and 269ff 2) Total Scope 1: p. 79 including Currenta emissions, which are NOT in the scope of this CDP Report acc. to the operational control approach. Currenta emissions are displayed in our auditor's Verification Letter: p. 2. Excluding Currenta from BAG emissions, we arrive at 1.51 million CO2e as reported in Question C6.1 of this CDP report (calculation: 3.9-2.39=1.51 million CO2e).	ISAE3000	100
Scope 2 location-based	Annual process	Complete	Reasonable assurance	Bayer Annual Report 2018; Verification Letter_ Bayer+CUR _CDP	1) Bayer Annual Report 2018: Independent Auditor's Report on Reasonable and Limited Assurance: p.259ff and 269ff 2) Total Scope 2: p. 79 including Currenta emissions, which are NOT in the scope of this CDP Report acc. to the operational control approach. Currenta emissions are displayed in our auditor's Verification Letter: p. 2. Excluding Currenta from BAG emissions,	ISAE3000	100

					we arrive at 1.48 million CO2e as reported in Question C6.3 of this CDP report (calculation: 1.64-0.16=1.48 million CO2e).		
Scope 2 marked-based	Annual process	Complete	Reasonable assurance	Bayer Annual Report 2018; Verification Letter_ Bayer+CUR _CDP	1) Bayer Annual Report 2018: Independent Auditor's Report on Reasonable and Limited Assurance: p.259ff and 269ff 2) Total Scope 2: p. 79 including Currenta emissions, which are NOT in the scope of this CDP Report acc. to the operational control approach. Currenta emissions are displayed in our auditor's Verification Letter: p. 2. Excluding Currenta from BAG emissions, we arrive at 1.4 m CO2e as reported in Question C6.3 of this CDP report (calculation: 1.55-0.15=1.4 m CO2e).	ISAE3000	100

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

Scope	Verification or assurance cycle in place	Status in the current reporting year	Attach the statement	Page/ section reference	Relevant standard
Scope 3- at least one applicable category	Annual process	Complete	Bayer_Scope3_Assurance_2018	Pages 3-5 : "Independent Practitioner's Limited Assurance Report on Sustainability Information"; Assured Scope 3 emissions on pages 8-16: "Bayer AG Scope 3 Emissions Data 2018"	ISAE 3410
Scope 3- at least one applicable category	Annual process	Complete	Bayer_Scope3_CDP_Verification_Template_2018	Pages 1-3 "Bayer_Scope3_CDP_Verification_Template_2018"	ISAE 3410

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

Yes

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

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and Performance	Progress against emissions reduction target	Reasonable assurance	Progress against emission reduction target (target attainment in 2018) is described within the Management Report of Bayer's Annual Report, which is verified with a reasonable assurance by Deloitte. Thus, it is included in the verification process.
C6. Emissions data	Year on year change in emissions (Scope 1 and 2)	Reasonable assurance	Year on year changes in Scope 1 and 2 emissions are described within the Management Report of Bayer's Annual Report, which is verified with a reasonable assurance by Deloitte. Thus, they are included in the verification process.
C6. Emissions data	Year on year emissions intensity figure	Reasonable assurance	Specific GHG emissions (emissions intensity) for the current and the previous reporting year are described within the Management Report of Bayer's Annual Report, which is verified with a reasonable assurance by Deloitte. Thus, they are included in the verification process.
C8. Energy	Other, please specify: Energy Consumption and efficieny	Reasonable assurance	Energy consumption and energy efficiency for the current and the previous reporting year are described within the Management Report of Bayer's Annual Report, which is verified with a reasonable assurance by Deloitte. Thus, they are included in the verification process.
C12. Engagement	Other, please specify: Supplier Management	Reasonable assurance	Details on sustainability in the supply chain (e.g. the sustainability requirements defined in the Supplier Code of Conduct) are described within the Management Report of Bayer's Annual Report, which is verified with a reasonable assurance by Deloitte. Thus, they are included in the verification process.

C11. Carbon pricing

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

Yes

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

EU ETS

(C11.1b) Complete the following table for each of the emissions trading systems in which you participate.

System name	% of Scope 1 emissions covered by the ETS	Period start date	Period end date
EU ETS	10	01/01/2018	12/31/2018

Allowances allocated	Allowances purchased	Verified emissions in metric tons CO2e	Details of ownership
121,000	0	147,000	Facilities we own and operate

(C11.1d) What is your strategy for complying with the systems in which you participate or anticipate participating?

Bayer's strategy to make sure we comply with the EU ETS is to keep sufficient allowances. Additional allowances will be bought if our own allowances do not meet the needs under regulatory national calculation. FOR EXAMPLE, we appraise our situation in terms of allowances for each year. We match our expected requirements of allowances against our expected apportionment and our sizeable buffer to decide whether there is a need to buy additional allowances.
Furthermore, Bayer has introduced an ambitious GHG emission reduction strategy. Our ambitious GHG reduction plan helps to comply with the EU ETS and to manage risks that arise from this scheme and potential future emission cap-and-trade systems. The Bayer Climate Program, launched in 2007, was a game changer to bundle our expertise in providing climate change mitigation and adaptation solutions, to improve our CO2 footprint and to increase awareness of climate change issues. Company-wide communication and implementation has fostered broad resource efficiency initiatives. Setting GHG EMISSION REDUCTION TARGETS and driving initiatives to achieve them have become an integral part of Bayer's sustainability strategy. FOR EXAMPLE, we decided to improve Bayer's carbon footprint and set more ambitious GHG REDUCTION AND ENERGY EFFICIENCY TARGETS following the Paris Agreement: to achieve an improvement of 10% in energy efficiency and a 20% reduction in specific GHG emissions by 2020 compared with 2015. These targets reflect our contribution to climate protection and support our strategy for complying with the EU ETS.

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

No

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

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

C12. Engagement

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers
Yes, other partners in the value chain

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

Type of engage-ment	Details of engage-ment	% of suppliers by number	% total procurement spend (direct and indirect)	% Scope 3 emissions as reported in C6.5	Rationale for the coverage of your engagement	Impact of engagement, including measures of success	Comment
Information collection (under-standing supplier behavior)	Collect climate change and carbon information at least annually from suppliers	0.78	27.5	27.5	Bayer's purchasing volume of ca. EUR 17.1 billion from 101,188 suppliers in 153 countries in 2018 makes suppliers a strategic priority of our engagement activities. Bayer collects climate change and carbon information from all relevant suppliers regularly e.g. regarding the suppliers' greenhouse gas (GHG) emissions, climate change strategies or procedures to measure and reduce environmental impacts of GHGs. Bayer collects information on supplier behaviour through online assessments and on-site audits by external auditors. RATIONALE: Because we cannot evaluate all 101,188 suppliers, suppliers are selected for the evaluations based on a combination of country and category sustainability risks as well as according to their strategic importance in line with our Group targets. Strategic importance is assumed if a supplier has a major influence on business in terms of, e.g., procurement spend and long-term collaboration prospects (3-5 years). The online assessments are carried out on Bayer's behalf by the service provider EcoVadis. EcoVadis evaluated 715 (2017: 622) suppliers on our behalf in 2018. In addition, 79 (2017: 57) of our suppliers were audited on-site by external, independent auditors in 2018. Throughout 2019 we start to integrate legacy Monsanto suppliers into our 4-step management process. The audit criteria include both the specifications of our code of conduct and industry-specific requirements that	i) IMPACT OF ENGAGEMENT: The online assessments and on-site audits are analyzed and documented in order to define specific improvement measures in case of unsatisfactory results. In 2018, this applied above all to the categories of sustainable procurement and the environment. In case of critical results, Bayer requests the suppliers to rectify the identified weaknesses within an appropriate period of time based on specific action plans. Our regular monitoring shows that in 2018 343 of our 794 suppliers evaluated have improved their sustainability performance which encompasses energy and GHG emissions. By requesting carbon and climate change information from our suppliers, SUPPLIERS BECOME MORE AWARE OF SUSTAINABILITY TOPICS, they ENGAGE IN SUSTAINABILITY ACTIVITIES and start or continue IMPROVING THEIR SUSTAINABILITY PERFORMANCE. E.g. one of our key suppliers in packaging supply has set the target of 10% reduction in energy and greenhouse gas (GHG) emissions per unit of production by 2020. The supplier has established a new energy policy and as of today 23% of their energy is sourced from renewable sources. ii) MEASURES OF SUCCESS: To measure the	To be consistent with previous CDP reports, % of procurement spend and % of Scope 3 emissions have been calculated based on Bayer suppliers before the acquisition of the newly acquired agriculture business in the second half of 2018. Throughout 2019 we start to integrate these suppliers into our 4-step management

					we have jointly laid out in the industry initiatives Together for Sustainability (TfS) and the Pharmaceutical Supply Chain Initiative (PSCI). The initiatives are intended to help standardize the sustainability requirements of suppliers in the chemical and pharmaceutical industries. Synergies are also created through the exchange of assessment and audit results within the initiatives. This helped us achieve our target of developing and introducing a new sustainability standard for our suppliers by 2020. Within the TfS initiative, a total of 1,491 (2017: 1,794) sustainability assessments were performed, also through EcoVadis, in 2018, along with 358 (2017: 441) audits. Within the scope of PSCI the number of audits was 123 (2017: 67). In addition, Bayer auditors evaluate selected new and existing suppliers particularly with regard to health, safety and environmental protection. A total of 130 (2017: 115) suppliers were evaluated by Bayer auditors in 2018.	success of our engagement with suppliers, we set ambitious targets and measure our success in terms of target fulfillment. Bayer's goal is to evaluate all Bayer suppliers with a significant procurement spend (above €1 million p.a.) regarded as potentially high-risk suppliers due to their combined country and category sustainability risk. Our target attainment before acquisition of Monsanto was 100% in 2018 (2017: 93%). Throughout 2019 we start to integrate legacy Monsanto suppliers into our 4-step management process. Our goal is to continue to have all strategically important legacy Bayer suppliers evaluated by the end of 2020. Success is also measured through re-assessments or follow-up audits that monitor the implementation of improvements requested by us.	process. From 2019 onwards, they will therefore be included in our calculations of the % of procurement spend and % of Scope 3. Additional comment: Scope 3 emissions are assumed to be roughly proportional to procurement spend.

(C12.1c) Give details of your climate-related engagement strategy with other partners in the value chain.

EXAMPLE 1:
PARTNERS: Bayer is engaging with other partners in the value chain through SusChem - the European Technology Platform for Sustainable Chemistry. SusChem brings together industry, academia, governmental policy groups and the wider society. Bayer is also involved in the public-private partnership SPIRE, which is supported by SusChem.
ENGAGEMENT STRATEGY: Bayer supports SusChem's mission to initiate European chemical and biochemical innovation to respond to society's challenges by providing sustainable solutions. These include e.g. innovations that contribute to a resource-efficient process industry or enable new uses for CO2. Bayer has supported SusChem to make a significant contribution to climate-related policy development in the European Institutions, especially the Key Enabling Technologies initiative and important European Innovation Partnerships. On the topic Sustainable and Inclusive Biotechnology SusChem has identified Sustainable Agriculture and Forestry as one of the areas of particular priority.
Bayer actively supported SusChem's engagement in 2018. SusChem, e.g., conducted a stakeholder meeting with particular focus on "The future of Research and Innovation in Europe: Defining Technology Priorities for Sustainable Growth and Shaping expectations and priorities for the next EU Framework Programme from the viewpoint of sustainable chemistry". Here, in particular, the aspects of circularity e.g. identifying new feedstocks, low carbon industries e.g reducing emissions, energy and resource usage and new technologies for materials up and recycling e.g. the valorization of waste streams were at the center of discussion.
The Public Private Partnership SPIRE aims to enable new technologies and best practices in important stages of large-scale value chains that will contribute to a resource-efficient process industry. On the topic of the bioeconomy the Public Private Partnership SPIRE initiated a cooperation with the Joint Technology Initiative Bio-based Industry through a working group that has identified a number of bio-based topics for the process industry.
For EXAMPLE, one project in which Bayer is involved focuses on flexible continuous production facilities by introducing novel online sensors and closed-loop control methods, thus using Industry 4.0 concepts to create substantial improvements.

EXAMPLE 2:

PARTNERS: Crop Science (CS) engages with participants in the food chain such as farmers, the processing industry, exporters and dealers.
ENGAGEMENT STRATEGY: The central element is the BayG.A.P. program via which Bayer TRAINS growers to successfully implement good agricultural practices. Our TRAININGS teach farmers how to use crop protection products effectively and safely, mainly as part of customer events or through courses in cooperation with partners e.g. local, regional and international associations. CS is intensifying its DIRECT COOPERATION with farmers and the food value chain. The goal is to develop integrated solutions for sustainable agriculture to safeguard and increase yields and to improve the quality of harvested produce. Bayer also reinforces its support for sustainable agriculture with Bayer ForwardFarming: a knowledge platform to demonstrate sustainable agriculture in practice.
PRIORITIZATION: Bayer focuses on training activities in countries where there are no statutory requirements or certification for users regarding the safe handling of crop protection products.
MEASURES: We track the reach of our trainings and partnerships. In 2018, ca. 1 mio farmers worldwide received safety training from Bayer. CS has initiated >500 food chain partnership initiatives in >40 countries. >300 growers worldwide have been trained with BayG.A.P. (expected to rise to 10,000 by end of 2020). 30 growers from India obtained the G.A.P. Letter of Conformance.

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

Trade associations
Funding research organizations
Other

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

Yes

(C12.3c) 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 influenced, or are you attempting to influence the position?
German Chemical Industry Association (VCI)	Consistent	The VCI acknowledges the commitment of the chemical industry in Germany to sustainability and promotes the sustainable development in companies. The VCI holds the position that, with its products and with its efficient co-generation plants, the chemical industry is contributing to sustainable development and climate change mitigation. Furthermore, the VCI is committed to international standards for sustainability and works closely with global organizations for the promotion of sustainable development, climate mitigation and resource efficiency.	Bayer is involved with the VCI regarding important issues related to the German chemical industry, including climate change, and is influencing the association through active involvement in relevant committees and working groups. Bayer's CEO serves as vice-president of the VCI.
The Federation of German	Consistent	The BDI generally supports ambitious and effective climate protection in Germany, the EU and worldwide. The BDI is strongly involved in the	Bayer is involved with the BDI on issues important to the German industry, including climate change related issues. Bayer's CEO

Industries (BDI)		discussions regarding resource efficiency in the circular economy.	serves as Member of the Presidential Board of the BDI. In addition, Bayer provided significant input in the past e.g. in developing BDI positions regarding electricity market design.

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?

No

(C12.3e) Provide details of the other engagement activities that you undertake.

1) SusChem - the European Technology Platform for Sustainable Chemistry, which brings together industry, academia, governmental policy groups and the wider society. The Head of Process Technology Development at Bayer's corporate function Engineering & Technology represented Bayer as a Member of the SusChem Board. Bayer supports SusChem's mission to initiate European chemical and biochemical innovation to respond to society's challenges by providing sustainable solutions. These include e.g. innovations that contribute to a resource-efficient process industry or enable new uses for CO2.
SusChem, and Bayer as member, have encouraged the new European initiatives under the Horizon 2020 framework programme for research and innovation. SusChem sees Horizon 2020 as a major opportunity for sustainable chemistry in Europe. E.g. the Public Private Partnership SPIRE aims to enable new technologies and best practices in important stages of large-scale value chains that will contribute to a resource-efficient process industry. One project in which Bayer is involved focuses on flexible continuous production facilities by introducing novel online sensors and closed-loop control methods, thus using Industry 4.0 concepts to create substantial improvements. Furthermore, SusChem, together with EuropaBio, inspired the Bio-Based Industries Joint Technology Initiative in 2013, an initiative to develop new sustainable sources from domestic renewable raw materials, and started an initiative to bring the bio-based industry value chains closer together with typical chemical value chains. SusChem has continued to lead discussions on a cooperation with the Innovative Medicine Initiative and Biopharma Europe focusing on the potential of novel (bio-) catalysis, innovative formulation technology, tailored sustainable production processes and the application of state-of-the-art chemical computation and metrology to life science problems.
Bayer ACTIVELY SUPPORTED SUSCHEM'S ENGAGEMENT IN 2018. SusChem, e.g., conducted a stakeholder meeting with particular focus on "The future of Research and Innovation in Europe: Defining Technology Priorities for Sustainable Growth and Shaping expectations and priorities for the next EU Framework Programme from the viewpoint of sustainable chemistry". Here, in particular, the aspects of circularity e.g. identifying new feedstocks, low carbon industries e.g reducing emissions, energy and resource usage and new technologies for materials up and recycling e.g. the valorization of waste streams were at the center of discussion.
Bayer has supported SusChem to make a significant contribution to climate-related policy development in the European Institutions, esp. the Key Enabling Technologies initiative (Advanced Process Technologies, including Industrial Biotechnology, Advanced Materials, Digital Technologies) and important European Innovation Partnerships. On the topic Sustainable and Inclusive Biotechnology SusChem has identified Sustainable Agriculture and Forestry as one of the areas of particular priority. On the topic of the bioeconomy the Public Private Partnership SPIRE initiated a cooperation with the Joint Technology Initiative Bio-based Industry through a working group that has identified a number of bio-based topics for the process industry.

2) econsense - a German business network founded on the initiative of the Federation of German Industries with the goal to provide a dialogue platform and think tank to advance sustainable development in business. The Head of Sustainability & Business Stewardship at Bayer is Chairman of the econsense Board. Among others, econsense conducted a study about the implementation of the EU Directive on disclosure of non-financial

information and discussed the results with companies, policymakers, as well as providers of ESG ratings. Other focus topics were the implementation of TCFD recommendations, particularly, scenario analysis, Germany Energy Transition Act and development of science-based targets. Furthermore, econsense contributed with side events to COP24 in Katowice. Bayer actively contributes to the work in several econsense groups e.g. Environmental & Climate Issues, Reporting & Rating, SDGs & Digital Transformation and Sustainability in the Supply Chain to promote sustainability in the business community and enable best practice sharing for a dialogue with stakeholders in politics, science and business.

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

Bayer`s organizational processes are designed to ensure a common approach for all direct and indirect engagement activities, consistent with our strategy on climate change - across divisions and geographies. An important instrument for ensuring the alignment of our engagement activities with our overall climate change strategy is Bayer's Public and Governmental Affairs Committee (PGA Committee). The PGA Committee is Bayer's political think tank and political liaison that helps the company to maintain its social license to operate. It coordinates the political work (including work on climate change-related issues) for Bayer AG and meets regularly. The PGA Committee is chaired by the Head of Public and Governmental Affairs and is sponsored by Bayer's CEO. Furthermore, it consists of top managers from the Corporate Center and the divisions. Experts from the Corporate Sustainability & Business Stewardship department are invited as needed to contribute with their expertise-based advocacy work to the discussions involving environmental and climate-related issues. The involvement of these representatives in the PGA Committee ensures the consideration of our overall climate change strategy in Bayer's political activities and the alignment of the activities with our strategy.

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

Publication	Status	Attach the document	Page/Section reference	Content elements	Comment
In mainstream reports	Complete	Bayer Annual Report 2018	The chapter "Environmental Protection" of Bayer's Annual report 2018 on pages 77-83 includes Bayer's GHG EMISSIONS PERFORMANCE and Bayer's response to CLIMATE CHANGE. In this chapter, Bayer depicts its position and efforts regarding the environment, including climate protection. Furthermore, Bayer's Combined Management Report on pages 23-84 includes a description of our sustainability strategy and governance (incl. climate), and relevant risks and opportunities.	• Governance • Strategy • Risks & opportunities • Emissions figures • Emission targets • Other metrics • Other, please specify: Environmental incidents	Bayer's Integrated Annual Report includes comprehensive descriptions of our sustainability approach. This is integrated in Bayer's Management Report and verified by Deloitte as part of the reasonable assurance process of Bayer's Annual Report 2018. The sustainability information integrated in the report includes the content elements described in the previous column.

C14 Signoff

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

Comment for C4.2:

Our nonfinancial targets through 2020 will cease to apply in the current form from the end of 2018 as they pertain only to the Bayer Group excluding the acquired agriculture business in the second half of 2018. In view of the portfolio changes, we conducted a new materiality analysis in fall 2018 that will serve as the basis for new, ambitious Group targets that will be defined in 2019. We will need to fundamentally realign our targets in view of the integration of the acquired agriculture business and the impact it has on our enterprise.

Comment for C5.2:

Scope 1 and Scope 2 emissions for Bayer AG were calculated in line with the GHG Protocol. For the newly acquired agriculture business and the divestments in 2018, we used the portfolio-adjustment method as recommended by our auditor and in line with our Annual Report.

Comment for C6.5:

This CDP report encompasses emissions from our Life Science businesses, i.e. without Currenta, calculated according to a pro-rata method: newly acquired business was included from the closing day and divestments were included until the day of divestment.

Comment for C7.5:

For confidentiality reasons we report purchased and consumed electricity, heat, steam or cooling (MWh) as well as purchased and consumed low carbon electricity, heat, steam or cooling accounted in market-based approach (MWh) by region. Data for countries in EMEA region is summarized and reported under Germany. Data for countries in Americas region is summarized and reported under United States of America. Data for countries in Asia-Pacific region is summarized and reported under India. All countries not included in this question’s list are summarized and reported under Rest of World.

Comment for 8.2d and 8.2e:

For the reporting year, data refers to BAG without the newly acquired agriculture business.

Comment for 10.1a:

The verification of GHG emissions is included into the auditing process of the Annual Report, which includes a reasonable assurance for all sustainability data within the Annual Report except for information marked with a dotted line. Sustainability data within the Annual Report marked with a dotted line was assured with a limited Assurance against ISAE3000. As all sustainability information is therefore verified with AT LEAST Limited assurance against ISAE3000, we selected ISAE3000 as relevant standard in this question.

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

Job title	Corresponding job category
Bayer AG Board Member for Human Resources, Technology and Sustainability	Director on board