C0. Introduction

C0.1

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

Merck is a global science and technology company headquartered in Darmstadt, Germany.

Our **Healthcare** business sector comprises the two businesses Biopharma and Allergopharma. Our Biopharma business discovers, develops, manufactures and markets innovative pharmaceutical and biological prescription drugs in four franchises: Oncology, Neurology & Immunology, Fertility, and General Medicine & Endocrinology. Biopharma is the larger one of our Healthcare businesses. Our streamlined R&D pipeline positions us with a clear focus on becoming a leading specialty innovator in oncology, immuno-oncology and immunology, including multiple sclerosis. Our Allergopharma business is one of the leading companies in the field of allergy immunotherapy (AIT) in Europe.

In **Life Science**, with our Research Solutions, Process Solutions, and Applied Solutions business units, we are a leading, worldwide supplier of tools, high-grade chemicals, and equipment for academic labs, biotech, and biopharmaceutical manufacturers, as well as the industrial sector. Research Solutions provides our academic customers with the chemicals and tools needed to make scientific discovery easier and faster. Process Solutions provides drug manufacturers with process development expertise and technologies, such as continuous bioprocessing. Applied Solutions offers both testing kits and services to ensure that our food is safe to eat and water is clean to drink. Our portfolio comprises more than 300,000 products, ranging from lab water systems to genome-editing tools, antibodies, and cell lines, as well as end-to-end bioprocessing systems to support the manufacturing needs of both emerging biotech and large pharma companies.

Our **Performance Materials** business sector comprises the specialty chemicals business of Merck. We offer innovative solutions especially for the electronics industry — for microchips and displays — and for surfaces of every kind. The business sector consists of three business units: Semiconductor Solutions, Display Solutions, and Surface Solutions. Comparing Performance Materials with a smartphone, Display Solutions represents the user interface, Semiconductor Solutions the intelligence, and Surface Solutions the aesthetics. With the acquisition of Versum Materials and Intermolecular, Semiconductor Solutions is now the largest business unit within Performance Materials. It supplies products for every major step in the wafer manufacturing process, including doping, lithography, patterning, deposition, planarization, etching, and cleaning and enables the safe and responsible handling of gases and liquid chemicals for electronic manufacturers. It focuses on the development and deployment of safe and reliable delivery equipment. Our Display Solutions business unit comprises the liquid crystals, OLED (organic light-emitting diodes), photoresists, and liquid crystal windows businesses. In the Surface Solutions business unit, we provide our customers with solutions that help them to create innovative surfaces of all kinds.

Apart from our three business sectors, our financial reporting presents the five regions Europe, North America, Asia-Pacific (APAC), Latin America as well as Middle East and Africa (MEA). As of December 31, 2019, we had 57,071 employees worldwide, which compares with 51,749 on December 31, 2018. In 2019, our 222 subsidiaries with employees in 66 countries generated sales of € 16.2 billion. Our 103 production sites are located across 21 countries.

The closing of the acquisition of Intermolecular, Inc. on September 20,2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint. The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

C0.2

(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	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2019	December 31 2019	No	<Not Applicable>

C0.3

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

China
France
Germany
Ireland
Italy
Japan
Spain
Switzerland
United Kingdom of Great Britain and Northern Ireland
United States of America

C0.4

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

EUR

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C1. Governance

C1.1

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

Yes

C1.1a

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

Position of individual(s)	Please explain
Director on board	Overall responsibility for climate protection at Merck is taken by a member of the Executive Board. Within the Board of Directors key decisions on the overall strategy are taken. For instance, in 2019, the Board decided to start developing a new climate target for the period leading up to 2030/2040. The goal proposal is currently being discussed in Merck's Board of Directors and will be decided in 2020. In 2018, it was decided to integrate renewable energy into the scope of our climate goal. The Group function Environment Health Safety Security Quality (EQ) coordinates and steers activities to implement Merck's climate protection program EDISON Energy Efficiency and Climate Protection. EDISON is the main instrument to reach Merck's target to reduce its greenhouse gas emissions by 20% by 2020 and pools all Merck group activities worldwide that are aimed at climate protection and energy efficiency. EQ monitors regularly GHG emissions and the implementation of GHG reduction projects. The Head of EQ reports directly to the respective member of the Board and informs the whole Board regularly on the current state and next steps of our climate protection program. In case, action by the Board is needed, the basis for decision is provided by EQ. Besides, climate protection issues are subject of discussions between EQ and single members of the Board. In the framework of Merck's Annual Report and Corporate Responsibility Report the Board approves Merck's official GHG emissions. Furthermore, climate change and climate protection are also regular topics of Merck's Corporate Responsibility (CR) Committee. This Group-wide committee, under the overall responsibility of the Chairman of the Executive Board and CEO of Merck, steers the implementation of our corporate responsibility strategy and meets three times per year. It consists of representatives from the businesses as well as from relevant Group functions such as EQ, HR, Compliance, and Procurement. The CR Committee reviews the CR strategy to ensure that it covers the topics relevant to Merck (e.g. climate change) and that it addresses potential areas where action is needed. In this framework climate progress towards our goal is monitored as well. We strive to identify challenges promptly in order to minimize risks, but also to seize the business opportunities that arise from societal change.

C1.1b

(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	Scope of board-level oversight	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 Reviewing and guiding business plans Setting performance objectives Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and targets for addressing climate-related issues	<Not Applicable>	Overall responsibility for climate protection at Merck is taken by a member of the Executive Board. Within the Board of Directors key decisions on the overall strategy are taken; for instance on the integration of renewable energy into the scope of our climate goal or the decision on new climate goals. The Group function Environment Health Safety Security Quality (EQ) coordinates and steers activities to implement Merck's climate protection program EDISON Energy Efficiency and Climate Protection. EDISON is the main instrument to reach Merck's target to reduce its greenhouse gas emissions by 20% by 2020 and pools all Merck group activities worldwide that are aimed at climate protection and energy efficiency. EQ monitors GHG emissions regularly using a central IT platform and monitors the implementation of energy efficiency and GHG reduction projects. The Head of EQ reports directly to the respective member of the Board and informs the whole Board regularly on the current state and next steps of our climate protection program. In case, action by the Board is needed, the basis for decision is provided by EQ. For instance, in 2019, we started developing a new climate target for the period leading up to 2030. The goal proposal is currently being discussed in Merck's board of directors and will be decided in 2020. Besides, climate protection issues are subject of discussions between EQ and single members of the Board. In the framework of Merck's Annual Report and Corporate Responsibility Report the Board approves Merck's official GHG emissions. Furthermore, climate change and climate protection are also regular topics of Merck's Corporate Responsibility (CR) Committee. This Group-wide committee, under the overall responsibility of the Chairman of the Executive Board and CEO of Merck, steers the implementation of our corporate responsibility strategy and meets three times per year. It consists of representatives from the businesses as well as from relevant Group functions such as EQ, HR, Compliance, and Procurement. The CR Committee reviews the CR strategy to ensure that it covers the topics relevant to Merck (e.g. climate change) and that it addresses potential areas where action is needed. In this framework climate progress towards our goal is monitored as well. We strive to identify challenges promptly in order to minimize risks, but also to seize the business opportunities that arise from societal change.

C1.2

(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)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Corporate responsibility committee	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Other, please specify (Group function EQ (Environment etc.))	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Half-yearly

C1.2a

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

Overall responsibility for climate protection at Merck is taken by a member of the Executive Board. Within the Board of Directors key decisions on the overall strategy are taken; for instance on the integration of renewable energy into the scope of our climate goal or the decision on new climate goals.

The Group function Environment Health Safety Security Quality (EQ) coordinates and steers activities to implement Merck's climate protection program EDISON Energy Efficiency and Climate Protection. EDISON is the main instrument to reach Merck's target to reduce its greenhouse gas emissions by 20% by 2020 and pools all Merck group activities worldwide that are aimed at climate protection and energy efficiency. EQ monitors GHG emissions regularly using a central IT platform and monitors the implementation of energy efficiency and GHG reduction projects. The Head of EQ reports directly to the respective member of the Board and informs the whole Board regularly on the current state and next steps of our climate protection program. In case, action by the Board is needed, the basis for decision is provided by EQ. For instance, in 2019, we started developing a new climate target for the period leading up to 2030. The goal proposal is currently being discussed in Merck's board of directors and will be decided in 2020. Besides, climate protection issues are subject of discussions between EQ and single members of the Board. In the framework of Merck's Annual Report and Corporate Responsibility Report the Board approves Merck's official GHG emissions.

Furthermore, climate change and climate protection are also regular topics of Merck's Corporate Responsibility (CR) Committee. This Group-wide committee, under the overall responsibility of the Chairman of the Executive Board and CEO of Merck, steers the implementation of our corporate responsibility strategy and meets three times per year. It consists of representatives from the businesses as well as from relevant Group functions such as EQ, HR, Compliance, and Procurement. The CR Committee reviews the CR strategy to ensure that it covers the topics relevant to Merck (e.g. climate change) and that it addresses potential areas where action is needed. In this framework climate progress towards our goal is monitored as well. We strive to identify challenges promptly in order to minimize risks, but also to seize the business opportunities that arise from societal change.

C1.3

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Incentives for management of climate-related issues are managed on various levels.

C1.3a

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

Entitled to incentive	Type of incentive	Activity inventivized	Comment
Environment/Sustainability manager	Monetary reward	Emissions reduction project Energy reduction project Efficiency project	Environment/Sustainability managers in various positions within Merck receive monetary incentives related to climate protection and energy saving/efficiency activities (e.g. Corporate EHS, Life Science).
Energy manager	Monetary reward	Energy reduction project Efficiency project	Energy managers receive financial incentives with regard to climate protection and energy saving/efficiency (e.g. for detecting energy saving potentials or implementing energy saving projects).
Facilities manager	Monetary reward	Energy reduction project Efficiency project	Facility managers receive financial incentives with regard to climate protection and energy saving/efficiency (e.g. for detecting energy saving potentials or implementing energy saving projects).
Process operation manager	Monetary reward	Emissions reduction project Efficiency project	Process operations managers receive financial incentives with regard to climate protection and energy saving/efficiency (e.g. for detecting energy saving potentials or implementing energy saving projects).
Other, please specify (Employees)	Monetary reward	Emissions reduction project Energy reduction project Efficiency project	At our largest manufacturing site Darmstadt the employee suggestion scheme financially rewards good ideas on energy efficiency and emission reduction.
Board/Executive board	Monetary reward	Other (please specify) (Extraordinary contributions to the aspirations and targets of the Merck Group's stakeholders (for example, employee satisfaction, customer satisfaction, Corporate Social Responsibility, implementation of diversity requirements))	Adjustment criteria for increasing profit sharing of Merck's Executive Board could include among others extraordinary contributions to meeting the expectations and objectives of our stakeholders (for example employee satisfaction, customer satisfaction, Corporate Social Responsibility, implementation of diversity requirements). Hereby, Corporate Social Responsibility includes climate protection as well.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	2	Short-term horizon in line with group risk management processes.
Medium-term	2	5	Mid-term horizon in line with group risk management processes.
Long-term	5	10	Long-term horizon in line with group risk management processes.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

A risk impact is classified as substantial if higher than € 20 million (as depicted also in our Annual Report). Impact is measured as potential negative deviation from planned EBIT and/or cash flow. The reporting threshold for the bi-annual standard reporting is € 5 million. For the exceptional ad-hoc reporting it is € 25 million. Risks with probability of occurrence or impacts too difficult to quantify have to be reported and managed, nonetheless, in case they are deemed to be substantial based on qualitative factors by judgement of the responsible colleagues.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Risk management process
Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment
More than once a year

Time horizon(s) covered
Short-term
Medium-term
Long-term

Description of process
Company level: Merck's Group-wide risk management processes are based on our risk management guideline. The business heads, managing directors of Merck subsidiaries, and the heads of Group functions are specified as employees with responsibility for risks. Every six months, the risk owners assess their risks and report their risk portfolio to Risk Management. Besides, risks have to be reported on an ad hoc basis when they arise and meet certain thresholds. For regular reporting, all risks above a € 5 million thresholds have to be reported (before mitigation impact). For ad-hoc reporting, the reporting threshold is € 25 million. Risks below these thresholds are steered independently within the business sectors. Likewise, risk-mitigating measures are reported and assessed. The effectiveness of these measures and the planned implementation time frame are monitored by Risk Management. The focus time horizon for risk reporting is five years. Beside this risk reporting, potential longer-term climate-related risks are evaluated by the businesses and Group functions. Group Risk Management reports directly to the Group Chief Financial Officer and uses the information reported to determine the current risk portfolio for the Merck Group, presenting this in a report to the Executive Board, the Supervisory Board and the Finance Committee with detailed explanations twice per year. Risks are categorized into business-related risks, financial risks, legal risks, human resources risks, information technology risks, risks of the divestment, acquisition and integration of companies and businesses, environmental risks and safety risks. Hereby, climate-related risks are covered by the risk category environmental. As a Group function Environment Health Safety Security Quality EQ is integrated in the risk management process. EQ regularly assesses environmental incl. climate-related risks to our operation units and business. Part of this half-annual risk evaluation by EQ is the checking of a so-called watch-list that covers long-term risks like climate change. Long-term risks are also discussed in the group-wide CR committee. Merck's group-wide Business Continuity Management is a further component to assess risks and ensure the uninterrupted availability of all key business and mission-critical business activities, even in case of a disaster. Hereby, long-term risks such as climate-related risks are covered as well. Within Business Continuity Management the whole up- and downstream value chain is considered. Asset level: As part of their daily work and as an integral part of their ISO 14001 and ISO 50001 certification our site EHS and Facility Management evaluate climate-related risks. Hereby, the direct impact on the sites is assessed as well as the up- and downstream value chain. Regulatory and other risks are considered as well as opportunities (e.g. by using incentive systems). Additionally, the assets play an important role in Business Continuity Management as they provide the basis of the overall process (e.g. business impact analyses, risk assessments/mitigation, recovery and response measures). The tool 'Site Risk Inventory' is used to evaluate risks on site level. This inventory covers climate-related risks (short-, medium, long-term) as well. As the site EHS Management reports directly via dotted line to the Group function EQ it is safeguarded that all relevant risks throughout the Merck Group are known, can be further assessed and passed on to the group-wide risk management.

C2.2a

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	As part of our ISO 14001 and 50001 certifications, we constantly check on asset and group level existing or future regulations, among others on climate-related issues (e.g. emission trading schemes, energy efficiency requirements, reporting requirements, climate-related taxes etc.). On Group level the Steering Committee Advocacy regularly monitors key regulations globally. Based on this, the businesses are informed on new developments and possible risks. For instance, emission trading schemes may impact our operational costs strongly. At this time, Merck is covered by the EU Emission Trading Scheme (EU ETS) with power plants at the Darmstadt and Gernsheim sites in Germany. As a long-term solution to reform the ETS, the establishing of the Market Stability Reserve (MSR) have been started in 2018 (Decision (EU) 2015/1814). The MSR is intended as a flexible mechanism to reduce surpluses of certificates in the market and will operate entirely according to pre-defined rules. Both measures (backloading and MSR) will lead to higher costs for the single certificates. With the framework 2030 for climate and energy goals the EU countries have agreed to increase the binding reduction target to 40% emissions reduction below the 1990 level. This will have an impact on the annual reduction in the 'cap' on emissions from EU ETS sectors by 2020. This can also be seen in the context of the Paris climate conference (COP21) in December 2015 / "Paris Agreement". The EU has already made considerable advances and will further have the most ambitious climate targets in the world. The amended EU Emissions Trading Directive, which came into force in April 2018, provides stricter allocation rules after 2020. Details are currently being set at EU level. There is still the risk of changes of the EU ETS in the coming years and still there are planning and investment uncertainties caused by such discussions and by possible regulatory changes within the next years.
Emerging regulation	Relevant, always included	As part of our ISO 14001 and 50001 certifications, we constantly check on asset and group level existing or future regulations, among others on climate-related issues (e.g. emission trading schemes, energy efficiency requirements, reporting requirements, climate-related taxes etc.). On Group level the Steering Committee Advocacy regularly monitors key regulations globally. Based on this, the businesses are informed on new developments and possible risks. For instance, emission trading schemes may impact our operational costs strongly. At this time, Merck is covered by the EU Emission Trading Scheme (EU ETS) with power plants at the Darmstadt and Gernsheim sites in Germany. As a long-term solution to reform the ETS, the establishing of the Market Stability Reserve (MSR) have been started in 2018 (Decision (EU) 2015/1814). The MSR is intended as a flexible mechanism to reduce surpluses of certificates in the market and will operate entirely according to pre-defined rules. Both measures (backloading and MSR) will lead to higher costs for the single certificates. With the framework 2030 for climate and energy goals the EU countries have agreed to increase the binding reduction target to 40% emissions reduction below the 1990 level. This will have an impact on the annual reduction in the 'cap' on emissions from EU ETS sectors by 2020. This can also be seen in the context of the Paris climate conference (COP21) in December 2015 / "Paris Agreement". The EU has already made considerable advances and will further have the most ambitious climate targets in the world. The amended EU Emissions Trading Directive, which came into force in April 2018, provides stricter allocation rules after 2020. Details are currently being set at EU level. There is still the risk of changes of the EU ETS in the coming years and still there are planning and investment uncertainties caused by such discussions and by possible regulatory changes within the next years.
Technology	Relevant, sometimes included	To tackle climate change there is the need to transition to lower emissions technologies. For Merck this means primarily to safeguard a secure, low or zero carbon energy supply. Within the scope of Merck's climate protection goal to reduce greenhouse gas emissions by 20% by 2020, one of the measures is the installation of low or zero carbon technologies to generate energy (e.g. photovoltaic plants, biomass plants, CHP plants). Here we see the risks that investments might be unsuccessful because of changing framework conditions (e.g. unexpected increases in the costs of fuels) and that alternative technologies might be much more costly than standard technologies. For instance, at Merck's largest site, Darmstadt, we operate a large gas power plant to generate electricity, heat and steam. The plant underlies the EU ETS. Replacing this by a low or zero carbon technology will bear huge risks and uncertainties. Before such technologies are implemented possible risks are evaluated and mitigated within Merck's overall investment process. Later-on risk mitigation is done by the businesses. Furthermore, Merck's group-wide Business Continuity Management is an important component to assess this kind of risks and ensure the uninterrupted availability of all key business and mission-critical business activities.
Legal	Not relevant, included	Legal risks from climate-related litigation claims are monitored in Merck's Group-wide risk management (risk category legal risks). At this time, they are not relevant for Merck as there are no existing litigation claims and no emerging ones can be seen.
Market	Relevant, sometimes included	Risks in Merck's upstream supply chain are considered by the businesses, e.g. interruptions in raw material supply due to extreme weather events at our supplier's sites, longer delivery times because of the shift from air to sea transportation, higher costs because of stricter climate-related regulations imposed on our supplier (e.g. emission trading schemes). Furthermore, we see the risk of increasing energy prices. For instance, energy prices in Germany have increased strongly and still increase because of the German Renewable Energy Sources Act that intends to increase the share of renewable energy in electricity generation. The contribution for renewable energies is up to a total of 6.405 Eurocent per kWh in 2019. For German Merck sites this sums up to almost 5.5 million Euros in 2019. Hereby, Merck's group-wide Business Continuity Management is an important component to assess this kind of risks and ensure the uninterrupted availability of all key business and mission-critical business activities. Among many other reasons, climate related issues can be one trigger for business interruptions. Due to our product portfolio we do not see any risks in Merck's downstream supply chain from climate change for the upcoming years. There are no critical products where we expect decreasing sales quantities because of changing customer behavior due to climate change. We rather see opportunities for some of our products (e.g. to fight Malaria or to improve energy efficiency in the display sector).
Reputation	Relevant, always included	Reputational risks are part of the group risk management process. They are managed locally in the respective business or function. For instance, our Group functions Corporate Affairs and Investor Relations as well as the businesses are in close contact with customers, investors, rating agencies etc. Example: We see the risk of not reporting on climate change in a way that is expected from our stakeholders (investors, customers etc.) impacting our revenues. To mitigate this risk, we regularly conduct materiality analyses in the framework of Merck's Corporate Responsibility Report that integrate feedback from multiple different stakeholders. By this, we safeguard that the we cover the topics relevant to Merck (e.g. risks from climate change) within our CR strategy which is reviewed by Merck's Group-wide Corporate Responsibility (CR) Committee under the overall responsibility of the Chairman of the Executive Board and CEO of Merck.
Acute physical	Relevant, always included	Acute physical risks are covered by the risk management on Group and asset level. On site level, this is done, for instance, by the 'Site Risk Inventory' tool. This inventory covers climate-related risks (short-, medium, long-term) as well. As the site EHS Management reports directly via dotted line to the Group function EQ it is safeguarded that all relevant risks throughout the Merck Group are known, can be further assessed and passed on to the group-wide risk management. For instance, we see the risk of higher frequency and increased severity of storms that might harm some of our sites. In 2017, two sites in the US had to be closed down out of precautionary measures because of hurricane Irma. Nevertheless, there was no physical damage and the financial damage was low.
Chronic physical	Not relevant, explanation provided	We see the lack of water as the major chronic physical risk from climate change. Merck identifies the degree of water stress for all manufacturing sites by applying the WRI Aqueduct and WWF Water Risk Filter plus a self-assessment and updates the results on a regular basis. Besides, Merck uses a Sustainable Water Management (SWM) based on a CEFIC (Association of Chemical Industry Europe) tool to identify and manage risks. By applying the CEFIC tool at all water relevant sites by 2020 Merck analyses water availability and water management at local level. Sites are considered relevant, when their water use is "high" (>70,000 m3 per year) or located in a water stress area (Risk Factor "high" or "very high") in combination with a water use above 30,000 m3 per year ("medium" or "high" water user). Currently, only 7 sites out of approx. 100 manufacturing sites were identified as relevant because they are located in water stress areas and are "medium and large users". Based on this, we currently do not see any substantive risks.

C2.3

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

Yes

C2.3a

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

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation	Carbon pricing mechanisms

Primary potential financial impact
Increased direct costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
The EU Emission Trading Scheme (EU ETS) launched Europe-wide in 2005 poses a risk to Merck. With emissions of approx. 80,000 t of CO2 per year the heating and power plants at the Darmstadt and Gernsheim sites in Germany fall under the EU ETS. In the trading periods I and II Merck benefited from free allowances. In the third trading period (2013-2020) new allocation rules were implemented. In 2019 Merck purchased additional allowances and a purchase will remain necessary in the next years. Auctioning certificates causes an increase in energy costs and a negative impact on competitiveness. In the year 2013 there were discussions within the EU to change the regulatory framework for the third trading period. As a result, the backloading was implemented as a short-term measure with the aim of reducing the total number of emission certificates temporarily. As a long-term solution to reform the ETS, the establishing of the Market Stability Reserve (MSR) have been started in 2018 (Decision (EU) 2015/1814). The MSR is intended as a flexible mechanism to reduce surpluses of certificates in the market and will operate entirely according to pre-defined rules. Both measures (backloading and MSR) will lead to higher costs for the single certificates. With the framework 2030 for climate and energy goals the EU countries have agreed to increase the binding reduction target to 40% emissions reduction below the 1990 level. This will have an impact on the annual reduction in the 'cap' on emissions from EU ETS sectors by 2020. Discussions are currently taking place to increase the European climate protection target of 2030. This could also be accompanied by a tightening of the reduction targets in EU emissions trading. In addition, the "Brennstoffemissionshandelsgesetz (BEHG)" introduces a national carbon pricing system for fuels in Germany from 2021 (carbon price 25 Euro/t CO2 in 2021 - 60 Euro/t CO2 in 2026) which will also affect Merck (non-ETS). Around the world countries think about introducing cap and trade schemes, carbon taxes etc. as economic means to reduce greenhouse gas emissions. Besides already existing emission trading schemes, several countries (e.g. China, South Korea, Japan, Mexico, some US states) have scheduled or considered cap and trade schemes in the upcoming years. This will affect Merck that has subsidiaries in more than 66 countries and manufacturing sites in the countries mentioned above by increased operational costs.

Time horizon
Medium-term

Likelihood
Very likely

Magnitude of impact
Low

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

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
6000000

Potential financial impact figure – maximum (currency)
20000000

Explanation of financial impact figure
A purchase of allowances will be required within the next years for two German sites under EU ETS. According to today's assessment and depending on the allocation variant Merck's purchase of allowances for its plants under the EU ETS would result in roughly estimated annual costs of 1.2 – 2.1 million Euros (average annual impact until 2030; carbon price of 20-60 Euro/ton). The German Renewable Energy Sources Act caused higher electricity costs per kWh in the past. In 2013, the contribution for renewable energies rose by approx. 50% to 5.28 Eurocent per kWh and is up to a total of 6.405 Eurocent per kWh in 2019. For German Merck sites this sums up to almost 5.5 million Euros in 2019. In addition, the national carbon pricing system for fuels in Germany (Brennstoffemissionshandelsgesetz - BEHG, starting from 2021, will increase the direct energy costs. The mentioned maximum figure is an estimate for the Merck Group based on the financial impact we see for Germany.

Cost of response to risk
10000000

Description of response and explanation of cost calculation
Merck reacts on changes of the EU ETS in different ways. Scenario planning is used to estimate the possible financial impact by the changes in EU ETS. Merck observes tightly the discussions and decisions of the EU regarding the third trading period (2013-2020) and time thereafter to adapt strategy if needed. Besides this, we reduce the need for emissions certificates by implementing energy saving and greenhouse gas reduction projects. At Darmstadt and Gernsheim, our two sites underlying the EU ETS, a sophisticated process to improve energy efficiency and to reduce energy consumption is in place. Multiple energy efficiency projects have been implemented in the past years. At the Darmstadt site, for instance, Merck spent around € 27 million on the construction of two state-of-the-art energy stations which were commissioned in 2014 and 2015. The two stations are supplying the site with power, heating and cooling while decreasing the site's GHG emissions by around 2,500 metric tons per year. Both sites have been certified according to ISO 50001 Energy Management Systems since 2012 and benefit from their own energy supply, based on combined heat and power plants. In general, Merck invests continually into energy efficiency/ saving and greenhouse gas reduction measures at our sites and further develops its own energy supply. Under Merck's EDISON program that bundles Merck's activities with regard to greenhouse gas emission reduction, we invested into energy saving and energy efficiency projects in the double-digit million Euro range. Additional projects were implemented independent from EDISON. This is supported by Merck's target to reduce its greenhouse gas emissions by 20% by 2020 and by establishing Energy Management Systems at our sites. In total 13 Merck sites have been certified according to ISO 50001 Energy Management Systems. Costs of response to risks are part of the standard operational costs of Merck's sites and cannot be extracted from there. We estimate that we spent minimum 5-10 million Euros per year on an average in the past years. These are mainly costs for energy efficiency projects, improvements of our energy infrastructure (e.g. switch to low-carbon technologies) and GHG emission reduction projects. At the Darmstadt and Gernsheim site approx. 240,000 Euros are spent annually to manage energy law related reporting obligations (e.g. from EU ETS).

Comment

Identifier
Risk 2

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

Risk type & Primary climate-related risk driver

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

Primary potential financial impact

Increased direct costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
If weather-related events such as storms, floods, heat waves and droughts occur, they can also impact Merck sites. For instance, Merck had to shut down two sites in the US during a hurricane in 2018. Events like this might increase in number and impact in future. Because those weather-related events occur mostly in a limited area, the magnitude of impact is seen as low at this time.

Time horizon
Long-term

Likelihood
More likely than not

Magnitude of impact
Low

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

Potential financial impact figure (currency)
25000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
Weather-related events such as storms, floods, heat waves and droughts could interrupt the production at our sites directly or indirectly via interruptions in our supply chain. This could have an impact on our overall production capacity and sales and therewith have direct financial implications. Because those weather-related events occur mostly in a limited area, the magnitude of impact is seen as low. Nevertheless, possible risks of property damage and business interruption at Merck sites because of climate change related weather events are covered by insurance like comparable risks from other reasons. The mentioned financial impact is the insurance deductible to be covered by Merck in case of a damage.

Cost of response to risk
3000000

Description of response and explanation of cost calculation
Through our systematic risk management activities, we recognize, assess and manage risks early on and implement appropriate measures to minimize them. The aim of Merck's group-wide Business Continuity Management (BCM) for instance is to ensure the uninterrupted availability of all key business and mission-critical business activities, even in case of a disaster. Multiple sourcing and back-up manufacturing facilities safeguard the undisturbed supply of important raw materials and respectively production of our products. Among many other reasons, climate related issues can be one trigger for business interruptions. BCM consists of following main steps: prioritization, business impact analysis, risk assessment/mitigation, recovery and response measures. In this process site management has the responsibility of maintaining the ability of its organization to function without disruption. The business sectors compile and prioritize the individual business continuity plans into an overall concept and the respective global function monitors and steers the process (e.g. by providing policies, SOPs etc.). In case of climate-related emergency situations because of extreme weather events, Merck's Group-wide site emergency planning and response system will take effect to minimize potential impacts on Merck's employees, local residents, facilities, the local environment and business. Besides this, risks of property damage and business interruption are covered by insurance. The above mentioned figure for the cost of response to the risk is the share of the insurance premia to cover damages from floodings and storms. Further costs of response to risks are part of the standard operational costs of Merck's sites and include among others personnel costs.

Comment

Identifier
Risk 3

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

Risk type & Primary climate-related risk driver

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

Primary potential financial impact
Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
If weather-related events such as storms, floods, heat waves and droughts occur, they can also impact Merck sites indirectly via our supply chain. Merck's supply of raw materials does not particularly depend on the climate. For example, agricultural products are of minor importance as raw material for the manufacture of Merck products.

Time horizon
Long-term

Likelihood
More likely than not

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
Weather-related events such as storms, floods, heat waves and droughts could interrupt the production at our sites directly or indirectly via interruptions in our supply chain. This could have influence on our overall production capacity and sales and therewith have direct financial implications.

Cost of response to risk
0

Description of response and explanation of cost calculation
Through our systematic risk management activities, we recognize, assess and manage risks early on and implement appropriate measures to minimize them. The aim of Merck's group-wide Business Continuity Management (BCM) for instance is to ensure the uninterrupted availability of all key business and mission-critical business activities, even in case of a disaster. Multiple sourcing and back-up manufacturing facilities safeguard the undisturbed supply of important raw materials and respectively production of our products. Among many other reasons, climate related issues can be one trigger for business interruptions. BCM consists of following main steps: prioritization, business impact analysis, risk assessment/mitigation, recovery and response measures. In this process site management has the responsibility of maintaining the ability of its organization to function without disruption. The business sectors compile and prioritize the individual business continuity plans into an overall concept and the respective global function monitors and steers the process (e.g. by providing policies, SOPs etc.). Besides this, risks of business interruption are covered by insurance. Costs of response to risks are part of the standard operational costs of Merck's sites and cannot be specified for climate change related issues. For instance, Business Continuity Management covers various risks not all related to climate change.

Comment

C2.4

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

C2.4a

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

Identifier
Opp1

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Shift in consumer preferences

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Among the huge product portfolio of Merck there are various products where we see potential for increased revenues due to shifts in consumer preferences. As Merck develops and offers products that help our customers to reduce their energy consumption, we see a growing demand for these solutions. Our products significantly help our customers conserve energy and thus reduce their GHG emissions, help them to produce more energy-efficient products or to develop new technologies for renewable energy resources. Our Performance Materials portfolio contains numerous examples of such products. Among others, we are developing innovative solutions for energy-efficient displays and lighting (based on Light Emitting Diodes (LED) and Organic Light Emitting Diodes (OLED) technologies). Our liquid crystal window (LCW) technology helps to reduce the energy consumption of buildings. Furthermore, we supply the photovoltaics industry with materials for the production of solar cells. These materials enable the realization of innovative applications for photovoltaics such as flexible, semi-transparent and lightweight solar cells that can be used in buildings, on curved or straight surfaces or even in clothing. Our Design for Sustainability (DfS) program provides our Life Science product developers with a range of tools enabling them to analyze the impact of the product on the following areas: materials, energy and emissions, waste, water, packaging, usability, and innovation. For each of these areas we have developed several sustainability criteria that are noted on a scorecard. When developing a new product, our aim is to improve on as many of these criteria scores as possible. We conduct product life cycle analyses to understand the potential environmental impacts within different product life cycle stages. The findings of these analyses show us how we can improve our products and are incorporated into subsequent development stages. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. As a supplier of research organizations/pharmaceutical companies that fight climate-related diseases we see indirect opportunities (increasing sales) for our Life Science business.

Time horizon
Medium-term

Likelihood
Very likely

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
We see an increase in the demand for products from our businesses tackling climate transition risks. This results in an increase in annual sales. Nevertheless, financial implications of these opportunities are hard to estimate.

Cost to realize opportunity
0

Strategy to realize opportunity and explanation of cost calculation
This is part of our regular portfolio management and Research and Development approach that has several drivers. The costs cannot be allocated to activities caused by climate change only. Merck is regularly observing sales opportunities in the area of climate related key technologies. Besides, we engage in various research projects; e.g. on the improvement of renewable energy generation or on energy saving Organic Light Emitting Diodes (OLEDs). Among others, our Performance Materials business is developing innovative solutions for energy-efficient displays and lighting (based on Light Emitting Diodes (LED) and Organic Light Emitting Diodes (OLED) technologies). Our liquid crystal window (LCW) technology helps to reduce the energy consumption of buildings. Furthermore, we supply the photovoltaics industry with materials for the production of highly efficient solar cells. Our Design for Sustainability (DfS) program provides our Life Science product developers with a range of tools enabling them to analyze the impact of the product on the following areas: materials, energy and emissions, waste, water, packaging, usability, and innovation. For each of these areas we have developed several sustainability criteria that are noted on a scorecard. When developing a new product, our aim is to improve on as many of these criteria scores as possible. We conduct product life cycle analyses to understand the potential environmental impacts within different product life cycle stages. The findings of these analyses show us how we can improve our products and are incorporated into subsequent development stages. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. Merck is continuously investing in research and development of climate related product solutions and engages in various research projects, for instance, on the improvement of renewable energy generation and on energy saving lighting system (e.g. LEDs, OLEDs). Total Research and Development expenses of our Performance Materials division, for instance, rose to 267 million Euros in 2019, the share of these costs that can be assigned to development s that lead to energy savings is not calculated.

Comment

Identifier
Opp2

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development of climate adaptation, resilience and insurance risk solutions

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Companies who are offering products that help fighting climate-related diseases like Malaria etc. may profit directly from changing physical climate parameters. As a science and technology company, we are well-positioned to help improve the treatment of malaria, as well as to develop and enhance diagnostics and prevention. We are developing reliable diagnostics so that antimalarials are only administered to patients who are actually suffering from the disease. We have been working on a kit containing a novel malaria detection and typing test adaptable to the MUSE© cytometry platform. It aims to accurately diagnose malaria and measure the type of malaria parasite as well as the infection level. This malaria kit was launched for research use in 2018. At the end of 2018, we sold the underlying technology platform developed by our Life Science business sector to the U.S. laboratory supplier Luminex, which is now commercializing the diagnostic kit. We have been developing a new, innovative drug for the treatment of malaria since 2015. The new compound is intended to be developed as a single-dose combination treatment to treat and potentially prevent malaria in children. The Phase I was successfully completed, and a Phase Ib study provided data to support clinical proof of principle. The program is progressing towards the next phase. The clinical development plan is also being defined with new clinical studies in patients to start in late 2019 or early 2020. Our strategic collaboration with the University of Cape Town in South Africa has led to the development of a new research and development platform. In 2018, this collaboration, including our collaboration with the Medicines for Malaria Venture, was extended to continue screening activities with the aim of identifying new therapeutic solutions for malaria while building research capacity in and for Africa. To help prevent malaria from spreading, we are working to improve access to insect repellent as a vector control method. Through internal and external collaborations, we are working towards demonstrating the efficacy of IR3535® against malaria in Africa in a bid to foster the malaria claim for this insect repellent. IR3535® is already being utilized to help prevent the spread of the Zika virus and Dengue fever, and is particularly suitable for children and pregnant women.

Time horizon
Medium-term

Likelihood
More likely than not

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
We see an increase in the demand for products from our businesses tackling climate related diseases. This results in an increase in annual sales. Nevertheless, financial implications of these opportunities are hard to estimate.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

This is part of our regular portfolio management and Research and Development approach that has several drivers. The costs cannot be allocated to activities caused by climate change only. We are developing reliable diagnostics so that antimalarials are only administered to patients who are actually suffering from the disease. We have been working on a kit containing a novel malaria detection and typing test adaptable to the MUSE© cytometry platform. It aims to accurately diagnose malaria and measure the type of malaria parasite as well as the infection level. This malaria kit was launched for research use in 2018. At the end of 2018, we sold the underlying technology platform developed by our Life Science business sector to the U.S. laboratory supplier Luminex, which is now commercializing the diagnostic kit. We have been developing a new, innovative drug for the treatment of malaria since 2015. The new compound is intended to be developed as a single-dose combination treatment to treat and potentially prevent malaria in children. The Phase I was successfully completed, and a Phase Ib study provided data to support clinical proof of principle. The program is progressing towards the next phase. The clinical development plan is also being defined with new clinical studies in patients to start in late 2019 or early 2020. Our strategic collaboration with the University of Cape Town in South Africa has led to the development of a new research and development platform. In 2018, this collaboration, including our collaboration with the Medicines for Malaria Venture, was extended to continue screening activities with the aim of identifying new therapeutic solutions for malaria while building research capacity in and for Africa. To help prevent malaria from spreading, we are working to improve access to insect repellent as a vector control method. Through internal and external collaborations, we are working towards demonstrating the efficacy of IR3535® against malaria in Africa in a bid to foster the malaria claim for this insect repellent. IR3535® is already being utilized to help prevent the spread of the Zika virus and Dengue fever, and is particularly suitable for children and pregnant women.

Comment

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes

C3.1a

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

No, and we do not anticipate doing so in the next two years

C3.1c

(C3.1c) Why does your organization not use climate-related scenario analysis to inform its strategy?

Climate change is integrated in Merck's overall risk assessment and with the knowledge of our unit Group Risk Management concepts on climate-related scenario analysis will be evaluated to define the next steps of our climate change mitigation journey.

C3.1d

(C3.1d) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	Already now Merck offers a range of products that help to mitigate climate change and that support the transition to a carbon neutral society. For instance, Merck develops and offers products that help our customers to reduce their energy consumption, we see a growing demand for these solutions. Our products significantly help our customers conserve energy and thus reduce their GHG emissions, help them to produce more energy-efficient products or to develop new technologies for renewable energy resources. Our Performance Materials portfolio contains numerous examples of such products. Another example is our Design for Sustainability (DfS) program that provides our Life Science product developers with a range of tools enabling them to analyze the impact of the product on the following areas: materials, energy and emissions, waste, water, packaging, usability, and innovation. For each of these areas we have developed several sustainability criteria that are noted on a scorecard. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. In future, we see an increasing demand for such kind of products, especially in the field of climate change. To better seize these climate-related business opportunities, there is the need to integrate sustainability aspects (climate change mitigation etc.) stronger in our product cycles. This approach is part of a new group-wide Sustainability Strategy which is currently in Merck's Board of Directors for discussion. A decision is expected for 2020. Based on this, Merck's business sectors will develop specific strategies.
Supply chain and/or value chain	Evaluation in progress	Merck uses raw materials, packaging materials, etc. from various suppliers. In total, the goods and services we purchased in 2019 from more than 55,000 suppliers in almost 150 countries amounted to around € 7.5 billion. Among the materials Merck purchases, there is no single material purchased in noticeably higher quantities than the others, and our review has not revealed materials sourced in large amounts with an exceptionally high carbon footprint. Based on this, Merck is manufacturing more than 300,000 different products. Both facts prevented us so far from engaging in our value chain. To react on this increasing risk regarding reputation etc. it was decided to start an ambitious project to broaden our scope of data analysis and assess our complete scope 3 emissions in order to prioritize and set respective targets. Results are expected for end of 2020/begin of 2021. Furthermore, we will intensify in the mid-term run our analysis of the assessments coming from the industry initiative Together for Sustainability (TfS) Merck joined in 2014.
Investment in R&D	Evaluation in progress	Already now Merck offers a range of products that help to mitigate climate change and that support the transition to a carbon neutral society. For instance, Merck develops and offers products that help our customers to reduce their energy consumption, we see a growing demand for these solutions. Our products significantly help our customers conserve energy and thus reduce their GHG emissions, help them to produce more energy-efficient products or to develop new technologies for renewable energy resources. Our Performance Materials portfolio contains numerous examples of such products. Another example is our Design for Sustainability (DfS) program that provides our Life Science product developers with a range of tools enabling them to analyze the impact of the product on the following areas: materials, energy and emissions, waste, water, packaging, usability, and innovation. For each of these areas we have developed several sustainability criteria that are noted on a scorecard. In future, we see an increasing demand for such kind of products, especially in the field of climate change. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. To better seize these climate-related business opportunities, there is the need to integrate sustainability aspects (climate change mitigation etc.) stronger in our product cycles. This approach is part of a new group-wide Sustainability Strategy which is currently in Merck's Board of Directors for discussion and decision. A decision is expected for 2020. Based on this, Merck's business sectors will develop specific strategies. If the new Sustainability Strategy is accepted by the Board, this will most likely impact investments in R&D as well.
Operations	Yes	The number of carbon pricing mechanisms are increasing globally affecting Merck that operates in 66 countries. Emission trading schemes, carbon taxes etc. are already affecting our operational costs and we are assuming an even increased impact. Therefore, Merck invests continually into energy efficiency/ saving and greenhouse gas reduction measures at our sites and further develops its own energy supply. Under Merck's EDISON program that bundles Merck's activities with regard to greenhouse gas emission reduction, we invested into energy saving and energy efficiency projects in the double-digit million Euro range. Additional projects were implemented independent from EDISON. At the Darmstadt site, for instance, Merck spent around € 27 million on the construction of two state-of-the-art energy stations which were commissioned in 2014 and 2015. In our Life Science business we have one production process that emits large quantities of greenhouse gas emissions. In the past years several projects have been conducted to reduce these emissions. In early 2019 for instance, we transferred a production line to a new site and can now manufacture these products in an emission-free plant. This led to an additional 10,000 metric tons of CO2eq savings. Throughout 2018 and 2019, we initiated two additional process emission reduction projects that will continue through the year 2022. Aim is to completely eliminate these emissions in the upcoming 5 to 10 years. For this, the respective budget (in total more than 20 million EUR) has already been allocated.

C3.1e

(C3.1e) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Capital expenditures Capital allocation	In our Life Science business, we have one process that emits large quantities of greenhouse gas emissions. In the past years several projects have been conducted to reduce these emissions. In early 2019 for instance, we transferred a production line to a new site and can now manufacture these products in an emission-free plant. This led to an additional 10,000 metric tons of CO2eq savings. Throughout 2018 and 2019, we initiated two additional process emission reduction projects that will continue through the year 2022. Aim is to completely eliminate these emissions. For this, the respective budget (in total more than 20 million EUR) has been allocated. Merck invests continually into energy efficiency/ saving and greenhouse gas reduction measures at our sites and further develops its own energy supply. Under Merck's EDISON program that bundles Merck's activities with regard to greenhouse gas emission reduction, we invested into energy saving and energy efficiency projects in the double-digit million Euro range. Additional projects were implemented independent from EDISON. At the Darmstadt site, for instance, Merck spent around € 27 million on the construction of two state-of-the-art energy stations which were commissioned in 2014 and 2015.

C3.1f

(C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

C4. Targets and performance

C4.1

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

Absolute target

C4.1a

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

Target reference number
Abs 1

Year target was set
2009

Target coverage
Company-wide

Scope(s) (or Scope 3 category)
Scope 1+2 (market-based)

Base year
2006

Covered emissions in base year (metric tons CO2e)
781937

Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)
100

Target year
2020

Targeted reduction from base year (%)
20

Covered emissions in target year (metric tons CO2e) [auto-calculated]
625549.6

Covered emissions in reporting year (metric tons CO2e)
664973

% of target achieved [auto-calculated]
74.791191617739

Target status in reporting year
Underway

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

Please explain (including target coverage)
Despite growth in our operating business, we managed to reduce our greenhouse gas emissions by 15% relative to the 2006 baseline. Between 2006 and 2019, we more than doubled our sales, which means that, relative to sales, our emissions dropped significantly. Merck's climate protection program EDISON Energy Efficiency and Climate Protection is the main instrument to reach Merck's target to reduce its greenhouse gas emissions by 20% by 2020 and pools all Merck group activities worldwide that are aimed at climate protection and energy efficiency. Through the more than 360 Edison projects initiated since 2012, we aim to save around 177,000 metric tons of CO2 annually in the medium term. In 2017, Merck's Executive Board approved a roadmap for achieving the remaining savings needed to meet our climate target, and in 2018 they made the decision to integrate power from renewable sources fully into the target scope and to purchase more power from renewable sources in an effort to achieve this objective faster. Note: The closing of the acquisition of Intermolecular, Inc. on September 20,2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint. The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?
No other climate-related targets

C4.3

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

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	136	
To be implemented*	3	51
Implementation commenced*	66	8824
Implemented*	35	2702
Not to be implemented	0	

C4.3b

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

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)
1346

Scope(s)
Scope 1
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
370000

Investment required (unit currency – as specified in C0.4)
44000

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Energy efficiency in production processes	Other, please specify (Insulation, Cooling technology)

Estimated annual CO2e savings (metric tonnes CO2e)
4

Scope(s)
Scope 1
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
21000

Investment required (unit currency – as specified in C0.4)
110000

Payback period
4-10 years

Estimated lifetime of the initiative
6-10 years

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
44

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
12000

Investment required (unit currency – as specified in C0.4)
2000

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Energy efficiency in buildings	Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)
18

Scope(s)
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
19000

Investment required (unit currency – as specified in C0.4)
1000

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Energy efficiency in production processes	Cooling technology

Estimated annual CO2e savings (metric tonnes CO2e)
135

Scope(s)
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
77000

Investment required (unit currency – as specified in C0.4)
13000

Payback period
<1 year

Estimated lifetime of the initiative
<1 year

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air

Estimated annual CO2e savings (metric tonnes CO2e)
10

Scope(s)
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
8300

Investment required (unit currency – as specified in C0.4)
3500

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment
Data only covers projects of the two major sites Darmstadt and Gernsheim in Germany. More projects have been implemented at other Merck sites.

Initiative category & Initiative type

Low-carbon energy consumption	Low-carbon electricity mix

Estimated annual CO2e savings (metric tonnes CO2e)
1145

Scope(s)
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
0

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
Ongoing

Comment
In the UK and Switzerland additional contracts on the procurement of electricity from renewable sources have been concluded in 2019.

C4.3c

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

Method	Comment
Compliance with regulatory requirements/standards	Merck regularly checks on company and asset level regulatory requirements/standards on energy/energy efficiency or greenhouse gas emissions to be compliant.
Employee engagement	Our commitment to climate change mitigation is not restricted to the workplace - we encourage our employees to exhibit this through more sustainable living habits as well. To keep our employees informed, we publish a selection of climate protection facts and figures on Merck's intranet. Furthermore, various tools such as energy checklists or examples of best practices are also available to help employees share information and learn from one another. We continuously provide information on Merck's climate change mitigation efforts in our employee magazine and in an employee newsletter. Through an online training system, we have trained employees at our Darmstadt and Gernsheim sites in Germany on the topic of energy management. As an incentive to use public transportation, the Darmstadt Merck site offers a "Jobticket", the cost of which is partially covered by the company. More than 4,000 employees take advantage of this option. Furthermore, we offer the carpooling platform "TwoGo" at our Darmstadt headquarters.
Internal incentives/recognition programs	At our German subsidiaries, we offer a subsidy of € 100 towards monthly lease payments to employees who opt for a greener car model. In the United States, we provide our employees with financial incentives to choose a more sustainable lifestyle. For example, employees can receive up to US$ 1,000 in subsidies towards the installation of solar power on their home and up to US$ 100 towards the cost of an energy audit. Employees are also eligible for as much as US$ 3,500 towards the purchase of a hybrid or electric vehicle that was designated as "SmartWay Elite" by the U.S. Environmental Protection Agency. To date, we have helped 59 of our U.S. employees install home solar power systems and motivated 366 people to purchase a qualifying hybrid or electric vehicle. To encourage green mobility, we have installed an extensive charging infrastructure at our global headquarters in Darmstadt, part of which is available to our employees for their own personal use. In addition, we also provide charging stations for company and personal vehicles in France, India, Ireland, Switzerland, the United Kingdom, and the United States.

C4.5

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

C4.5a

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

Level of aggregation
Company-wide

Description of product/Group of products
Our Performance Materials products help boost sustainability in a variety of ways. Liquid crystals ensure high picture quality in computer monitors and televisions, while also making them more power efficient. This is because our PS-VA technology (polymer-stabilized vertical alignment) make better use of the backlighting, the display component that consumes the most power. PS-VA equipped devices require significantly less energy than their predecessors. Self-aligned vertical alignment (SA-VA) is the next-generation liquid crystal (LC) technology and was launched in 2018. SA-VA helps conserve resources and is even more environmentally sustainable because less energy and solvent for the orientation layer are required to manufacture the displays. Moreover, its manufacture is more efficient as it requires fewer process steps and can be processed at lower temperatures. Mobile-device displays have increasingly high resolutions, yet are still expected to be as energy-efficient as possible. This is where our liquid crystals for touchscreen applications come in. Based on ultra-brightness FFS technology (UB-FFS), these liquid crystals provide displays with 15% more light transmission. This can reduce the energy consumption of smartphones and tablets by around 30%, thereby prolonging battery life. Devices with the innovative UB-Plus liquid crystal technology and with a significant reduction in energy consumption are expected to enter the market in 2019. Windows that can be darkened in a matter of seconds are now a reality, thanks to our liquid crystal window (LCW) technology. New estimates based on planned customer projects show that this technology can lower the energy consumed by building climate control systems and lighting by up to 10%, thereby replacing conventional shading. Organic light-emitting diodes (OLEDs) increase the energy efficiency of displays while also providing brilliant colors and razor-sharp images. To further enable unique display applications and efficient production of large-area OLED displays, we are developing high performance OLED materials for vacuum evaporation methods and printing processes. Furthermore, we supply the photovoltaics industry with materials for the production of solar cells.

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

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

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

% of total portfolio value
<Not Applicable>

Asset classes/ product types
<Not Applicable>

Comment
Figures on revenue or R&D expenditures on that detailed Level are not disclosed by Merck.

Level of aggregation
Company-wide

Description of product/Group of products
Our Life Science business has developed the Design for Sustainability (DfS) program, which aims to reduce the environmental impacts of our products across their entire life cycle, from manufacture to end of life. Our design teams use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy & emissions, waste, water, packaging, and usability & innovation. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. Our solvent Cyrene™, for instance, is derived from waste cellulose and is used as a more sustainable alternative to substances such as NMP and DMF, which are classified as toxic to reproduction. Through Cyrene™ and other greener solvents, we are helping our customers to make their production processes safer and more environmentally sustainable. Cyrene™ was named "Environmental Product of the Year" at the Environmental Leader Awards 2019. Our Life Science business has as well established a packaging sustainability framework that defines our strategy for driving significant improvements in the sustainability of our packaging by 2022. We call it the SMASH Packaging plan. It is comprised of three focus areas we refer to as pillars – Optimize Resources, More Sustainable Materials, and Design for Circular Economy. Within those pillars, we aim to Shrink (reduce the amount of packaging used), Secure (zero deforestation), Switch (improve plastic sustainability), and Save (Maximize recyclability). Life Science's ZooMAb® recombinant antibodies platform represents an entirely new generation of recombinant monoclonal antibodies designed to be a greener alternative compared to traditional antibodies. ZooMAb antibodies are recombinantly produced, resulting in minimal animal involvement and an animal-free final product that is also free of biocides, preservatives and animal byproducts, adhering to Designing for Safer Chemicals initiative. ZooMAb antibodies also adhere to designing for energy efficiency as ZooMAb antibodies are lyophilized, enabling shipping and storage at room temperature and not requiring Styrofoam shipping containers and ice bricks.

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

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

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

% of total portfolio value
<Not Applicable>

Asset classes/ product types
<Not Applicable>

Comment
Figures on revenue or R&D expenditures on that detailed Level are not disclosed by Merck.

C5. Emissions methodology

C5.1

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

Scope 1

Base year start
January 1 2006

Base year end
December 31 2006

Base year emissions (metric tons CO2e)
377511

Comment

Scope 2 (location-based)

Base year start
January 1 2006

Base year end
December 31 2006

Base year emissions (metric tons CO2e)
401762

Comment

Scope 2 (market-based)

Base year start
January 1 2006

Base year end
December 31 2006

Base year emissions (metric tons CO2e)
404426

Comment

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
359129

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.2

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

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment

C6.3

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

Reporting year

Scope 2, location-based
335315

Scope 2, market-based (if applicable)
305844

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.4

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

C6.4a

(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source
Company owned vehicles

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
No emissions from this source

Relevance of market-based Scope 2 emissions from this source (if applicable)
No emissions from this source

Explain why this source is excluded
Combustion of fossil fuels in company owned vehicles is partly considered. Merck accounts dispenses of gasoline and diesel at filling stations owned/controlled by Merck to have comparable and meaningful data. Collecting information on the energy consumption of all vehicles owned/controlled by Merck is not included due to the high effort needed to collect the data.

Source
Small sites

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source (if applicable)
Emissions are not relevant

Explain why this source is excluded
Merck’s GHG accounting covers all production sites, (large) R&D sites, (large) sites with warehouses and (large) commercial affiliates (in total around 200 sites). A number of small commercial affiliates, labs, etc. have not been incorporated into Merck’s EHS data management system because we assessed their GHG emissions as being minor in relation to the sites already included in our accounting. For one, integrating these sites requires a huge effort for GHG emissions that are minor in relation to the sites already included in our accounting. Secondly, very often these small sites are not able to provide the necessary data because they use rented offices and do not receive energy-related information from their landlord. In 2019, around 80% of Merck’s emissions come from just 38 production sites. Therefore, these sites are in the main focus for the reduction of GHG emissions.

Source
Thermal waste air purification

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
No emissions from this source

Relevance of market-based Scope 2 emissions from this source (if applicable)
No emissions from this source

Explain why this source is excluded
Emissions of thermal waste air purification (e.g. from regenerative thermal oxidizers for the destruction of VOC's) are negligible and are not included in the GHG inventory.

C6.5

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

Purchased goods and services

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Emissions from purchased goods and services are expected to be highly relevant to Merck. As a global pharmaceutical and chemical company, Merck uses raw materials, packaging materials, etc. from various suppliers. In total, the goods and services we purchased in 2019 from more than 55,000 suppliers in almost 150 countries amounted to around € 7.5 billion. Among the materials Merck purchases, there is no single material purchased in noticeably higher quantities than the others, and our review has not revealed materials sourced in large amounts with an exceptionally high Product Carbon Footprint, preventing us from making a prioritization. Nevertheless, we are now focusing our attention to our supply chain (Scope 3). We are currently embarked in an ambitious project to broaden our scope of data analysis and assess our complete Scope 3 emissions in order to set proper targets. Results are expected for end of 2020/begin of 2021.

Capital goods

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Emissions from the production of capital goods purchased by Merck are expected to be medium to highly relevant, but no figures are available at this time. As a global pharmaceutical and chemical company, Merck uses raw materials, packaging materials, etc. from various suppliers. In total, the goods and services we purchased in 2019 from more than 55,000 suppliers in almost 150 countries amounted to around € 7.5 billion. Among the materials Merck purchases, there is no single material purchased in noticeably higher quantities than the others, and our review has not revealed materials sourced in large amounts with an exceptionally high Product Carbon Footprint, preventing us from making a prioritization. The same applies for capital goods. Nevertheless, we are now focusing our attention to our supply chain (Scope 3). We are currently embarked in an ambitious project to broaden our scope of data analysis and assess our complete Scope 3 emissions in order to set proper targets. Results are expected for end of 2020/begin of 2021.

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

Evaluation status
Relevant, calculated

Metric tonnes CO2e
127476

Emissions calculation methodology
Category 3 includes emissions related to the production of fuel and energy purchased and consumed by the reporting company in the reporting year that are not included in scope 1 or scope 2. Data on purchased and consumed fuel (mainly natural gas) which are basis to calculate category 3 emissions are collected via Merck's central EHS data management system. To determine upstream emissions of purchased fuel, the fuel quantities are multiplied with cradle-to-gate emission factors (source: mainly DEFRA, 2019; partially ecoinvent Data V2.2, 2010). Upstream emissions of purchased electricity, steam, heating and cooling are calculated based on the amount of energy purchased, fuel efficiencies, global fuel shares of electricity generation, and emission factors. The amount of primary energy is determined based on the quantities of purchased electricity, heating, steam, and cooling, as well as the respective fuel efficiencies (85% for steam/heat/cold generation, 37% for electricity generation). The proportion of the different fuel types relative to the total amount of primary energy is calculated based on the fuel shares of global electricity generation (source: "Key World Energy STATISTICS", IEA 2019). Transmission and distribution (T&D) losses are determined based on the quantities of electricity and steam/heating/cooling purchased as well as country-specific loss factors. Basis for country-specific electric power transmission and distribution losses: IEA 2019. Basis for the loss factor for purchased heat/steam (5%): DEFRA 2019. The same factor is used for cooling. Emissions from the generation of purchased electricity sold to end users is not relevant for Merck because Merck does not sell purchased electricity. A number of small commercial affiliates, labs, etc. have not been incorporated into Merck's EHS data management system. For one, integrating these sites requires a huge effort for GHG emissions that are minor in relation to the sites already included in our accounting. Secondly, very often these small sites are not able to provide the necessary data because they use rented offices and do not receive energy-related information from their landlord. We assume that the accounted emissions cover the vast majority of Merck's emissions.

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

Please explain
Emissions from fuel- and energy-related activities are of medium relevance. Data was verified.

Upstream transportation and distribution

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Being a global company, Merck operates in 66 countries. We therefore expect that transportation and distribution of goods purchased by Merck, as well as products manufactured by Merck, to be an emission source of moderate relevance. Nevertheless, reliable data for our transport operations is not yet available Group-wide.

Waste generated in operations

Evaluation status
Relevant, calculated

Metric tonnes CO2e
83672

Emissions calculation methodology
Category 5 includes emissions from third-party disposal and treatment of waste generated in facilities owned or controlled by Merck (including disposal of both solid waste and wastewater). The calculation of emissions from waste generated in operations and disposed of by third parties is based on primary data from Merck's manufacturing sites collected on an annual basis via Merck's central EHS data management system. This data is split up into various waste types (e.g. solvent waste, soil waste) and waste disposal methods (e.g. waste-to-energy, landfill, recycling). Emission factors based on the carbon content of the waste were taken from the "Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain". The emission factor for external waste recycling/recovery and for external waste incineration with energy recovery is 0 kg CO2e/metric ton carbon (it is assumed that recycling and energy recovery are attributed to the organization that uses the recycled material, or that uses the waste to generate energy); the emission factor for external waste incineration without energy recovery is 1 kg CO2e/metric ton carbon; the emission factor for external landfill waste is 13 kg CO2e/metric ton carbon. Carbon content factors are mainly taken from the "2006 IPCC Guidelines for National Greenhouse Gas Inventories" (e.g. solvent waste: 80%; construction and demolition waste: 20%; plastic waste: 75%). These data are then multiplied with each other. Emissions resulting from the transportation of waste materials are not taken into account. To calculate greenhouse gas emissions from wastewater treatment in third party municipal or industrial wastewater treatment plants, we use primary data from Merck's manufacturing sites, which is collected on an annual basis via Merck's central EHS data management system. Wastewater quantities are multiplied by an emission factor (0.708 kg CO2e/m3 wastewater) from DEFRA, 2019. Merck's waste and wastewater accounting only covers manufacturing sites. Pure warehouse sites, labs or commercial affiliates are not included in our waste reporting. Nevertheless, it is expected that the accounting covers more than 95% of Merck's overall waste quantity. Additionally, it can be assumed that the majority of waste not taken into account is recycled (paper, cardboard, plastic, etc.).

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

Please explain
Emissions from waste generated in operations are of medium relevance. Data was verified.

Business travel

Evaluation status
Relevant, calculated

Metric tonnes CO2e
86961

Emissions calculation methodology
Category 6 includes emissions from the transportation of employees for business related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. Air travel: Based on its flight booking and billing processes, Merck's payment solution service provider supplies detailed data of all flights booked. Greenhouse gas emissions are calculated by atmosfair (www.atmosfair.de), a recognized non-governmental organization dealing with climate protection with a focus on travel. Methodology used: DEFRA/GHG Protocol. Data covers approximately 80% to 85% of the business flights of Merck employees. When the greenhouse effect at high altitudes is taken into account, the emissions from air travel add up to 167 metric kilotons CO2eq (Radiation Forcing Index RFI of 2.7). Rail travel: Rail travel is considered relevant in some European countries (e.g. Germany, France, Spain). In non-European countries, it is seen as rather negligible. At this time, data for rail travel is only available in Germany. This data is provided by Deutsche Bahn AG Emission factors used per type of train: long distance trains: 0 kg CO2/passenger-km (the Deutsche Bahn AG switched to renewable energy for long distance trains); short distance service: 0.05 kg CO2/passenger-km. Rental cars: Emissions data is provided by Merck's global rental car providers on an annual basis. The emissions reported include car rental globally. Data on other means of transportation (e.g. trams, taxis and buses) are not available. Their impact on Merck's overall emissions is expected to be negligible.

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

Please explain
Emissions from business travel are of medium relevance. Data was verified.

Employee commuting

Evaluation status
Relevant, calculated

Metric tonnes CO2e
75195

Emissions calculation methodology
Within Merck, there is no detailed data available on how employees commute to work (means of transport), the distance they travel each day, and how often they commute to work per year. Therefore, the assessment of the GHG emissions is based on estimates and assumptions. For this, we use the "Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain" along with statistical data. For Darmstadt, Merck's largest site with approx. 11,000 employees, the number of parking spots and Job-Tickets (Merck supports the use of public transportation at the Darmstadt facility) are taken into account when estimating the percentages for the different modes of transportation. For the rest of Europe and North America, statistical data from internet research is used. We then take this data and calculate estimates for the Emerging Markets (Latin America and Asia without Japan) and ROW (Rest of World). For Darmstadt, it was assumed that 46.4% of the employees travel by car, 10.3% travel by rail, 18.1% travel by tram/subway, 10.3% travel by bus, and 14.9% are non-motorized (on foot, by bike etc.; incl. passengers car-pooling). For Europe, it was assumed that 61.8% of the employees travel by car, 4.8% travel by rail, 8.4% travel by tram/subway, 4.8% travel by bus, and 20.4% are non-motorized. For North America, it was assumed that 82% of the employees travel by car, 0.6% travel by rail, 1.7% travel by tram/subway, 2.8% travel by bus, and 13% are non-motorized. For Latin America, Asia/Pacific and Middle East/Africa, it was assumed that 10% of the employees travel by car, 10% travel by rail, 35% travel by tram/subway, 30% travel by bus, and 15% are non-motorized. The average number of trips per year and employee (440) as well as the average travel distance (30 km by car or rail, 20 km by bus or tram/subway; single trips) are taken from the "Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain". Emission factors for modes of transport are taken from "UK Government conversion factors for Company Reporting", 2019.

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

Please explain
Emissions from employee commuting are of medium relevance. Data was verified.

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Category 8 includes emissions from the operation of assets that are leased by Merck and that are not already included in the reporting company's scope 1 or scope 2 inventories. Information was verified. Emissions from this category are not relevant for Merck's scope 3 reporting because leased assets (e.g. rented offices, labs or warehouses) are integrated in the annual EHS data collection processes and are part of Merck's scope 1 and 2 GHG inventory. A number of small commercial affiliates, labs, etc. have not been incorporated into Merck's EHS data management system. For one, integrating these sites requires a huge effort for GHG emissions that are minor in relation to the sites already included in our accounting. Secondly, very often these small sites are not able to provide the necessary data because they use rented offices and do not receive energy-related information from their landlord.

Downstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Merck does not report Scope 3 emissions under category 9, "Downstream transportation and distribution". An analysis of up- and downstream logistic processes shows that for category 9, reliable data for emissions between our gate and the end consumer (for Merck mainly business customers) are only available for emissions from the transportation process that Merck pays for. According to the WRI/WBCSD "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" these emissions have to be reported under category 4.

Processing of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Category 10 includes emissions from the processing of sold intermediate products by third parties (e.g. manufacturers) subsequent to sale by the reporting company. Merck produces a huge variety of intermediate products for various purposes. Due to the range of potential applications and our customer structure, the related GHG emissions cannot be tracked in a practical fashion. Reliable figures are difficult to obtain. Merck adheres to the recommendation of the "Guidance for Accounting and 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". Information was verified.

Use of sold products

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Emissions from the use of sold products are expected to be of low relevance because of Merck's product portfolio.

End of life treatment of sold products

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Emissions from the end-of-life treatment of sold products are expected to be of low relevance because of Merck's product portfolio.

Downstream leased assets

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Category 13 includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities. This category is not relevant for Merck because Merck essentially does not lease out real estate or other fixed assets (as assessed by Merck experts). Information was verified.

Franchises

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Category 14 includes emissions from the operation of franchises. This category is not relevant for Merck as Merck does not operate franchises, i.e. businesses operating under a license to sell or distribute another company’s goods or services within a certain location. Out-licensing in the pharmaceutical sector is not regarded as franchising. Information was verified.

Investments

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Emissions from investments are expected to be of low relevance as Merck normally has operational control when investing in (emission-intensive) sites; in this case, GHG emissions are covered via scope 1 and 2 emissions.

Other (upstream)

Evaluation status

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain

Other (downstream)

Evaluation status

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?
Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	12284	

C6.10

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

Intensity figure
0.000042

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
664973

Metric denominator
unit total revenue

Metric denominator: Unit total
15905000000

Scope 2 figure used
Market-based

% change from previous year
6.8

Direction of change
Decreased

Reason for change
The decrease in intensity is on the one hand side caused by a decrease in emissions due to the purchase of more renewable energy and the implementation of energy efficiency/GHG reduction projects. Total absolute emissions decreased from 2018 to 2019 (2018: 665,612 tons, 2019: 664,973). On the other hand, side there was an increase in Merck's overall revenue. The strong decrease in the intensity figure shows that Merck is still on the way of decoupling growth from GHG emissions. Note: On October 7, 2019 Merck acquired Versum Materials. As stated in question C0.1 emissions data on Versum Materials have not yet been integrated into our reporting. To have a proper comparison, the above mentioned revenue does not contain the revenue of Versum Materials and therefore differs from the overall Merck revenue reported elsewhere in this questionnaire.

Intensity figure
0.297

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
664973

Metric denominator
Other, please specify (megawatt hour energy used (MWh))

Metric denominator: Unit total
2239872

Scope 2 figure used
Market-based

% change from previous year
0.7

Direction of change
Decreased

Reason for change
The decrease in intensity is on the one hand side caused by a decrease in emissions due to the purchase of more renewable energy and the implementation of energy efficiency/GHG reduction projects. Total absolute emissions decreased from 2018 to 2019 (2018: 665,612 tons, 2019: 664,973). On the other hand side the total energy consumption increased (2018: 2,228 GWh, 2019: 2,240 GWh); i.e. there is a decoupling of energy consumption and GHG emissions.

C7. Emissions breakdowns

C7.1

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

C7.1a

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

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	266030	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	79853	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	13246	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

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

Country/Region	Scope 1 emissions (metric tons CO2e)
Japan	11256
United Kingdom of Great Britain and Northern Ireland	4581
Italy	12803
Ireland	11475
France	10967
China	699
Switzerland	10159
Spain	6485
Germany	122257
United States of America	153637
Other, please specify (Rest of world)	14810

C7.3

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

By activity

C7.3c

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

Activity	Scope 1 emissions (metric tons CO2e)
Emissions from manufacturing sites	310749
Emissions from non-manufacturing sites	48380

C7.5

(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 for in Scope 2 market-based approach (MWh)
Japan	15860	15116	30243	0
United Kingdom of Great Britain and Northern Ireland	4313	3319	17461	4023
Italy	5184	5159	15854	0
Ireland	11279	0	29689	29689
France	8500	8345	76948	0
China	32437	32437	71518	0
Switzerland	3506	164	65776	56628
Spain	6922	72	21564	21340
Germany	41335	41673	104154	0
United States of America	160934	153310	364756	23438
Other, please specify (Rest of world)	45045	46249	102785	2692

C7.6

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

By activity

C7.6c

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

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Emissions from manufacturing sites	255790	238294
Emissions from non-manufacturing sites	79525	67550

C7.9

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

Decreased

C7.9a

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

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	1145	Decreased	0.17	'CO2 savings from additional contracts concluded in 2019 on the purchase of renewable electricity according to question C4.3a'/'Scope 1+2 Emissions 2018'*100: 1,145/665,612*100=0.1720
Other emissions reduction activities	1557	Decreased	0.23	'CO2 savings from energy efficiency projects implemented in 2019 according to question C4.3a'/'Scope 1+2 Emissions 2018'*100: 1,557/665,612*100=0.2339
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output	2063	Increased	0.31	Calculation 1 - increase because of organic growth: 'Scope 1+2 Emissions 2019'+'CO2 savings from projects implemented in 2019 according to question C4.3a'+'CO2 savings from additional renewable energy purchase in 2019 according to question C4.3a'-'Scope 1+2 Emissions 2018': 664,973+1,557+1,145-665,612=2063 Calculation 2 - percent change because of organic growth: 'Result from Calculation 1 (see above)'/'Scope 1+2 Emissions 2018'*100: 2,063/665,612*100=0.3099
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

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

Market-based

C8. Energy

C8.1

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

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

C8.2

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

	Indicate whether your organization undertook this energy-related activity in the reporting year
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	No
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

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

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	30506	1306391	1336897
Consumption of purchased or acquired electricity	<Not Applicable>	137810	618218	756028
Consumption of purchased or acquired heat	<Not Applicable>	0	143061	143061
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	0	1659	1659
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	2371	<Not Applicable>	2371
Total energy consumption	<Not Applicable>	170687	2069329	2240016

C8.2b

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

	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

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

Fuels (excluding feedstocks)
Natural Gas

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
1273469

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2026

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.05333 GJ/kg, carbon content factor (based on higher heating value): 13.77 kg C/GJ; conversion factor higher – lower heating value: 0.9; density: 0.833 kg/m3.

Comment
Natural gas is used to generate electricity, heat, steam and cooling. At several sites this is done via self-cogeneration or self-trigeneration. Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Diesel

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
17944

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2666

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.04526 GJ/kg, carbon content factor (based on higher heating value): 19.19 kg C/GJ; conversion factor higher – lower heating value: 0.95; density: 0.825 kg/l.

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Liquefied Petroleum Gas (LPG)

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
14617

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2151

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.04979 GJ/kg, carbon content factor (based on higher heating value): 15.48 kg C/GJ; conversion factor higher – lower heating value: 0.95; density: 0.54 kg/l.

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Motor Gasoline

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
164

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2495

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.04663 GJ/kg, carbon content factor (based on higher heating value): 17.955 kg C/GJ; conversion factor higher – lower heating value: 0.95; density: 0.75 kg/l

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Kerosene

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
111

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2587

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.046105 GJ/kg, carbon content factor (based on higher heating value): 18.62 kg C/GJ; conversion factor higher – lower heating value: 0.95; density: 0.8 kg/l.

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Wood Waste

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
30506

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.4027

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.01642 GJ/kg, carbon content factor (based on higher heating value): 28.98 kg C/GJ; conversion factor higher – lower heating value: 0.95.

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

Fuels (excluding feedstocks)
Biodiesel

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization

86

MWh fuel consumed for self-generation of electricity

MWh fuel consumed for self-generation of heat

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling

MWh fuel consumed for self-cogeneration or self-trigeneration

Emission factor
0.2548

Unit
metric tons CO2 per MWh

Emissions factor source
Data is collected in various units of measurements. Factors needed are mainly from GHG protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Calculation worksheets. December 2007. Version 3.1. Higher heating value: 0.02842 GJ/kg, carbon content factor (based on higher heating value): 18.34 kg C/GJ; conversion factor higher – lower heating value: 0.95; density: 0.85 kg/l.

Comment
Data on the share of the fuels used for the different purposes is not available. Due to the very high level of detail these data are not collected on Merck Group level although available on site level.

C8.2d

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

	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			2620	2371
Heat				
Steam				
Cooling				

C8.2e

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

Sourcing method
Unbundled energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type
Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling
United States of America

MWh consumed accounted for at a zero emission factor
23438

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type
Hydropower

Country/region of consumption of low-carbon electricity, heat, steam or cooling
Switzerland

MWh consumed accounted for at a zero emission factor
56628

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, not supported by energy attribute certificates

Low-carbon technology type
Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling
Ireland

MWh consumed accounted for at a zero emission factor

29689

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, not supported by energy attribute certificates

Low-carbon technology type
Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling
United Kingdom of Great Britain and Northern Ireland

MWh consumed accounted for at a zero emission factor
4023

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, not supported by energy attribute certificates

Low-carbon technology type
Solar

Country/region of consumption of low-carbon electricity, heat, steam or cooling
Spain

MWh consumed accounted for at a zero emission factor
21340

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, not supported by energy attribute certificates

Low-carbon technology type
Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling
Netherlands

MWh consumed accounted for at a zero emission factor
2422

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, not supported by energy attribute certificates

Low-carbon technology type
Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling
Australia

MWh consumed accounted for at a zero emission factor
270

Comment

C9. Additional metrics

C9.1

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

C10. Verification

C10.1

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

	Verification/assurance status
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

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

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/ section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

C10.1b

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

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/ section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

C10.1c

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

Scope 3 category
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Waste generated in operations

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Business travel

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Employee commuting

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category

Scope 3: Upstream leased assets

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Processing of sold products

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Downstream leased assets

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Franchises

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Merck Corporate Responsibility Report 2019.pdf
Merck CDP Verification Letter 2019.pdf

Page/section reference
Merck CDP Verification letter 2019, see page 2 Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178, 213-214

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

C10.2

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

C10.2a

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

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Progress against emissions reduction target	ISAE3000	The progress against our GHG reduction target was published in Merck's Corporate Responsibility Report (p. 122, 160) which was externally verified. See pages 213/214 of Merck's Corporate Responsibility Report for the Independent Assurance Report of the external verifier or the attached CDP Verification Letter. Merck Corporate Responsibility Report 2019.pdf Merck CDP Verification Letter 2019.pdf
C6. Emissions data	Year on year change in emissions (Scope 1 and 2)	ISAE3000	Year on year change was published in Merck's Corporate Responsibility Report (p. 122, 160) which was externally verified. See pages 213/214 of Merck's Corporate Responsibility Report for the Independent Assurance Report of the external verifier or the attached CDP Verification Letter. Merck Corporate Responsibility Report 2019.pdf Merck CDP Verification Letter 2019.pdf
C6. Emissions data	Year on year change in emissions (Scope 3)	ISAE3000	Year on year change was published in Merck's Corporate Responsibility Report (p. 161) which was externally verified. See pages 213/214 of Merck's Corporate Responsibility Report for the Independent Assurance Report of the external verifier or the attached CDP Verification Letter. Merck Corporate Responsibility Report 2019.pdf Merck CDP Verification Letter 2019.pdf
C8. Energy	Energy consumption	ISAE3000	Year on year change was published in Merck's Corporate Responsibility Report (p. 163) which was externally verified. See pages 213/214 of Merck's Corporate Responsibility Report for the Independent Assurance Report of the external verifier or the attached CDP Verification Letter. Merck Corporate Responsibility Report 2019.pdf Merck CDP Verification Letter 2019.pdf

C11. Carbon pricing

C11.1

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

C11.1a

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

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

EU ETS

% of Scope 1 emissions covered by the ETS
22.3

% of Scope 2 emissions covered by the ETS
0

Period start date
January 1 2019

Period end date
December 31 2019

Allowances allocated
56518

Allowances purchased
23584

Verified Scope 1 emissions in metric tons CO2e
80102

Verified Scope 2 emissions in metric tons CO2e
0

Details of ownership
Facilities we own and operate

Comment

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

With power plants at the Darmstadt and Gernsheim sites in Germany, Merck is covered by the EU Emission Trading Scheme (EU ETS) launched Europe-wide in 2005. When issuing emissions certificates, the German Emissions Trading Authority (DEHSt) acknowledged our previous measures (the substitution of brown and black coal with gas) as "early actions". In the trading periods I and II Merck benefited from free allowances. In the third trading period (2013-2020) new allocation rules were implemented. Merck's free allocation is based on heat benchmarks and industrial exceptions. In 2019 Merck purchased additional allowances. A purchase will remain necessary in the next years.

In the year 2013 there were discussions within the EU to change the regulatory framework for the third trading period. As a result, the backloading was implemented as a short-term measure with the aim of reducing the total number of emission certificates temporarily. As a long-term solution to reform the ETS, the establishing of the Market Stability Reserve (MSR) have been started in 2018 (Decision (EU) 2015/1814). The MSR is intended as a flexible mechanism to reduce surpluses of certificates in the market and will operate entirely according to pre-defined rules. Both measures (backloading and MSR) will lead to higher costs for the single certificates.

With the framework 2030 for climate and energy goals the EU countries have agreed to increase the binding reduction target to 40% emissions reduction below the 1990 level. This will have an impact on the annual reduction in the 'cap' on emissions from EU ETS sectors by 2020. This can also be seen in the context of the Paris climate conference (COP21) in December 2015 / "Paris Agreement". The EU has already made considerable advances and will further have the most ambitious climate targets in the world.

The amended EU Emissions Trading Directive, which came into force in April 2018, provides stricter allocation rules after 2020. Further details have been established in the meantime. There is still the risk of changes of the EU ETS in the coming years and still there are planning and investment uncertainties caused by such discussions and by possible regulatory changes within the next years.

Merck reacts on changes of the EU ETS in different ways. Scenario planning is used to estimate the possible financial impact by the changes in EU ETS. Merck observes tightly the discussions and decisions of the EU regarding the fourth trading period (2021-2030) and time thereafter to adapt strategy if needed. Besides this, we reduce the need for emissions certificates by implementing energy saving and greenhouse gas reduction projects. At Darmstadt and Gernsheim, the two sites underlying the EU ETS, a sophisticated process to improve energy efficiency and to reduce energy consumption is in place. Production plants are systematically examined on potentials to save energy. Multiple energy efficiency projects were implemented in the past years. At the Darmstadt site, for instance, Merck spent around € 27 million on the construction of two state-of-the-art energy stations which were commissioned in 2014 and 2015. The two stations are supplying the site with power, heating and cooling while decreasing the site's GHG emissions by around 2,500 metric tons per year. At the Gernsheim site a combined heat and power plant was installed reducing GHG emissions by 6,000 metric tons per year. To have a solid basis to improve energy efficiency and to save energy, the two sites have been certified according to ISO 50001 Energy Management Systems already in 2012.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?
No

C11.3

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

No, and we do not currently anticipate doing so in the next two years

C12. Engagement

C12.1

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

Yes, our suppliers

Yes, our customers

C12.1a

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

Type of engagement

Information collection (understanding supplier behavior)

Details of engagement

Collect climate change and carbon information at least annually from suppliers

% of suppliers by number

3

% total procurement spend (direct and indirect)

% of supplier-related Scope 3 emissions as reported in C6.5

Rationale for the coverage of your engagement

Description of engagement: In 2014, Merck joined the industry initiative Together for Sustainability (TfS). Under TfS, suppliers are assessed either on information obtained during audits, or on the basis of self-reported and publicly accessible information provided by EcoVadis, an independent rating agency. EcoVadis assesses suppliers from 155 countries and 198 sectors across the four categories of Environment, Labor and Human Rights, Ethics, and Sustainable Procurement. The results are shared among TfS member companies in compliance with all restrictions stipulated by competition law. Strategically speaking, TfS activities focus heavily on achieving demonstrable improvements in supplier sustainability standards. Through the TfS initiative, we have access to more than 1,600 assessments from our suppliers. Among other, the supplier assessments provide us with information on their sustainability performance, including GHG emissions, energy and emission reduction projects and relevant international certifications. Rationale for coverage: The coverage is calculated by dividing the number of 1600 TfS assessments from our suppliers through the total number of our suppliers (55,000). Nevertheless, as a global pharmaceutical and chemical company, Merck uses raw materials, packaging materials, etc. from various suppliers. In total, the goods and services we purchased in 2019 from more than 55,000 suppliers in almost 150 countries amounted to around € 7.5 billion. Among the materials Merck purchases, there is no single material purchased in noticeably higher quantities than the others, and our review has not revealed materials sourced in large amounts with an exceptionally high Product Carbon Footprint, preventing us from making a prioritization. To improve this situation, we are currently embarked in an ambitious project to broaden our scope of data analysis and assess our complete Scope 3 emissions in order to set proper targets. Results are expected for end of 2020/begin of 2021. Furthermore, we will intensify our analysis of TfS assessment results and implement comprehensive mitigation activities.

Impact of engagement, including measures of success

Within the TfS assessments suppliers are ranked according to their sustainability performance. Important elements to achieve scorecard improvements are reporting and actions on energy use and GHG emissions.

Comment

C12.1b

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

Type of engagement
Collaboration & innovation

Details of engagement
Other, please specify (Merck is in direct contact with many of its customers to further develop our products according to the needs of the clients.)

% of customers by number

% of customer - related Scope 3 emissions as reported in C6.5

Portfolio coverage (total or outstanding)
<Not Applicable>

Please explain the rationale for selecting this group of customers and scope of engagement
Merck is in direct contact with many of its customers to further develop our products according to the needs of the clients. Hereby, sustainability and climate protection is an important aspect. Nevertheless, we do not have any detailed data on the number of customers or similar.

Impact of engagement, including measures of success
Merck products significantly help our customers conserve energy and thus reduce their GHG emissions, help them to produce more energy-efficient products or to develop new technologies for renewable energy resources. Our Performance Materials portfolio contains numerous examples of such products. Among others, we are developing innovative solutions for energy-efficient displays and lighting (based on Light Emitting Diodes (LED) and Organic Light Emitting Diodes (OLED) technologies). Our liquid crystal window (LCW) technology helps to reduce the energy consumption of buildings. Furthermore, we supply the photovoltaics industry with materials for the production of solar cells. These materials enable the realization of innovative applications for photovoltaics such as flexible, semi-transparent and lightweight solar cells. Our Life Science business has developed the Design for Sustainability (DfS) program, which aims to reduce the environmental impacts of our products across their entire life cycle, from manufacture to end of life. These approaches help reduce energy and thus GHG emissions and water consumption, create more productive processes that minimize waste, streamline packaging, and potentially reduce associated costs. Our Life Science business continues to introduce innovative products to our catalogue that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

C12.3

(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

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?
No

C12.3f

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

Merck is engaged in various industry associations and is actively promoting action against climate change within these associations. In the chemical sector, Merck shares the position of the German Chemical Industry Association (VCI) on climate change. The same applies for the pharmaceutical sector where Merck is engaged in efpia, the European Federation of Pharmaceutical Industries and Associations. Here, for instance, we were involved in the development of a white paper on climate change. At Merck, key players who are involved in advocacy activities of e.g. VCI or the European Chemical Industry Council (CEFIC) and who respond to consultations about climate change, emission trading etc., are involved in Merck's climate protection program as well. For example, employees of the energy management department of Merck's largest site, Darmstadt (approx. 20-30% of Merck's total energy consumption), are key players in our internal programs on GHG reduction and at the same time they are engaged in multiple industry associations.

By this, consistency between Merck's strategy and our advocacy activities is ensured. EHS Managers and other functions that play a role in our climate protection activities are regularly informed about Merck's climate protection program by newsletters or trainings, congresses, etc. In general, employees are informed about Merck's climate protection program through internal or external communications.

C12.4

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

Publication
In mainstream reports

Status
Complete

Attach the document
Merck Annual Report 2019.pdf

Page/Section reference
Annual Report Merck 2019; see pages 40-42

Content elements
Governance
Strategy
Emissions figures
Emission targets

Comment

Publication
In voluntary sustainability report

Status
Complete

Attach the document
Merck Corporate Responsibility Report 2019.pdf

Page/Section reference
Merck Corporate Responsibility Report 2019, see pages 121-123, 160-161, 178

Content elements
Governance
Strategy
Emissions figures
Emission targets
Other metrics

Comment

C15. Signoff

C-FI

(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.

C15.1

(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Member of the Executive Board, CEO Healthcare	Director on board

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

In total, the goods and services we purchased in 2019 from more than 55,000 suppliers in almost 150 countries amounted to around € 7.5 billion compared with € 7.4 billion in 2018, representing an increase of 2%. Of these, we purchased 53% from suppliers based in Europe, 23% from suppliers based in North America, 16% from suppliers based in Asia-Pacific, and 8% from suppliers based in other regions. Among the materials Merck purchases, there is no single material purchased in noticeably higher quantities than the others, and our review has not revealed materials sourced in large amounts with an exceptionally high Product Carbon Footprint, preventing us from making a prioritization. Therefore, we are focusing our resources on scope 1 and 2 emission reduction activities, but have launched an ambitious project to calculate our scope 3 emissions and, based on this, set the corresponding reduction targets. Results are expected for end of 2020/begin of 2021.

One of the goals of our supplier management is compliance with fundamental environmental and social standards, alongside high-quality, reliable delivery and competitive prices. Our Group Procurement Policy stipulates expectations for our suppliers and specifies how we monitor compliance with our standards. This policy reflects both internal and external guidelines, such as our Code of Conduct, our Human Rights Charter, our EHS Policy (Environment, Health and Safety Policy), ISO 14001, and the BME Code of Conduct. In our Responsible Sourcing Principles we set out these expectations for our suppliers and formally oblige them to apply these standards to their own vendors. Group Procurement is responsible for integrating corporate responsibility (CR) requirements into the relevant stages of our sourcing and supplier management processes. It is a global organization with direct accountability and resources in procurement-relevant local subsidiaries. Our Procurement Supplier Security Team coordinates the relevant measures, such as updating our guidelines where necessary, examining processes and coordinating our participation in external initiatives. All these elements are under continuous improvement in order to keep up with the dynamic globalized world.

In 2014, we joined the industry initiative known as Together for Sustainability (TfS). Under TfS, suppliers are assessed either on information obtained during audits, or on the basis of self-reported and publicly accessible information provided by EcoVadis, an independent rating agency. EcoVadis assesses suppliers from 150 countries and 190 sectors across the four categories of Environment, Social, Ethics, and Sustainable Procurement. The results are shared among TfS member companies in compliance with all restrictions stipulated by competition law. The strategic focus of the TfS activities concentrates strongly on the initiative´s demonstrable improvements of supplier sustainability standards. Via a collaborative platform, we have access to evaluated supplier self-assessments of more than 20,000 suppliers and audit reports from over 1,800 suppliers. In addition to the TfS supplier information, Merck also conducts CR audits on select vendors based on the potential risk they pose, to identify ways to boost sustainability and monitor their implementation.

Risks with regards to climate change and/or Merck's supply chain are also assessed through our established risk management processes and are within the scope of Business Continuity Management. For further details, please see our Corporate Responsibility Report 2019 (https://www.merckgroup.com/en/cr-report/2019/).

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	16152000000

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?
Yes

SC0.2a

(SC0.2a) Please use the table below to share your ISIN.

	ISIN country code (2 letters)	ISIN numeric identifier and single check digit (10 numbers overall)
Row 1	DE	0006599905

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member
Bristol-Myers Squibb

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
858

Uncertainty (±%)
30

Major sources of emissions

Energy usage, one manufacturing process

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Bristol-Myers Squibb

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
731

Uncertainty (±%)
30

Major sources of emissions
Energy usage

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
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Requesting member
Bristol-Myers Squibb

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
892

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Intel Corporation

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
957

Uncertainty (±%)
30

Major sources of emissions
Energy usage, one manufacturing process Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-

related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Intel Corporation

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
815

Uncertainty (±%)
30

Major sources of emissions
Energy usage Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide

estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the “cradle-to-gate” approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product’s main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer’s energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Intel Corporation

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
995

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers. Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck’s total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck’s overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck’s product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the “cradle-to-gate” approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product’s main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer’s energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
International Flavors & Fragrances Inc.

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
19

Uncertainty (±%)
30

Major sources of emissions
Energy usage, one manufacturing process

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
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Requesting member
International Flavors & Fragrances Inc.

Scope of emissions
Scope 2

Allocation level
Please select

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
16

Uncertainty (±%)
30

Major sources of emissions
Energy usage

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer.

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Requesting member
International Flavors & Fragrances Inc.

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
19

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
Johnson & Johnson

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
2622

Uncertainty (±%)
30

Major sources of emissions
Energy usage, one manufacturing process

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
Johnson & Johnson

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
2233

Uncertainty (±%)
30

Major sources of emissions
Energy usage

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
Johnson & Johnson

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
2725

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
L’Oréal

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
201

Uncertainty (±%)
30

Major sources of emissions
Energy usage, one manufacturing process

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
L'Oréal

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
171

Uncertainty (±%)
30

Major sources of emissions
Energy usage

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

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Requesting member
L'Oréal

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
209

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Samsung Electronics

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
4500

Uncertainty (±%)
30

Major sources of emissions

Energy usage, one manufacturing process Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Samsung Electronics

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
3832

Uncertainty (±%)
30

Major sources of emissions
Energy usage Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall

and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

Requesting member
Samsung Electronics

Scope of emissions
Scope 3

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
4678

Uncertainty (±%)
30

Major sources of emissions
Fuel-and-energy-related activities (cat. 3), Waste generated in operations (cat. 5), Business travel (cat. 6), Employee commuting (cat. 7), Upstream leased assets (cat. 8), Processing of sold products (cat. 10), Downstream leased assets (cat. 13) and Franchises (cat. 14). Currently, we do not have the necessary detailed information to estimate the related GHG emissions for the remaining categories within the GHG Protocol, and to break them down to single products and customers. Note: The closing of the acquisition of Intermolecular, Inc. on September 20, 2019 and Versum Materials, Inc. on October 7, 2019 marked two major milestones in the transformation journey of our Performance Materials business sector. The corresponding emissions indicators of Versum Materials have not yet been integrated into our reporting. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we are currently expecting this to add roughly 1.3 million metric tons of CO2eq per year to our carbon footprint (Scope 1and 2). The majority of these are process-related emissions. During the integration process, we are examining the root cause of these high emissions along with ways to curb them. Because we have no data available for Versum Materials dating back to 2006, we cannot incorporate these additional emissions into our current climate action target. However, we will be integrating these into the scope of our next target, which will take effect in 2021.

Verified
No

Allocation method
Other, please specify (Allocation based on revenue/sales)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Allocation was carried through on a pro rata basis using customer sales and Merck's total revenues. The figure involves a considerable element of uncertainty that cannot be assessed (see additional information below). Merck tracks both Scope 1 and Scope 2 emissions from all its manufacturing sites as well as from the most relevant R&D sites, sites with warehouses and commercial affiliates (in total more than 200 sites). For several scope 3 categories GHG emissions were assessed but we do not have the necessary detailed information to estimate the related GHG emissions for all the Scope 3 categories. All GHG emissions data available on Merck Group level are externally verified. In its Healthcare, Life Science and Performance Materials business sectors, Merck offers more than 300,000 products. Allocation of Scope 1, Scope 2 and Scope 3 emissions to specific products by breaking down site related or other emissions is not possible at a reasonable effort because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. For instance, there are products with high sales but low emissions and vice versa. Another example is the influence of packaging sizes. Small packaging sizes are commonly more expensive than big sizes related to product weight/volume, but in terms of GHG emissions it is vice versa. Nevertheless, this approach is used to provide estimates to our customers. The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor. At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy and emissions, waste, water, packaging, and usability and innovation. The experts from R&D, Product Management, Quality, Procurement, and other units use the results as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Our Life Science business continues to introduce innovative products to our catalogue like Cyrene that align with the 12 Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Life Science has developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes. Our innovations reduce the use of toxic materials in internal processes whilst addressing increasing regulatory restrictions. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

No published information has been used.

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	As we currently do not see an efficient way to allocate GHG emissions to our customers there is the need to have a simple, generally accepted, methodology to provide a good estimate for these figures. Physical allocation of GHG emissions by breaking down site related emissions into specific product lines is not possible with justifiable efforts because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Considering also the fact that Merck offers more than 300,000 products, direct allocation of Scope 1 and Scope 2 emissions to specific products is very complex and would require an enormous effort and be costly. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. For instance, the companies asking us to respond to CDP Supply Chain purchase several hundreds of different products. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. Nevertheless, this pro rata approach is used to provide estimates to our customers. To address requests on single product specific GHG emissions Merck's Performance Materials business carried through a pilot project on product life cycle emissions of two major product groups. Our Life Science business has conducted life cycle assessments and product carbon footprints for many of their products used in biopharmaceutical manufacturing and bioscience research. These analyses are used to drive innovation and opportunities for further reducing environmental impacts through its Design for Sustainability program. Life Science will work with customers on responding to their specific inquiries and requests regarding product life cycle impacts.
Customer base is too large and diverse to accurately track emissions to the customer level	As we currently do not see an efficient way to allocate GHG emissions to our customers there is the need to have a simple, generally accepted, methodology to provide a good estimate for these figures. Physical allocation of GHG emissions by breaking down site related emissions into specific product lines is not possible with justifiable efforts because very often a single manufacturing site or even a single plant/factory is engaged in the production of a variety of intermediates, products or product groups from multiple business sectors at any given time. Considering also the fact that Merck offers more than 300,000 products, direct allocation of Scope 1 and Scope 2 emissions to specific products is very complex and would require an enormous effort and be costly. Also, most customers purchase multiple products that span across various manufacturing sites, making identification of GHG emissions specific to one customer even more complex. For instance, the companies asking us to respond to CDP Supply Chain purchase several hundreds of different products. Beside the considerations with regard to physical allocation described above, we have evaluated a sales-based approach as well, linking GHG emissions to Merck's overall and customer specific sales figures. The idea is to set up intensity figures (emissions per sales) and to multiply them with the sales that Merck had with the given customer. Again, the variety and complexity of Merck's product portfolio prevented the derivation of meaningful figures as there is no clear correlation between GHG emissions and sales. Nevertheless, this pro rata approach is used to provide estimates to our customers. To address requests on single product specific GHG emissions Merck's Performance Materials business carried through a pilot project on product life cycle emissions of two major product groups. Our Life Science business has conducted life cycle assessments and product carbon footprints for many of their products used in biopharmaceutical manufacturing and bioscience research. These analyses are used to drive innovation and opportunities for further reducing environmental impacts through its Design for Sustainability program. Life Science will work with customers on responding to their specific inquiries and requests regarding product life cycle impacts.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

Merck will continue to refine data collection and GHG calculation methodologies along its supply chain and to better identify "hot spot" emissions for key product lines and our customers.

To improve our Scope 3 inventory, it was decided to start an ambitious project to broaden our scope of data analysis and assess our complete scope 3 emissions in order to prioritize and set respective targets. Results are expected for end of 2020/begin of 2021.

At our Life Science business, the Design for Sustainability (DfS) program is integrated within the product development process. DfS aims to reduce the environmental and health impacts of our products across their entire life cycle, from manufacture to use through to disposal. The design teams incorporate sustainability considerations early in the design process. They use a scorecard to assess a product's main environmental hotspots throughout its entire life cycle, driving improvement across six main focus areas: materials, energy & emissions, waste, water, packaging, and usability & innovation. We now offer more than 1000 greener alternative products based on the 12 principles of green chemistry and our Design for Sustainability program. In order to reduce the environmental impacts of products, it is key to understand the products across their life cycle. In some cases, the complete life cycle ("cradle to grave") was investigated; in other cases, the focus is on parts of the cycle through the "cradle-to-gate" approach, meaning that the R&D phase of a product up to the point of delivery to the customer is analysed. Sometimes the focus is on particular aspects, such as greenhouse gas emissions, water consumption, or packaging. The results of the analyses show where there is potential for improvement. The experts from R&D, Product Management, Quality, Procurement, and other units use these data as a basis to develop specific measures and initiatives across the entire product life cycle; they furthermore engage in an exchange of relevant best practices and ideas. The results of our analyses are shared with our customers as well. Life Science conducts several analyses to identify product impacts and to improve the sustainability of its products. An example is the LCA comparing the Titripac® product delivery system with the 1L polyethylene bottle product delivery system. The life cycle energy and carbon footprint for both product delivery systems were calculated, and the results showed that the Titripac® had substantial benefits over the polyethylene bottles: a 61% reduction in GHG emissions, a 33% reduction in GHG emissions for shipping to U.S. customers, a 42% reduction in packaging material mass, a 91% increase in renewable materials, and a 73% reduction in solid waste. Beside DfS, our Life Science business continues to introduce innovative products to our catalogue that align with the Principles of Green Chemistry thereby also reducing customer's energy consumption, limiting waste and improving safety. Our innovations reduce the use of toxic materials in internal processes while addressing increasing regulatory restrictions. We have developed a proprietary green chemistry evaluation tool aligned with the 12 Principles of Green Chemistry called DOZN. This online tool allows customers and scientists around the world to measure the relative greenness of their own chemicals and processes.

The Performance Materials business calculated the product carbon footprint for pearlescent pigments and liquid crystal mixtures as well as the product water footprint for liquid crystal mixtures using the "cradle-to-gate" approach. Our customers utilize these data to calculate footprints for their products. Since our performance materials are only present in the end product in minute amounts, our contribution to the end product's footprint is generally very minor.

Besides this, Merck is involved in research projects on life cycle assessments. Merck actively participated for instance in the research project InnovA2 which was funded by the German Federal Ministry of Education and Research. Existing LCA methods apply for continuous mono production and cannot be adapted to the situation at Merck or at other chemical companies where manufacturing is characterized by batch production, multiple processes per plant, processes consisting of various unit operations and using various equipment of the plant as well as commonly used systems for energy and media supply, waste gas incineration etc. Goal of the project is to develop a modular model that allows the preparation of fast and flexible LCAs for multi-product batch production.

For further details, please see our Corporate Responsibility Report 2019 (https://www.merckgroup.com/en/cr-report/2019/).

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

Requesting member
Bristol-Myers Squibb

Group type of project
Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Merck would welcome an opportunity to engage Brystol-Myers Squibb in a conversation around climate protection and the reduction of GHG emissions. We propose to have a meeting to discuss possible ways of a joint approach for reduction activities.

Requesting member
Intel Corporation

Group type of project

Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Merck would welcome an opportunity to engage Intel in a conversation around climate protection and the reduction of GHG emissions. As we are continuously examining and improving environmental performance both internally and externally with customers, we propose to have a meeting to discuss possible ways of a joint approach for reduction activities.

Requesting member
International Flavors & Fragrances Inc.

Group type of project
Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Merck would welcome an opportunity to engage IFF in a conversation around climate protection and the reduction of GHG emissions. As we are continuously examining and improving environmental performance both internally and externally with customers, we propose to have a meeting to discuss possible ways of a joint approach for reduction activities.

Requesting member
Johnson & Johnson

Group type of project
Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Areas of interest for a discussion with Johnson & Johnson include, but are not limited to, the following: Design for Sustainability process, Design for Sustainability Consultancy service, product recycling service offerings, expanded polystyrene cooler return programs and application of our Greener Alternative products portfolio, including switching to novel solvents. We look forward to an opportunity to meet with Johnson & Johnson.

Requesting member
L'Oréal

Group type of project
Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Merck would welcome an opportunity to engage L'Oréal in a conversation around climate protection and the reduction of GHG emissions. We propose to have a meeting to discuss possible ways of a joint approach for reduction activities etc. For instance, we see opportunities to collaborate with L'Oréal for privileging local sourcing in Europe (pigments, UV-Filters) and to optimize deliveries with advanced logistic platforms.

Requesting member
Samsung Electronics

Group type of project
Please select

Type of project
Please select

Emissions targeted
Please select

Estimated timeframe for carbon reductions to be realized
Please select

Estimated lifetime CO2e savings

Estimated payback
Please select

Details of proposal
Merck would welcome an opportunity to engage Samsung Electronics in a conversation around climate protection and the reduction of GHG emissions. We propose to have a meeting to discuss possible ways of a joint approach for reduction activities.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?
No

SC3.1

(SC3.1) Do you want to enroll in the 2020-2021 CDP Action Exchange initiative?
No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2019-2020 Action Exchange initiative?
No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?
No, I am not providing data

Submit your response

In which language are you submitting your response?
English

Please confirm how your response should be handled by CDP

	I am submitting to	Public or Non-Public Submission	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Investors Customers	Public	Yes, submit Supply Chain Questions now

Please confirm below
I have read and accept the applicable Terms