

Novartis - Climate Change 2019

C0. Introduction

C0.1

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

Novartis is a global healthcare company based in Basel, Switzerland, with a history going back more than 150 years. We provide healthcare solutions that address the evolving needs of patients and societies worldwide. Novartis products are sold in about 155 countries and they reached more than 800 million people globally in 2018. Approximately 125,000 people of 147 nationalities work at Novartis around the world (this figure is as of December 31, 2018, prior to our 2019 spin-off of our former Alcon Division). Rapidly aging populations and the growth in chronic illnesses such as heart disease and cancer continue to increase demand for care and put pressure on health systems around the world. These trends raise the importance of delivering true innovation that produces better health outcomes for patients and society – and doing this more efficiently.

Our purpose is to reimagine medicine to improve and extend people's lives. Our vision is to be a trusted leader in changing the practice of medicine. Our strategy is to build a leading, focused medicines company powered by advanced therapy platforms and data science. As we implement our strategy we have five priorities to shape our future and to help us continue to create value for our company, our shareholders and society: unleash the power of our people, deliver transformative innovation, embrace operational excellence, go big on data and digital and build trust with society.

In building trust with society we aim to hold ourselves to the highest ethical standards, be part of the solution on pricing and access to medicines, tackle complex global health challenges and do our part as a responsible global citizen. With respect to the environment we established a new company wide environmental sustainability strategy, with the aspiration to become carbon neutral by 2025 and plastic and water neutral by 2030. In addition to Novartis using only renewable energy (carbon neutral own operations) scope 1 and 2, the strategy set a target to reduce our overall carbon footprint (scope 1, 2 and 3) by half by 2030 therefore including business travel, employee commuting, and use of our products. This will be achieved by meeting our approved Science Based Target of a 35% reduction in absolute emissions across our value chain and additional use of credible, transparent carbon sequestration projects (offsets) through natural climate solutions including forestry projects owned by Novartis.

Research and development is at the core of our company, with 23,000 scientists, physicians and business professionals worldwide focused on discovering new treatments and developing them for patients. The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis collaborating across scientific and organizational boundaries, with a focus on powerful new technologies that have the potential to help produce therapeutic breakthroughs for patients. Global Drug Development (GDD) oversees all drug development activities for our Innovative Medicines Division and the biosimilars portfolio of our Sandoz Division.

Our Innovative Medicines Division researches, develops, manufactures, distributes and sells patented prescription medicines to enhance health outcomes for patients and healthcare providers. Innovative Medicines is organized into two global business units: Novartis Oncology and Novartis Pharmaceuticals. Sandoz develops, manufactures, distributes and sells prescription medicines as well as pharmaceutical active substances that are not protected by valid and enforceable third-party patents.

Novartis Technical Operations (NTO) manages our manufacturing operations and supply chain across our Innovative Medicines and Sandoz Divisions, with a goal of further improving efficiency. Novartis Business Services (NBS), our shared services organisation, delivers integrated solutions to all Novartis divisions and units worldwide. NBS seeks to drive efficiency and effectiveness across Novartis by simplifying and standardizing services across six service domains: people & organization (formally HR), real estate and facility services, procurement, information technology, commercial and medical support activities, and financial reporting and accounting operations. NBS works to leverage the full scale of Novartis to create value across the Company and to free up resources to invest in innovation and product pipeline.

Our Global Health and Corporate Responsibility (GH & CR) strategy fundamentally supports this company purpose and vision, with a focus on expanding access to healthcare and doing business responsibly which includes striving for environmental sustainability. We take our responsibility for environmental impacts seriously, and we plan to continue to do what we can to reduce or mitigate our environmental impacts through our ambitious new environmental sustainability targets and our newly approved Science Based Targets for carbon reduction.

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
Row 1	January 1 2018	December 31 2018	No	<Not Applicable>

C0.3

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

Austria
Belgium
China
Egypt
France
Germany
India
Indonesia
Ireland
Italy
Japan
Malaysia
Poland
Russian Federation
Singapore
Slovenia
South Africa
Spain
Switzerland
Turkey
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.

USD

C0.5

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

Operational control

C1. Governance

C1.1

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

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
Board Chair	The Board of Directors is led by the Chairman of the Board and is responsible for setting the strategic direction of the Novartis Group. The Board typically meets 12 times per year and each meeting lasts 6 hours. Climate change is a priority topic for the organization which is balanced with other business issues and priorities. The Chairman of the Board is responsible for ensuring all material issues are managed effectively by the company. In 2017 the Chairman of the Board requested that we revisit our environmental strategy to see if more ambition was possible. At the instruction of the CEO a review was completed under the direction of the Head of Novartis Business Services and a new strategy was approved by the CEO and the Board in 2018. This strategy sets ambitious new climate change targets for our business. These are to use only renewable energy (scope 1 and 2) before the end of 2025 and to reduce our Scope 1, 2 and 3 footprint by half from a 2016 baseline before the end of 2030.
Chief Executive Officer (CEO)	The Executive Committee of Novartis (ECN) led by the CEO meets each month. The ECN formally approves our environmental strategy and targets. It also reviews and approves annual budgets and sets business priorities. It oversees and approves major capital expenditures, acquisitions and divestitures. The ECN also tracks progress against goals and targets for addressing climate related issues. Performance is assured by independent auditors and is reported annually in our Novartis in society report (formally Corporate Responsibility report). The CEO works to ensure that Novartis' climate strategy is balanced with other business priorities and that sufficient resources are in place. The CEO can also take action to accelerate implementation as needed to respond to external expectations or business needs.
Board-level committee	The Governance, Nomination and Corporate Responsibilities Committee (GN&CRC) oversees the company's strategy and governance on corporate responsibility which includes climate related issues. This group typically meets 3/4 times per year and each meeting lasts 2 hours. The Risk Committee oversees the company's risks across a wide range of possible topics including climate related physical and transition risks. This task is subject to final Board approval at the GN&CRC. The Chief Ethics, Risk and Compliance Officer is responsible for identifying and elevating issues generated by an integrated enterprise level risk review process. These committees are responsible for identifying and investigating issues which are of strategic importance to the business and checking if they are appropriately managed. If either had concerns about the Novartis climate strategy these would be brought to the attention of the Board and the Executive Committee of Novartis (ECN).

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	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Monitoring implementation and performance of objectives Monitoring and overseeing progress against goals and targets for addressing climate-related issues	The Governance, Nomination and Corporate Responsibilities Committee typically meets three/four times per year. Climate change strategy is discussed periodically and any recommendations are subject to Board approval. In 2018 the Board approved the new corporate environmental sustainability strategy. The Executive Committee of Novartis, which includes the CEO and other C suite leaders, meets monthly. Environmental sustainability strategy progress is monitored routinely, to include progress towards carbon neutrality. In 2018 climate strategy, investments in renewable energy (power purchase agreements) and climate resilience were included as agenda items.

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)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	Quarterly
Other C-Suite Officer, please specify (Global Head of Novartis Technical Ops)	Both assessing and managing climate-related risks and opportunities	As important matters arise
Other C-Suite Officer, please specify (Head of Novartis Business Services)	Both assessing and managing climate-related risks and opportunities	As important matters arise
Other, please specify (Environmental Sustainability Implementation Steering Committee)	Both assessing and managing climate-related risks and opportunities	As important matters arise
Other C-Suite Officer, please specify (Chief Ethics, Risk and Compliance Officer)	Both assessing and managing climate-related risks and opportunities	Quarterly
Other committee, please specify (ESG Committee)	Both assessing and managing climate-related risks and opportunities	Quarterly
Other committee, please specify (HSE Governance Board)	Both assessing and managing climate-related risks and opportunities	As important matters arise

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).

The CEO chairs the Executive Committee of Novartis (ECN). The Board is establishing and maintaining good governance practices and issuing board level company policies. The ECN is responsible for overseeing the daily implementation of Board policies which includes climate related issues. The members of the ECN are the CEO of Novartis, Chief People and Organization Officer of Novartis, Chief Ethics, Risk & Compliance Officer of Novartis, Chief Financial Officer of Novartis, President of Novartis Oncology, Chief Digital Officer of Novartis, President of Novartis Institutes for BioMedical Research (NIBR), the President of Novartis Pharmaceuticals, Group General Counsel of Novartis, Head of Novartis Technical Operations (NTO), Head of Global Drug Development, Chief Medical Officer for Novartis, CEO of Sandoz and Head of Novartis Business Services (NBS).

The CEO chairs the Environment, Social and Governance (ESG) Committee. The ESG Committee is the sub-committee of the ECN with oversight of the Novartis Trust and Reputation strategy. The Committee meets on a quarterly basis to assess progress on key action points as part of a quarterly ESG scorecard submission process, and then updates the wider Executive Committee and the Board on progress and challenges. Permanent members of the committee include the CEO, Group General Counsel, Head of Novartis Business Services, Chief Ethics, Risk and Compliance Officer, President of the Pharmaceuticals or Oncology Business Units (alternates each year) and permanent guests include the Group Head of Global Health and Corporate Responsibility (GH&CR), Head of Investor Relations, Head of Strategy, Head of Group Internal Audit and Head of Communications.

The Chief Ethics, Risk and Compliance Officer reports directly to the CEO, is a member of the ECN and is responsible for Enterprise Risk Management across Novartis. He reports quarterly to the risk committee of the Board about relevant risks and issues including climate related physical and transition risks as appropriate.

The Health, Safety and Environment (HSE) Governance Board is responsible for ensuring all HSE risks and issues including climate are managed appropriately. ECN members (The Head of NTO, the Chief People & Organization Officer and the Head of NBS) are standing members of the HSE Governance Board meetings. These roles were selected because the Heads of NTO and NBS have operational responsibility for 100% of our scope 1 and 2 carbon emissions and more than 50% of our scope 3 carbon footprint; the Chief People & Organization Officer has a key role in ensuring that environmental sustainability and climate change considerations are considered as part of routine business decisions because this is part of our culture. The HSE Governance Board also includes the Global Head of Health & Corporate Responsibility for Novartis, the Head of Real Estate and Facilities Services, the Global Head of HSE, and the Global Environment Head. The Global Environment Head is responsible for identifying climate related risks and issues, making recommendations for how they should be managed, developing metrics so progress against targets can be monitored, and seeking endorsement for implementation from the HSE Governance Board.

Novartis does not have a traditional COO but a Head of Novartis Business Services (NBS). The role reports directly to the CEO, is a member of the ECN and ensures the company has effective operational and financial procedures in place. NBS drives efficiency and effectiveness across Novartis by simplifying and standardizing services across HR, Real Estate & Facility Services, Procurement, IT, commercial and medical support activities and Finance. This person is also responsible for the design of the corporate environmental sustainability strategy, the management of environmental risks and for achievement of the associated environmental targets and goals, including climate. Execution of the strategy is spread across the business, with resources and programs in various portions of the company. Progress is monitored by the Environmental Sustainability Strategy Implementation Steering Committee which meets at least quarterly. The Head of NBS updates the CEO at the ESG Committee.

The Environmental Sustainability Strategy Implementation Steering Committee was created to convene at least quarterly to track progress on environmental strategy and resolve issues and barriers in execution of the strategy. Members include the Head NTO, Head NBS (ECN Members), Group Head of Communications & Advocacy, Group Head of Global Health & Corporate Responsibility, Head of Technical Research & Development (TRD), Chief Procurement Officer, Head Group Business Planning & Analysis (BPA) & Treasury and the Group Head of Real Estate and Facility Services (REFS).

C1.3

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

Yes

C1.3a

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

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

Members of the Executive Committee Novartis (ECN) are rewarded for meeting division specific absolute emission reduction targets on total scope 1, scope 2 and scope 3 greenhouse gas (GHG) in tons CO₂e in support of our environmental sustainability strategy which are to be carbon neutral own operations (scope 1 and 2) before the end of 2025 and to reduce our overall carbon footprint (scope 1, 2 and 3) before the end of 2030 from a 2016 baseline.

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Energy reduction target

Comment

The Head of Novartis Business Services (NBS) is rewarded for the corporate absolute emission reduction targets on total Scope 1 and Scope 2 GHG (in tons CO₂e), CO₂ emissions from vehicles fleet (in tons CO₂) energy efficiency and energy savings targets (savings from energy projects in USD, GJ and tCO₂e). The Head of NBS is also rewarded for ensuring the achievement of our 2030 climate target which is to reduce our overall carbon footprint (scope 1, 2 and 3) by half by 2030. Targets also include other environmental, HSE and sustainability targets.

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

The Head of Novartis Technical Operations (NTO) is rewarded for the corporate absolute emission reduction targets on total Scope 1 and Scope 2 GHG (in tons CO₂e), energy efficiency and energy savings targets (savings from energy projects in USD, GJ and tCO₂e). The Head of NTO is also rewarded for ensuring the achievement of our 2030 climate target which is to reduce our overall carbon footprint (scope 1, 2 and 3) by half by 2030. Targets also include other environmental, HSE and sustainability targets.

Who is entitled to benefit from these incentives?

Other, please specify (REFS Region/Country/Site Managers)

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

Real Estate and Facilities Services (REFS) and Novartis Technical Operations (NTO) Region/Country/Site Managers are rewarded for meeting group or division specific absolute emission reduction targets on total Scope 1 and Scope 2 GHG (in tons CO₂e), CO₂ emissions from vehicles fleet (in tons CO₂) and energy savings targets (savings from energy projects in USD, GJ and tCO₂e). On a group level, targets also include emission reduction and energy efficiency projects, as well as behaviour change related projects and related indicators.

Who is entitled to benefit from these incentives?

Other, please specify (Country managers)

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

Country managers are rewarded for reducing CO₂ emissions from the vehicles fleet and for energy efficiency of their commercial buildings.

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Recognition (non-monetary)

Activity incentivized

Emissions reduction target

Comment

All associates are eligible to be nominated for awards through REFS, HSE and GH&CR to recognize significant contributions to the company goals in reducing carbon footprint through efficiency and behaviours, or other sustainability projects such as water footprint, sustainable packaging and waste reductions. The 2018 Better World Awards recognized individuals and teams in six different categories and one award for outstanding individual achievement. Associates and teams could be nominated on projects, best practices or behaviors anywhere. Once nominations were submitted, a panel of expert judges reviewed and selected the winners. The 2018 award for Environmental Sustainability was presented to an associate who had been instrumental in Green Team activities in the past and helped create the One Novartis Environmental Sustainability Team for global engagement and sharing of best practices to reduce use of energy and reduce our carbon footprint while also supporting our other environmental goals related to waste and water.

Who is entitled to benefit from these incentives?

Chief Procurement Officer (CPO)

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

The Chief Procurement Officer reports to the Head of NBS. The CPO is rewarded for the corporate absolute emission reduction targets on total Scope 1 and Scope 2 GHG (in tons CO₂e) through energy supply projects (proportion of energy supplied from renewable sources). The CPO is also rewarded for ensuring the achievement of our 2030 climate target which is to reduce our overall carbon footprint (scope 1, 2 and 3) by half by 2030.

C2. Risks and opportunities

C2.1

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

	From (years)	To (years)	Comment
Short-term	0	2	Short-term horizons include previous goals as well as progress beyond those goals as applicable.
Medium-term	3	7	Medium-term horizon includes goals that are actionable and within programming and planning timeframes. There is a heavy focus on increasing the use of renewables and maximizing efficiency for own operations during the medium-horizon.
Long-term	8		Continuing to improve company performance is a focus for the long-term horizon, as is expanding efforts within the supply chain to improve Scope 3 performance by partnering with suppliers.

C2.2

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

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

C2.2a

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

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Six-monthly or more frequently	>6 years	The Head of Climate continuously reviews climate risk models and updates annually. Global level risk assessments are completed and shared with appropriate senior leadership across the company where applicable to help inform where more detailed risk assessments might be required to be generated initially or updated based on a perceived change in risk. Physical climate risk categories are generally flooding due to heavy precipitation, sea level rise, water scarcity and heat events. Climate transition risks include carbon pricing and carbon taxes. Those risks could apply to specific company sites or to broader regional supply chains.

C2.2b

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

At Novartis, risk and strategy processes are integrated in a cross-functional risk management approach, because both belong together. A holistic view of Novartis risks is consolidated in a Novartis Risk Compass and enables senior management, Executive Committee of Novartis and the Novartis Board of Directors to focus discussions on key strategic risks and align the company strategy and our risk exposure. The functions included are Corporate Finance, People & Organization, Business Continuity Management (BCM) & Novartis Emergency Management (NEM), Integrity & Compliance, HSE (Health, Safety, Environment), Information Security, Data Privacy, Quality Assurance and Third Party Risk Management (TPRM), thus including strategical direction, direct operations as well supply chain. This allows a holistic approach to determine our risk exposure followed by defining the scope of risk management activities, understanding the external and internal context in which Novartis operates, defining criteria of the potential impact of each risk and the likelihood that each risk will occur. The updated enterprise risk management (ERM) process includes a Risk Identification top down from all business units of Novartis as well as the supporting functions that is known as the One Risk Discussion. In addition, the Risk Identification is bottom up from the countries. All these outputs are then consolidated into the Risk Compass of Novartis, which is continually monitored by the Risk & Resilience team. This process is repeated annually.

A risk matrix, where the likelihood of a risk occurring is plotted against the impact on objectives if it does occur, gives guidance for prioritization. The matrix consists of four levels for the likelihood and four levels for impact: low, medium, high and very high. Novartis Risk Compass is composed also of four categories: strategic, operational, emerging & awareness risks which enables us to focus on the right risk with the right level of mitigation activities. All functions within the company define their threshold of substantive impact. E.g. the financial ranges to define substantive impact at the overall company level are <1%, 1-2%, >2-4% and >4% loss of annual sales. Other measures are time of a delayed product registration, findings in authority inspections, increased resilience, damage of reputation and or environment. Plotting the impact against the likelihood that this substantive impact will materialize in a 5 year time horizon, puts the different risks in different positions on a risk matrix and thus guides the senior management, Executive committee of Novartis and Novartis Board of Directors to focus on the key risks.

Novartis conducted both sensitivity and stress testing for climate and water through 2018 at the global level and piloted an in depth risk assessment methodology for the NIBR campus in Cambridge, MA. In partnership with the Massachusetts Institute of Technology (MIT) Joint Program on the Science and Policy of Global Change, Novartis conducted the first of a multi-phase project for long-term climate risk analysis starting with 67 key global sites across the US, Europe and Asia. An initial review is underway of more specific water risks in several river basins globally (Europe, Africa and Asia) that are significant to Novartis.

MIT Joint Program uses an Integrated Global System Model (IGSM) which is a flexible model that joins detailed models of the earth's climate system and the human driven economic system through combined use of the MIT Earth System Model (MESM) and the MIT Economic Projection and Policy Analysis (EPPA) model. The flood modelling uses sensitivity analysis to examine a changing set of inputs related to 24 hour precipitation data and combined impact of sea level rise and storm surge. The flood risk assessment is a stress test using multiple Monte Carlo simulations through a set of various transfer functions. The output of this model is aligned with a tailored Climate Change Vulnerability Index (CCVI) co-created by MIT Joint Program and Novartis, and is deployed in multiple Monte Carlo simulations globally to bound both probability and uncertainty of climate outcomes. This entire collaboration between Novartis and MIT Joint Program is a first of kind partnership for MIT with a commercial and industrial partner to design a credible, repeatable climate risk methodology for global operations. Once more granular climate data is derived, it is then combined with other risks and opportunities to form an impact valuation. Initial research at several sites shows that individual climate events may not qualify as substantive events financially, however site and regional data will be aggregated as developed over time to construct a global view of financial impact. Due to the effort involved, a full global financial analysis is not yet complete. Efforts to do so began in 2017 and have continued through 2018.

C2.2c

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Current regulations are always considered from a risk and opportunity perspective. Novartis operates globally, and has significant financial exposure to developing carbon pricing mechanisms. 42 national systems exist, and Novartis has operations in 17 of those nations as well as across the EU where an ETS is already in place. The rapid price increase associated with the EU ETS is an example of the increasing financial risk potentially posed by the carbon footprint from Novartis production facilities and supply chain located in the EU. Slovenia, for instance, is one country where we have significant exposed operations. In the last 12 months, the cost of allowances in the EU ETS has increased from just under €4 to just under €14. Multiple institutions expect the EU ETS costs to increase to between €40-€80 by 2021 and between €50-€100 by 2030. Methods to manage this risk: Novartis is pursuing rapid shifts in procurement of renewable energy that should complement ongoing efficiency projects that will drive demand reduction. These efforts in efficiency, adoption of renewables and offsets will be applied to reduce our current and emerging exposure to risk in this area. Previous CDP reporting has shown that the pharma sector has a consistent view that this is a sector risk. Carbon pricing is a transition risk that is included in risk discussions because of its financial impact. The relative position in the risk matrix varies by location and by year.
Emerging regulation	Relevant, always included	Emerging regulations are always considered from a risk and opportunity perspective. Novartis operates globally, and has significant financial exposure to developing carbon pricing mechanisms. 42 national systems exist, and Novartis has operations in 17 of those nations as well as across the EU where an ETS is already in place. The rapid price increase in the EU ETS is an example of the increasing potential financial risk posed by our carbon footprint from the Novartis production facilities and supply chain located in the EU. Slovenia, for instance, is one country where we have significant exposed operations. In the last 12 months, the cost of allowances in the EU ETS has increased from just under €4 to just under €14. Multiple institutions expect the costs within the EU ETS to increase to between €40-€80 by 2021 and between €50-€100 by 2030. Methods to manage this risk: Novartis is pursuing rapid shifts in procurement of renewable energy that will complement ongoing efficiency projects that will drive demand reduction. These efforts in efficiency, adoption of renewables and offsets will be applied to reduce our current and emerging exposure to risk in this area. Previous CDP reporting by various companies in the Pharma sector have shown consistently that this is a sector risk. Because of the direct impact to direct operations and the supply chain from flooding, severe weather events, water scarcity and heat events that can disrupt manufacturing. Carbon pricing and Climate related financial disclosures are transition risks that are included in risk discussions because of their potential financial impact. The relative position in the risk matrix varies by location and by year.
Technology	Relevant, sometimes included	Emerging technology for production techniques may introduce more stress in an area impacted by climate change, possibly resulting in a capacity constraint and a risk to the business, so Novartis considers consumption requirements in terms of the supply chain and system of systems. Water intensive production processes in an area impacted by water scarcity are a perfect example. Novartis production in India is an example of a location that may be impacted, but Novartis may face similar risks in other parts of Asia and in Europe.
Legal	Relevant, always included	In many cases, there are legal requirements to be met regarding carbon emissions trading schemes or other emissions. Regulatory risks are always included as part of the risk identification process. These risks are reviewed at least annually. Increasingly more focus is given to evolving legal risks that might occur related to the financial disclosure of climate related financial risks. Formal financial disclosures can impact investor decisions and as such should meet rigorous standards for data integrity and review before being included as part of mainstream financial reporting. Failure to do so potentially represents a risk to the company. The Task Force on Climate-related Financial Disclosures (TCFD) is a specific example that applies to Novartis in this area. In recent years CDP reporting has shown that major pharmaceutical companies including Novartis view this as a sector risk. This risk is not limited to any single region that Novartis operates in, although changes are most likely to happen in the EU because this is already being discussed by some governments in the region.
Market	Relevant, sometimes included	Within the pharmaceutical sector clinical needs determine which products are ultimately used. However, where patient outcomes are equivalent more companies such as Kaiser Permanente are giving preference to products that have a lower carbon footprint. It is therefore critical that Novartis includes market considerations as part of its risk assessment process. Market risks driven by interruption to supply chains are also considered. This has happened in the past due to climate and carbon related issues in multiple markets. For example some suppliers to Novartis that are located in China have been required to shut down because of concerns about poor air quality related to the consumption of energy and the associated emissions, including impacting the Pharma sector supply chain. In addition severe weather conditions in Houston impacted an Alcon facility, however, business continuity plans limited the impact. Previous CDP reporting and discussions with peer companies has shown that the pharma sector has a consistent view that this is a sector risk. Market considerations are included in risk discussions because of their financial impact. The relative position in the risk matrix varies by location and by year.
Reputation	Relevant, always included	Risks related to reputation are always considered. Novartis continues the work of a Third Party Risk Management work stream to manage conduct of suppliers, as well as focusing on reputational risk and opportunity related to climate. New norms in the market require transparency as well as performance. Lack of transparency also represents a reputational risk. Reputation on environmental sustainability can also have both negative and positive impact on talent management. Supplier audits from the Nordic countries and Kaiser Permanente's decision in the US to decarbonize their supply chain are early examples of specific actions that require sustained performance to maintain a reputation that allows for access to these markets. Previous CDP reporting and conversation with peer companies has shown that the pharma sector has a consistent view that this is a sector risk. There is no regional limitation on this risk.
Acute physical	Relevant, always included	Sudden physical impact of climate change is always included in the consideration of risks most notably in relation to the impact of flooding, severe weather events, heat events and water scarcity. Acute physical risks include flooding from sea level rise, flooding from heavy precipitation events, water scarcity, heat events and changing storm patterns. In the last year, Novartis facilities and associates in the US have been impacted by flooding from severe weather events in the Southern portion of the US. Previous CDP reporting by various companies in the pharmaceuticals sector have demonstrated that this is a sector risk because of its direct impact on operations and the supply chain. Novartis has operations in the US, Europe and Asia that may experience these impacts more than some other regions.
Chronic physical	Relevant, always included	Chronic physical events such as persistent flooding that disrupts transportation and logistics networks needed to support normal business are considered, as are emerging trends in regional heat profiles that may overwhelm installed cooling capacity. Novartis operations in Jakarta (Indonesia) and Cambridge (US) are two examples of regional locations that may face chronic physical impact in the future. These impacts may prevent our associates from reaching their place of work and our buildings because of damage to infrastructure (e.g., utilities located in basements). Our work with Massachusetts Institute of Technology (MIT) in particular has highlighted impacts to our Cambridge Campus over the next 40 years which we are taking action to mitigate.

	Relevance & inclusion	Please explain
Upstream	Relevant, sometimes included	Climate stress on interdependent systems may impact grid resilience and bio diversity, so these are topics that are considered consistently but not addressed every single year. Emerging discussions during this reporting year are likely to lead to more frequent and holistic considerations of these risks to availability of raw materials. Other upstream risks that specifically had focus during 2018 are the risks possibly posed to the business by increasing carbon pricing schemes. 80% of Novartis carbon footprint is in Scope 3 emissions, which means that the company potentially has a large risk exposure that could vary based on energy intensity and physical location of key suppliers. Since Novartis has several hundred thousand suppliers in the entire network, focusing on firms with the most impact will be critical. This has sometimes been included in the past, and is likely to be always included in the future as more data becomes available to quantify scope of risk. Wildfires in California that have been made worse by ideal conditions created by heat events and water scarcity related to climate change have resulted in brown outs and black outs in portions of Northern and Southern California that directly impacted businesses that support Novartis sites. Previous CDP reporting and conversations with peer companies has shown that the pharma sector believes supply chain disruption may have a sector impact.
Downstream	Relevant, sometimes included	Climate impact on socio-economic systems can disrupt physical distribution supply chains, and also result in regional insecurity and instability that might make it difficult to deliver medicine to patients, so this is considered consistently but not addressed in every single year. Emerging discussions during this reporting year are likely to lead to more frequent and holistic considerations of these risks. Transportation networks in Africa are critical to allow patient access to medicine and healthcare, and studies have shown that severe weather events from climate change are likely to have a catastrophic effect on African roads and transportation networks. This would have a direct impact on a patient population that Novartis serves.

C2.2d

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

At Novartis, risk and strategy processes are integrated in a cross-functional risk management approach, because both belong together. A holistic view of Novartis risks is consolidated in a Novartis Risk Compass and enables senior management, Executive Committee of Novartis and the Novartis Board of Directors to focus discussions on key strategic risks and align the company strategy and our risk exposure. The functions included are Corporate Finance, People & Organization, Business Continuity Management & Novartis Emergency Management, Integrity & Compliance, Corporate Legal, HSE (Health, Safety, Environment), Information Security, Data Privacy, Quality Assurance and Third Party Risk Management (TPRM), thus including strategical direction, direct operations as well supply chain. This allows a holistic approach to determine our risk exposure followed by defining the scope of risk management activities, understanding the external and internal context in which Novartis operates, defining criteria of the potential impact of each risk and the likelihood that each risk will occur. The updated ERM process includes a Risk Identification top down from all business units of Novartis as well as the supporting functions that is known as the One Risk Discussion. In addition, the Risk Identification is bottom up from the countries. All these outputs are then consolidated into the Risk Compass of Novartis, which is continually monitored by the Risk & Resilience team. This process is repeated annually, and information like the global climate risk assessment is fed into this process.

A risk matrix, where the likelihood of a risk occurring is plotted against the impact on objectives if it does occur, gives guidance for prioritization. The matrix consists of four levels for the likelihood and four levels for impact: low, medium, high and very high. Novartis Risk Compass is composed also of four categories: strategic, operational, emerging & awareness risks which enables us to focus on the right risk with the right level of mitigation activities. Plotting the impact against the likelihood that this impact will materialize puts the risks in different positions on a risk matrix and thus guides senior management, ECN and Novartis Board of Directors to focus on the key risks.

Normal business continuity planning that anticipated impacts of severe weather events resulted in minimal disruption to operations in the aftermath of Hurricane Michael, and these basic business continuity activities will have a greater focus in the future informed by current climate risk scenario analysis fed into the One Risk process.

Novartis has taken a proactive approach towards existing and forthcoming legal schemes on greenhouse gas (GHG) emissions as set forth in its corporate environmental sustainability strategy approved in 2018. The new strategy aims to achieve carbon neutrality for own operations by 2025 through efficiency, use of nothing but renewable energy and credible offsets, and also aims to reduce Novartis' value chain carbon footprint for Scopes 1, 2 and 3 by 50% in 2030. Novartis and their supply chain may also be impacted

more broadly when prices of carbon will become more fully integrated into prices of goods and services. Novartis operates globally, and has significant potential financial exposure to developing carbon pricing mechanisms. 42 national systems exist, with Novartis operations in 17 of those nations which includes the EU where an Emissions Trading Scheme (ETS) is already in place.

Information on risk exposure related to carbon pricing as a transition risk has directly impacted the Novartis utilities procurement strategy and hedging execution. Increased costs in the non-energy costs of electricity have led procurement to rapidly accelerate procurement of renewable energy in order to contain possible cost increases in the future. Novartis with the support of a third party started a full review in 2018 of carbon emissions and existing use of energy attributes to reduce emissions, and the results have been used to influence energy procurement decisions as well as renewable energy attribute procurement in 2018 and moving forward. This analysis also contributed to the Novartis decision to pursue a Pan-European renewable power purchase agreement to limit this risk through reduced emissions.

Information on physical risks to various company sites has been provided to key personnel developing strategy and footprint plans for production operations. This information can serve to validate planned strategy or influence developing strategy. Those decisions are made as a result of many different factors, and climate risk is one data set provided to augment other information used in footprint determinations. Each of these examples also represents an opportunity for the company. Sound decisions in both of these areas can lower costs, lead to increased effectiveness and profitability over the short, medium and long term horizons.

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

Transition risk

Primary climate-related risk driver

Policy and legal: Increased pricing of GHG emissions

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Novartis has taken a proactive approach towards existing and forthcoming legal schemes on greenhouse gas (GHG) emissions as set forth in its Corporate Environmental Sustainability Strategy approved in 2018. The new strategy aims to achieve carbon neutrality for own operations by 2025 through efficiency, use of nothing but electricity and credible offsets, and also aims to reduce Novartis' value chain carbon footprint for Scopes 1, 2 and 3 by 50% in 2030. Novartis and its supply chain may also be impacted more broadly when prices of carbon will become more fully integrated into prices of goods and services. Novartis operates globally, and has significant potential financial exposure to developing carbon pricing mechanisms. 42 national systems exist, and Novartis has operations in 17 of those nations as well as across the EU where an ETS is already in place. Specifically Novartis has

assessed climate related risks associated with its energy procurement strategy. This has resulted in the strategy being revised to put a clear focus on renewable energy supply. Information on risk exposure related to carbon pricing, as a transition risk, has directly affected how Novartis procures energy and hedges against rising costs. Increased costs in the non-energy related charges for electricity have led Procurement to rapidly accelerate the procurement of renewable energy to contain possible cost increases in the future. Novartis, with the support of a third party, has started to review its use of energy attributes to reduce emissions. This analysis contributed to the Novartis decision to pursue a Pan-European renewable power purchase agreement to mitigate future costs of carbon.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-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)

62000000

Potential financial impact figure – maximum (currency)

93000000

Explanation of financial impact figure

Previously, purchased energy costs have exceeded USD 311 million annually. Potential future increases in both energy prices and the implementation of carbon costs may have a stronger impact of estimated 20-30% of energy cost in the long-term, i.e. USD 62-93 million per year. Estimates are based on the range of expected price increases in trading schemes and proposed carbon taxes. While these are highly variable in projections, the rapid price increase in the EU Emissions Trading Scheme (ETS) is an example of the increasing financial risk posed by our carbon footprint. In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030.

Management method

Increased costs have led Procurement to rapidly accelerate the procurement of renewable energy. Novartis, with the support of a third party, has started to review its use of energy attributes to reduce emissions. This analysis contributed to the Novartis decision to pursue a Pan-European renewable power purchase agreement to mitigate future costs of carbon. Novartis has also endorsed an internal carbon price of USD 100/tCO₂e as shadow price, anticipating the increase in real costs of carbon to rise to USD 40-80/ton CO₂e by 2025, and to USD 60-100/ton by 2030 as a result of both regulatory and carbon market dynamics. Efforts in efficiency, adoption of renewables and offsets will be applied to reduce potential exposure to carbon pricing as rapidly as possible. Consolidated tracking of trends in non-energy costs as well as possible exposure to pricing schemes based on energy intensity and physical location are being used by procurement to adjust procurement and hedging strategies to reduce volatility and exposure. Cost of management includes internal annual costs for three associates (part-time) and consultant support.

Cost of management

1000000

Comment

While the costs to manage the existing EU ETS scheme within the company are limited, the expansion of schemes into other markets will require additional management focus and efforts. Efforts to align with suppliers will also take time and resources that have not been determined yet. As EU-ETS moves into Phase IV in 2021, any reduction in free allowances could further increase annual management costs between USD 0.6 million and USD 2.2 million.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Increasing requirements for transparency and credibility in sustainability reporting are being seen in both regulatory and voluntary reporting. The number of reports required and requested, the increase in both the number and complexity of questions and the growing demand for transparency all drive increased costs to staff and respond as well as to track data in a more granular and verifiable manner. The size of the company and its presence in 110 markets globally mean that this is a larger risk to Novartis than some smaller companies. Additionally, as a pharmaceutical company, many external parties are routinely focused on emissions from operating sites whether it is carbon or water. All labor efforts to manage increased reporting (compulsory and voluntary) represent an opportunity cost in actions that could be taken to actually reduce emissions through execution of programs, as those charged with designing and executing programs are frequently the same staff who would prepare the reports.

Time horizon

Short-term

Likelihood

Virtually certain

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)

1000000

Potential financial impact figure – maximum (currency)

5000000

Explanation of financial impact figure

Increased costs for more widespread and rigorous reporting requirements (compulsory and voluntary) will potentially drive increases in cost of goods sold. This will result from costs in the supply chain in addition to internal costs, but those costs are not well defined yet. Increased costs of tracking the impact of carbon pricing and then reporting the risks and opportunities drives up resources devoted to tracking data, analyzing data and crafting appropriate responses to government, private sector and non-profit reporting agencies. Additionally, the expectation that these detailed reports are signed off at higher levels in the company expand the network of staff impacted in drafting and review processes, as well as increasing labor costs as a result of the seniority of associates involved. These costs represent opportunity costs for internal labor resources as well as external costs for consulting and technical services to validate and report data. Costs are based on labor rates.

Management method

Standardized responses are being developed to streamline reporting processes, and requirements for carbon reporting have been written into appropriate contracts with staff and companies executing utilities procurement. This has reduced some internal workload at the site levels, but those savings are likely not enough to offset growing labor and service costs. Cost of management is the same as the financial impact, and is based on aggregated cost of labor costs across multiple pay grades in addition to external consultant fees. This is a conservative figure, and likely understates the true costs. Cost of management includes internal annual costs for three associates (part-time) and consultant support.

Cost of management

1000000

Comment**Identifier**

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Technology: Costs to transition to lower emissions technology

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

In order to achieve more rapid progress in carbon footprint reductions to align to a science based target, significant investments may be required across the company. While many of these investments should involve normal replacement and updating of equipment like heating, ventilation and air conditioning to the most efficient current standards as a result of normal life cycle replacement, other investments may need to be accelerated. Additionally, some planned investments will likely require a higher level of performance in efficiency and carbon reduction than previously anticipated. Large quantities of water are used at several Novartis sites to cool production processes and /or buildings (e.g., the Basel Campus in Switzerland used 13 million m3 in 2018). Novartis encourages the use of water for cooling at sites where water is abundant. This saves significant quantities of energy and associated greenhouse gases (GHG) emissions. In the unlikely event of a longer-term future when sites could no longer abstract cooling water from the aquatic environment due to e.g. climate change resulting in water shortage, the use of mechanical chillers would be required to cool the production processes. This would result in significantly higher operating costs (estimated 10-20%) through increased energy usage and significantly higher GHG emissions (estimated 10-20%). The higher costs and higher GHG emissions would be considered a substantive financial risk to the organization. Possible future increases in energy prices and the implementation of carbon costs may have a stronger impact of estimated 20-30% of the USD 311 million energy cost in the long-term, i.e. a financial impact of USD 62-93 million per year.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

High

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)

311000000

Potential financial impact figure – maximum (currency)

404000000

Explanation of financial impact figure

Total energy costs were approximately USD 311 million in 2018, and while prices had been previously stable we have seen increases in the price of energy recently, both in direct costs of production and non-energy costs. Since the introduction of our energy program in 2008 we have reduced annual energy costs by USD 76 million through projects compared to a business as usual scenario. Possible future increases in energy prices and the implementation of carbon costs may have a stronger impact of estimated 20-30% of the USD 311 million energy cost in the long-term, i.e. a financial impact of USD 62-93 million per year.

Management method

Previously, sites identified and funded projects to reduce energy consumption and carbon footprint. Energy projects over the last 5 years had an average payback of 2.6 years. Management costs for the energy management programs at Divisions and sites of app. USD 4-5 million per year were largely over-compensated by the savings of so far USD 71 million p.a. in energy costs achieved by the program over last 7 years; i.e. no additional costs but rather attractive cost reductions overall. However, many of the future investments will be more expensive and require longer paybacks and more focused capital investment. Accordingly, standards for judging and approving these capital investments are being refined to allow a more streamlined analysis of sustainability benefits when making major capital investments. It is anticipated, though, that these investments will continue to provide a positive net present value. Costs to manage were validated in 2018 and include estimates of capital investments needed based on normalized costs per technology based on carbon reductions. Those have been extended out through the next 12 years, planning costs have been added and a discount rate has been applied. Cost of management is estimated to include labor costs (USD 2 million), capital costs and carbon pricing costs across various Novartis offices.

Cost of management

406000000

Comment

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Physical risk

Primary climate-related risk driver

Chronic: Changes in precipitation patterns and extreme variability in weather patterns

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Novartis' risk related to climate change exists in three areas: water scarcity, flooding from sea level rise and severe weather events, and heat events. All of these have the ability to create physical property destruction, interruption to business and impact on our associates and the patient communities that we support. Changes in precipitation patterns, coupled with sea level rise in some locations, likely represent a growing risk to the company and to its supply chain. Previous patterns of flooding will likely no longer be historically accurate, which means that engineering estimates for the built environment will be inadequate, both on site and in the surrounding communities. In the past year alone, Novartis associates in Houston, TX and Cambridge, MA both saw extended disruptions in their communities (flooding, power outages, disruption in transportation networks) as a result of unusual storm events and patterns. Extended heat events may eventually overwhelm installed cooling capacity, resulting in variations in temperature and humidity in research and production operations that are unacceptable.

Time horizon

Long-term

Likelihood

More likely than not

Magnitude of impact

Medium

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)

65000000

Potential financial impact figure – maximum (currency)

71000000

Explanation of financial impact figure

Sites may have to invest in the reinforcement of site infrastructure (larger storm water run-off, specific building protection, greater cooling capacity, etc.), which is estimated at USD 25 to 31 million overall. Additionally, site engineering might use 5-10% more resources over several years when such flood protection projects must be implemented. These additional engineering costs are assessed to be USD 0.4-0.5 million in total over next 5 years. Detailed risk assessments leveraging outside partners would also require financial resources. Financial estimate of impact is based on the working hypothesis of a possible occurrence of 8 events in 12 years having a maximum impact of USD 5 million per event in physical damage and disruption to business. That number is based on very loose assumptions and will change as more data becomes available in future years through more detailed modelling and risk assessment in collaboration with the Massachusetts Institute of Technology.

Management method

Actions related to flood protection are aspects of site engineering and facility management. Risks are assessed in the annual risk evaluation process, where natural disasters are a regular part of and are prepared site by site. To avoid such events, specific risk assessment and consequently necessary protection measures might become necessary. This may lead to higher costs to keep such risks within acceptable limits. Initial global risks are being assessed in collaboration with the Massachusetts Institute of Technology, and have been shared with applicable production, research and facilities staff. Use of the MIT Global Earth Systems Model (GESM) should create more accurate information about risks in water scarcity, flooding and heat events. A current campus risk assessment will serve as the model for subsequent detailed risk assessments globally that involve global, regional and local staff, to make informed decisions on acceptable level of risk and the physical investments needed. This could be shared as needed with group level business continuity, risk and strategy staff in a coordinated effort to assess and manage risk globally to our sites and to our integrated supply chain. The estimated cost (USD 32 million) includes the annual sponsorship fees for the MIT joint

program, labor costs internal to the company, external consulting fees for detailed risk assessments and the possible costs of adaptation measures to reduce risk exposure.

Cost of management

32000000

Comment

Identifier

Risk 5

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Market: Other

Type of financial impact

Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment)

Company- specific description

Currently Novartis sells multiple products based on natural compounds. One specific example is Sandostatin which generates roughly USD 1.6 billion in net sales globally as part of oncology. Disruption of this supply chain due to any reason, including loss of biodiversity, could in theory eliminate or dramatically reduce that in a smaller amount or all the way up to USD 1.6 billion in sales. Also, increasing efforts to design biologically based medicines will be impacted by a loss in biodiversity if fewer natural compounds are available for research, development and production of medicines. Various medicines using natural compounds may have different levels of risk.

Time horizon

Long-term

Likelihood

About as likely as not

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

0

Potential financial impact figure – maximum (currency)

1600000

Explanation of financial impact figure

Current Novartis products based on natural compounds include Sandostatin, which generates roughly USD 1.6 billion in net sales. Disruption of this supply chain could dramatically reduce or eliminate that up to the maximum of USD 1.6 billion in sales. Additionally, prices for agricultural commodities may increase by 20-30% over the next 10 years, which could have potential impact on products using natural compounds. This could potentially drive cost of goods sold up in that sector of our business and reduce margins for the portion of our USD 51 billion annual net sales that are dependent on agricultural commodities.

Management method

Novartis has staff that routinely work to enhance supply chain resilience, regardless of the type of potential disruption. Alternative suppliers and sources are implemented where necessary. Significant overall risks are assessed in the annual risk evaluation process, including disruptive events, and are prepared site by site. To avoid such events, specific risk assessment and consequently necessary protection measures might become necessary. This may lead to higher costs to keep such risks within acceptable limits. Initial global risks are being assessed in partnership with the Massachusetts Institute of Technology (MIT), and have been shared with production, research and facilities staff. A pilot program took place in one location this year in order to create a framework for replication of climate risk assessments at sites deemed to be at greatest risk. Use of the MIT Global Earth Systems Model (GESM) should create more accurate information about risks in water scarcity, flooding and heat events. A current site risk assessment will serve as the model for subsequent detailed risk assessments globally that involve global, regional and

local staff, to make informed decisions on acceptable level of risk and the physical investments needed. This could be shared with applicable group level business continuity, risk and strategy staff for coordinated risk management. Management costs include aggregated labor costs and external consulting support.

Cost of management

1150000

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?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Type of financial impact

Reduced operating costs (e.g., through efficiency gains and cost reductions)

Company-specific description

In general, Novartis investments have yielded a 2.6 year payback. Applied against a USD 311 million annual spend on energy, this would have significant financial benefit to the company. This could lower the cost of goods sold, improving the bottom line and freeing resources to be spent on research and development efforts for new drugs. Even a 10% improvement each year would deliver USD 31 million each year, quickly adding to over USD 100 million in 3-4 years of extra cash flow, providing benefit in the short to medium horizon. Some of those benefits may be reduced as greater efficiency makes it more difficult to achieve short term savings and rapid return on investment (ROI), thus projections beyond a medium horizon are not provided.

Time horizon

Current

Likelihood

Virtually certain

Magnitude of impact

Medium-high

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)

93000000

Potential financial impact figure – maximum (currency)

124000000

Explanation of financial impact figure

Reduction in energy use not only reduces expenses, but also results in absolute emissions reductions and reduces the exposure to future carbon pricing schemes globally. Previously, purchased energy costs have exceeded USD 311 million annually. Potential future increases in both energy prices and the implementation of carbon costs may have an impact of estimated 20-30% of energy cost in the long-term, i.e. USD 62-93 million per year. In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the market stability reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Many institutions expect the costs within the EU ETS alone to increase to between €40-€80 by 2021 and between €50-€100 by 2030. The combination of USD 62-93 million annually plus USD 31 million annually comprise the financial benefit through efficiency and avoided emissions.

Strategy to realize opportunity

The internal price of carbon along with carbon footprint reduction goals should drive investments in new technology, upgraded technology as part of equipment maintenance and refresh and incentive programs to drive absolute reductions. Costs to implement and the true long term opportunity are still being developed, however, initial estimates suggest that at least USD 33 million will be required. Examples include investments in energy efficiency at the Shanghai campus that delivered over 20% reductions in energy consumption.

Cost to realize opportunity

33000000

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Type of financial impact

Reduced exposure to future fossil fuel price increases

Company-specific description

Novartis is exposed to carbon pricing because it has significant operations in Europe. The emerging options for Power Purchase Agreements (PPA's) and expanding renewable generation in Europe mean that Novartis is able to obtain renewable energy for its own operations and potentially to negotiate PPA's for key supply chain partners that are co-located in Europe. This will help to reduce its scope 3 emissions. Rapid adoption of renewable energy can result in lower carbon, lower costs and greater business continuity depending on the specifics of the project. In some cases, more than one of those benefits may accrue. Novartis can prioritize projects based on those three general opportunities to improve business results. In markets like China, reducing carbon footprint may create opportunities as the nation develops carbon pricing schemes. In markets like India, reducing consumption and shifting to renewables can control variability in costs. In all other markets, rising costs of energy, both in production costs and non-energy costs, can be limited by efficiency and investment in renewable generation. Decarbonizing our products may also make them more attractive to companies like Kaiser Permanente, who have pledged to decarbonize their supply chain.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

High

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)

62000000

Potential financial impact figure – maximum (currency)

93000000

Explanation of financial impact figure

Reduction in energy use not only reduces expenses, but also results in absolute emissions reductions. That decrease in emissions also reduces the exposure to future carbon pricing schemes globally as described in the carbon pricing section of this submission. Previously, energy costs have exceeded USD 311 million annually. Future increases in both energy prices and the implementation of carbon costs may have a stronger impact of estimated 20-30% of energy cost in the long-term, i.e. USD 62-93 million per year.

Strategy to realize opportunity

Power purchase agreements for access to renewable energy projects that are on-site and offsite will likely be the primary approach. Some balance sheet financing of onsite renewables may take place in markets that don't support a procurement strategy leveraging PPAs. In an effort to integrate these risks into normal business, Novartis has also endorsed an internal carbon price of USD 100/tCO₂e as shadow price, anticipating the increase in real costs of carbon to possibly rise to USD 40-80/ton CO₂e by 2025, and to USD 60-100/ton by 2030 as a result of both regulatory and carbon market dynamics. Novartis is pursuing rapid shifts in procurement of renewable energy that should complement ongoing efficiency projects that will drive demand reduction. These efforts in efficiency, adoption of renewables and offsets will be applied to reduce potential exposure to carbon pricing as rapidly as possible. Consolidated tracking of trends in non-energy costs as well as exposure to pricing schemes based on energy intensity and physical location are used by procurement to adjust procurement and hedging strategies to reduce volatility and exposure.

Cost to realize opportunity

3300000

Comment

Costs in many cases are limited to legal fees for power purchase agreements and isolated cases of balance sheet financing of on site generation. Cost does not include existing utility bill costs.

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resilience

Primary climate-related opportunity driver

Other

Type of financial impact

Increased reliability of supply chain and ability to operate under various conditions

Company-specific description

Efforts to establish climate resilience in our own operations as well as working to establish collaborative climate resilience in our communities may allow Novartis to operate when others are unable to continue. By collaborating with communities, this could enhance brand value as well as positioning Novartis to capture market share if production of a competitor's comparable medicine is interrupted as a result of climate issues. Many of our locations are along coasts that are more vulnerable to flooding, as we have seen in Cambridge, MA in the last year. Additionally, more of our sites are being subjected to extended heat events like Basel. Water scarcity is becoming more of an issue in markets we operate in like India. Emphasis on recognizing and reacting to changes in our locations will be key to enduring stability and profits in those markets, potentially providing resilience that our competitors may not develop. Climate change could decrease water availability so taking action to reduce water consumption gives us the opportunity to build a more sustainable business and to continue to meet the needs of our patients. Novartis production of biosimilars relies on abundant local water supplies so this represents a risk to the company in water scarce areas. The financial benefit of decreased water consumptions varies by location. However, in one of our manufacturing sites in Turkey, the water consumption was reduced and the quality of effluent was increased by the installation a of a reverse osmosis-ultrafiltration system which allowed a proportion of the water to be reused within the site. The project cost USD 600,000, but the benefit was a water consumption reduction by 14% and a cost reduction of USD 100,000 per year.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium-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)

25616000

Potential financial impact figure – maximum (currency)

41946200

Explanation of financial impact figure

Exploration of financial impact began recently, and is underway. An initial working hypothesis for internal debate is that 8 events could occur over a 12 year period, each costing the company a maximum of USD 5 million in physical costs and disruption to business. It is not clear if that figure will prove to be accurate, but work continued in 2018 in partnership with the Massachusetts Institute of Technology (MIT) to assess possible risks. Costs to realize opportunity are based on costs for risk assessments and limited physical adaptation. In the meantime we are able to estimate the benefit to the business of reducing its water consumption. If we achieve our 2025 target we will save around 6 million m3. Applying the Novartis internal water costs of 3.66 USD / m3, which was determined during the development of our new environmental sustainability strategy and includes the full costs of water, we were able to estimate potential positive financial impact.

Strategy to realize opportunity

Conduct global climate risk assessments that will inform more detailed risk assessments. Once damage curves to include business impact of interruptions are assessed, that information can be shared with applicable associates working on strategy. Global risks are being assessed in partnership with the Massachusetts Institute of Technology, and can be shared with applicable production, research and facilities staff. Use of the MIT Global Earth Systems Model (GESM) should create more accurate information about climate risks. This can be shared with applicable group level business continuity, risk and strategy staff in a coordinated effort to assess and manage risk globally to our sites and to our integrated supply chain. Details about modelled climate risk that don't involve proprietary data should be shared with the communities where our analysis is taking place. This would allow progress in building resilience across the system of systems that are required to support normal business operations and provide significant reputational benefit as well as practical benefit. To realize the benefits of reduced water consumption we anticipate the need to invest in capital improvements for production and water processing. It is estimated that approximately USD 0.6 million will need to be invested at each of the top 30 Novartis locations and around USD 60 thousand at each of the remaining smaller locations meaning that an overall investment of around USD 30 million will be needed.

Cost to realize opportunity

30000000

Comment

C2.5

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

	Impact	Description
Products and services	Impacted	Our products and services have both threat and opportunity. Threats to the business include rising costs due to carbon pricing frameworks designed to achieve climate mitigation, risks to reputation if we don't behave as a responsible corporate citizen, loss of biodiversity that will disrupt our supply chain and the physical impacts from climate change that will introduce risk into our sites, the communities we serve and our patients. These impacts are being felt through EU ETS in Europe for a pricing scheme, and the other impacts may occur in multiple markets. Increased costs could impact the bottom line and reduce funding for research and development of new drugs. Previously, energy costs have exceeded USD 311 million annually. Future increases in both energy prices and the implementation of carbon costs may have a stronger impact of estimated 20-30% of energy cost in the long-term, i.e. USD 62-93 million per year. Estimates are based on the range of expected price increases in trading schemes and proposed carbon taxes. While these are highly variable in projections, the rapid price increase in the EU ETS is an obvious example of the increasing financial risk posed by our carbon footprint. In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030. This would have a medium-low impact as a result of diversion of funds.
Supply chain and/or value chain	Impacted	Due to the integrated nature of systems of systems, our supply chain could be impacted by heat, drought, flooding and sea level rise. Those impacts would be felt through decreasing biodiversity due to heat and drought. We have already seen disruptions to supply chain operations in multiple countries due to flooding and carbon emissions. Specifically India, Japan and Houston have seen flooding disrupt supply chain operations related to transportation and logistics. Additionally, we have seen closures in multiple commercial supply chains in China as a result of emissions during the autumn in multiple years recently, and anticipate that this disruption may continue. Alternatively, our ability to work with our supply chain to reduce their footprint will reduce their potential exposure to climate pricing schemes, reputational risk and operational disruptions. This would have a medium impact.
Adaptation and mitigation activities	Impacted	Risk to the operations and supply chain may exist due to flooding, sea level rise, heat and drought. As described elsewhere in the submission, all of these variables can impact the ability of sites to function, associates to get to work and the supply chain to deliver needed goods and services. An opportunity exists for Novartis to identify risks, recognize the financial impact and take appropriate actions to reduce or manage that risk. By doing so in advance of other companies, Novartis could maintain market share and in some cases increase market share against competitors if their operations are disrupted as a result of climate change due to a lack of assessment and planning. Additionally, Novartis can benefit in reputation and talent management by leading in climate risk assessment and climate adaptation. This would have a medium-low impact.
Investment in R&D	Not yet impacted	Novartis may face risks if it does not recognize shifting markets and market conditions as heat and humidity increase in multiple markets as a result of climate change. Changes in non-communicable diseases may represent challenges and opportunity as disease vectors change and the most effective way to deliver medicine in those changing environments may evolve. While not impacted yet, this may have a medium-low impact in the future. It will likely take 2-3 years before adjustments are made to the strategic R&D investment cycles as a result of climate related issues.
Operations	Impacted	Operations may be impacted by climate change due to disruptions in the power grid, transportation and logistics networks supporting movement of associates, goods and services. Additionally, operations may be impacted by increasing non-energy costs of electricity. In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030. Aggressive movement in efficiency and adoption of renewables can eliminate that risk and turn it into a competitive advantage for the company in reducing the exposure to carbon pricing described elsewhere in this submission. This will have a medium impact.
Other, please specify	We have not identified any risks or opportunities	While we recognize risks in most categories as described above, it is still too early to describe in specific financial detail how the other risk and opportunity elements may impact the business. Each of the risks and opportunities will be examined in priority order over time.

C2.6

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

	Relevance	Description
Revenues	Impacted	In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030. These projected cost increases as well as increasing energy costs are consistently briefed to impacted Chief Financial Officers (CFOs) within Novartis so financial planning can be adjusted, and mitigation strategies put into place, usually through efficiency and shift to renewables.
Operating costs	Impacted	In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030. These projected cost increases as well as increasing energy costs are consistently briefed to impacted Chief Financial Officers (CFOs) within Novartis so financial planning can be adjusted, and mitigation strategies put into place, usually through efficiency and shift to renewables.
Capital expenditures / capital allocation	Impacted	In the last 12 months, the cost of allowances in the EU ETS has increased from €15 to €27, driven in part by the introduction of the Market Stability Reserve in 2019 in attempt to reduce the amount of allowances in the market and stimulate the focus on emissions reduction by industry. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-80 by 2021 and between €50-100 by 2030. These projected cost increases as well as increasing energy costs are consistently briefed to impacted Chief Financial Officers (CFOs) within Novartis so financial planning can be adjusted and mitigation strategies put into place. This is usually achieved through efficiency, the shift to renewables and appropriate physical / process adaptations which are implemented and disclosed in alignment with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. The increasing price of energy and increasing prices of carbon pricing are accounted for in the implementation of an internal price of carbon. That shadow price of USD 100 per ton provides a useful estimate of the increasing real costs of carbon in operations, and is guiding capital investments in efficiency and renewables. This may have a medium impact.
Acquisitions and divestments	Not evaluated	This has not been evaluated yet.
Access to capital	Not impacted	No impact has been indicated in early discussions.
Assets	Impacted for some suppliers, facilities, or product lines	Hypothetical possible impact of 8 severe weather events over a 12 year period with a maximum impact of USD 5 million per event for a total of USD 40 million assessed in combination with MIT Joint Program and internal staff.
Liabilities	Not evaluated	This has not been evaluated yet.
Other	We have not identified any risks or opportunities	Evaluation of multiple other factors will continue as this effort becomes more mature. Highest priority will likely be given to larger impact areas, and evaluation may be a multi-year process to include refreshing valuations of areas with definite impact.

C3. Business Strategy

C3.1

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

Yes

C3.1a

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

Yes, qualitative and quantitative

C3.1c

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

In 2018, building trust with society became a top strategic priority for Novartis. We aim to hold ourselves to the highest ethical standards, be part of the solution on pricing and access to medicines, tackle complex global health challenges and do our part as a responsible global citizen. The most significant decision in 2018 related to climate was the adoption of a new company wide environmental strategy. This includes a focus on energy and climate resilience, with the aspiration to become carbon neutral by 2025 and plastic and water neutral by 2030. In addition to Novartis using only renewable energy (carbon neutral own operations) scope 1 and 2, the strategy set a target to reduce our overall carbon footprint (scope 1, 2 and 3) by half by 2030 therefore including business travel, employee commuting, and the use of our products. This will be achieved by meeting our newly approved Science Based target (SBTi) of a 35% reduction in absolute carbon emissions across our value chain and the additional use of credible, transparent carbon sequestration projects (offsets) through natural climate solutions including forestry projects owned by Novartis. This decision will drive operational, financial and business development decisions in the future as part of the strategic framework.

At Novartis risk and strategic processes are integrated in a cross-functional risk management approach because they belong together. A holistic view of Novartis risks is gathered and consolidated in the Novartis Risk Compass which enables senior management, Executive Committee of Novartis and the Novartis Board of Directors to focus discussions on key strategic risks and align the company strategy and our risk exposure. The functions included are Corporate Finance, People & Organization, BCM & Novartis Emergency Management, Integrity and Compliance, HSE (Health, Safety, Environment), Information security, Data privacy, Quality assurance and Third Party Risk Management (TPRM), thus including strategical direction, direct operations and supply chain. This allows holistic approach to determine our risk exposure followed by defining the scope of risk management activities, understanding the external and internal context in which Novartis operates, defining criteria of the potential impact of each risk and the likelihood that each risk will occur. The updated enterprise risk management (ERM) process includes a risk identification top down from all business units of Novartis as well as the supporting functions that is known as the One Risk Discussion. In addition, the risk identification is bottom up from the countries. All these outputs are then consolidated into the Risk Compass of Novartis which is continually monitored by the risk and resilience team. This process is repeated annually and information on climate related risks (physical and transition) are provided to be used in this process. Identified risks in all categories, including climate, then drive strategic decisions related to adaptation and control measures as well as changes to business processes such as shifting to the procurement of renewable energy.

Multiple opportunities exist which could create competitive advantage from climate change. These include actions to reduce energy consumption and associated greenhouse gases, climate mitigation as well as collaborative efforts to create climate resilience in communities where we operate. The avoidance of carbon taxes will reduce cost and complexity relative to other organizations. Proactively managing climate change risks will create shareholder value by positioning Novartis positively to investors such as BlackRock and Vanguard who, along with others, are increasingly prioritizing sustainability performance. Novartis' brand value will also be enhanced enabling the company to attract, recruit and retain the best talent. Discrete business opportunities may also exist as disease vectors change due to climate change related to both communicable and non-communicable diseases.

We have a dual strategy for greenhouse gas (GHG) emission reduction primarily from energy and fuel usage e.g., to improve energy efficiency and to adopt renewable energy sources. Efficiency serves as the foundation for all other efforts making implementation of distributed generation, distributed storage and demand response management more effective in reducing GHG emissions and building climate resilience in support of business continuity. Research has shown that companies who focus on sustainability achieve more positive financial returns because of the long term focus on the resilience of the company. Novartis management is also guided by input from a variety of stakeholders (BlackRock, Vanguard, We Mean Business, institutional investor letters to our CEO) in developing climate change requirements. The influence of impact investors, non-profit organizations and shareholders is increasingly impacting how policy is crafted. Internally we ensure progress by target setting, performance reporting and an annual process of management review.

Business and operations may be impacted by the growing effects of climate change and shifting weather patterns. With energy, GHG emissions and water resources becoming greater cost factors efficiency improvements and alternate sources will become more important. In the long term the increasingly severe affects of rising sea levels, extreme weather, changing precipitation patterns and water scarcity could also influence the way Novartis selects new locations and how these would be protected against the effects of climate change.

Climate issues caused a change in Novartis' energy procurement strategy. After the successful completion of a renewable power purchase agreement in the US that achieved carbon neutrality in that market for procured electricity we are now actively pursuing a pan-European power purchase agreement that will achieve the same, decarbonizing our purchased electricity in one of our largest regions of operations and eliminating transition risk associated with carbon pricing. Other major markets will follow for the same reason.

The negative impact of climate change is also being considered as the first round of more detailed climate risk assessments completed this year. These have been shared with members of production, finance and facilities to create a more holistic integrated risk management strategy. Applicable production and facility staff have been provided with initial data to help them validate or challenge footprint decisions. In the future this should be available at the beginning of all footprint discussions and would possibly include the context of regional supply chains as we examine where to most effectively produce our critical medicines.

C3.1d

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

Climate-related scenarios	Details
Nationally determined contributions (NDCs)	<p>Novartis is conducting both sensitivity and stress testing for climate and water in a long term horizon, and is basing many of the variables on a "Paris Forever" scenario based on nationally determined contributions. This scenario is perceived as the most likely future and assumes that climate policy remains constant in the wake of the Paris Accord after 2030, and that significant technology advancements in low-carbon emissions technologies do not scale in markets in the near future. This represents a conservative approach to risk, and does not assume improvements that would require significant policy or technology changes. In partnership with the Massachusetts Institute of Technology (MIT) Joint Program on the Science and Policy of Global Change, Novartis is conducting a multi-phase project for detailed climate risk analysis of a key site and an initial global assessment of critical sites for the production and research portions of the company that will inform follow on detailed analyses of risk. MIT Joint Program uses an Integrated Global System Model (IGSM) which is a flexible model that joins detailed models of the Earth's climate system and the human driven economic system through combined use of the MIT Earth System Model (MESM) and the MIT Economic Projection and Policy Analysis (EPPA) model. The flood modelling uses sensitivity analysis to examine a changing set of inputs related to 24 hour precipitation data and combined impact of sea level rise and storm surge. The flood risk assessment is a stress test using multiple Monte Carlo simulations through a set of transfer functions that include precipitation to depth, depth to damage, risk of depth and expected resultant damages. The output of this model will be aligned with a tailored Climate Change Vulnerability Index (CCVI) that is being co-created by MIT Joint Program and Novartis, and will be deployed in multiple Monte Carlo simulations globally to bound both probability and uncertainty of climate outcomes. This entire collaboration between Novartis and MIT Joint Program is a first of kind partnership for MIT with a commercial and industrial partner to design a credible, repeatable climate risk methodology for global operations. This forward looking data showing various pathways are then provided to applicable staff in production, procurement, facilities, finance, risk and business continuity staff so it can be considered in the existing integrated risk management process as well as influencing decisions in daily business such as utilities procurement. This integrated process should make Novartis more resilient and enable us to serve our patients even as risks and opportunities in markets and communities change. Results from the analysis delivered in late 2018 have been provided to leadership and will be used to make decisions on risk mitigation requirements as well as possible opportunities. This round of discussions is expected to last through to 2019 before significant decisions are considered in coordination with other company priorities and changes.</p>

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

Scope

Scope 1 +2 (market-based)

% emissions in Scope

100

Targeted % reduction from base year

100

Base year

2016

Start year

2018

Base year emissions covered by target (metric tons CO2e)

1320363

Target year

2025

Is this a science-based target?

Yes, this target has been approved as science-based by the Science-Based Targets initiative

% of target achieved

12.9

Target status

New

Please explain

The Novartis target is to reduce combined Scope1 and Scope2 (market-based) GHG emissions by 100% by 2025 based on 2016 emissions. The -100% by 2025 Scope 1 + 2 targets have been confirmed to be science-based by response from the SBT initiative as part of a larger corporate target of 35% absolute emissions reductions across the entire value chain. The status achieved in 2018 is a 12.9% reduction of emission from our industrial operations.

Target reference number

Abs 2

Scope

Scope 1+2 (market-based) +3 (upstream & downstream)

% emissions in Scope

100

Targeted % reduction from base year

35

Base year

2016

Start year

2018

Base year emissions covered by target (metric tons CO2e)

8216446

Target year

2030

Is this a science-based target?

Yes, this target has been approved as science-based by the Science-Based Targets initiative

% of target achieved

7

Target status

New

Please explain

Novartis received approval for Science Based Targets to achieve a 35% reduction in Scope 1, 2 and 3 emissions by 2030. This is part of a larger overall environmental sustainability strategy that includes water and waste goals as well. The focus in the company is to reduce absolute emissions by 35% through efficiency and aggressive adoption of renewables, and then to reduce our footprint even further for a minimum of a 50% value chain footprint reduction by leveraging credible, transparent offsets against own operations and supply chain where needed.

C4.2

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

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	15	590000
To be implemented*	15	590000
Implementation commenced*	3	15000
Implemented*	4	222133
Not to be implemented	5	500

C4.3b

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

Initiative type

Energy efficiency: Building services

Description of initiative

Building controls

Estimated annual CO2e savings (metric tonnes CO2e)

1000

Scope

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

200000

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

300000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

Building controls were implemented in two sites in Slovenia that allowed for greater real time awareness of energy consumption, allowing for immediate adjustments to major systems to include heating ventilation and air conditioning (HVAC) and significant motors, pumps and drives. Decreased consumption reduced Scope 2 carbon footprint while also delivering energy cost savings to the site.

Initiative type

Energy efficiency: Building services

Description of initiative

Building controls

Estimated annual CO2e savings (metric tonnes CO2e)

1000

Scope

Scope 1

Voluntary/Mandatory

Voluntary

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

100000

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

200000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

Building controls were implemented in two sites in Slovenia that allowed for greater real time awareness of energy consumption, allowing for immediate adjustments to major systems to include heating ventilation and air conditioning (HVAC) and significant motors, pumps and drives. Decreased consumption reduced Scope 1 carbon footprint while also delivering energy cost savings to the site.

Initiative type

Low-carbon energy purchase

Description of initiative

Wind

Estimated annual CO2e savings (metric tonnes CO2e)

220000

Scope

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

250000

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

100000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

11-15 years

Comment

A virtual power purchase agreement (PPA) was awarded to Invenergy to build new wind generation capacity in Texas, using Edison Energy as our buyer's agent into the market. Novartis is an off-taker for 100 MW of capacity from this 300 MW capacity project. Construction commenced in 2018, and the project is now fully operational and providing carbon free energy to the grid. This project was the first PPA for Novartis, and will make Novartis carbon neutral in Scope 2 emissions for electricity in the US market. Annual savings of 220,000 tons of carbon are the equivalent of removing 48,000 cars from the road.

Initiative type

Energy efficiency: Building services

Description of initiative

HVAC

Estimated annual CO2e savings (metric tonnes CO2e)

133

Scope

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

38500

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

400000

Payback period

4 - 10 years

Estimated lifetime of the initiative

11-15 years

Comment

Cooling technology optimization in Singapore through installation of high-efficiency chillers as part of a normal recapitalization project.

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

Method	Comment
Internal price on carbon	Novartis uses an internal shadow price of carbon of USD 100 per metric ton of carbon equivalent to influence decisions on capital investments. As described elsewhere in this submission in more detail, this is meant to show a more holistic approach to long term financial impact of investments that yield a sustainability improvement.
Marginal abatement cost curve	A marginal abatement cost curve was used to design a new round of internal investments for efficiency, renewables and offsets. A portfolio approach to sustainability yields a positive financial benefit as well as a positive carbon benefit to the company.
Lower return on investment (ROI) specification	Novartis financial guidance specifies that investments specifically focused on energy efficiency shall have return on investment calculated for the life of the asset as opposed to a shorter period of time for other investments, resulting in a lower hurdle rate for those investments.
Internal incentives/recognition programs	Internal award programs exist to recognize Novartis associate's efforts to reduce the carbon footprint of the company. These programs are sponsored by Global Health and Corporate Responsibility and Real Estate and Facility Services.
Employee engagement	Employee engagement programs were initiated in 2018 to raise awareness of the new corporate target for carbon neutrality in own operations and a 50% reduction in value chain carbon emissions. Engagements included internal social media posts, environmental network community calls, and onsite employee engagement in Cambridge (MA), Basel, Barcelona using external consultants to inform development and execution of more comprehensive employee engagement campaigns.

C4.5

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

Yes

C4.5a

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

Level of aggregation

Group of products

Description of product/Group of products

Sandoz, the generic products business unit of Novartis, is a leading producer of anti-infective Active Pharmaceutical Ingredients (AI APIs). Our manufacturing portfolio of AI APIs is predominantly located in Europe (Austria, Germany, Italy, Slovenia and Spain). Sandoz/Novartis is one of the few pharma companies that produces AI APIs outside China and India. We put high efforts in the energy efficiency of our manufacturing processes for AI APIs and achieved up to 30% energy efficiency improvement of these processes over the last 10 years. Furthermore, the carbon intensity of the energy used at our locations in Europe is by far lower compared the carbon intensities in China and India. Carbon Footprint LCA assessments of our AI API products have demonstrated that the per ton carbon impact of our products is in the order of magnitude of 16 kg CO₂e/kg API compared to 35 to 48 kg CO₂e/kg API when produced in China or India. They have a 2 to 3 times lower carbon footprint compared to most other AI APIs. Therefore, we consider the Sandoz AI APIs as low-carbon products.

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

Low-carbon product

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

Other, please specify (Carbon footprint LCA assessments of our products)

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

4

Comment

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 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

535235

Comment

In 2018, Novartis approved a new environmental sustainability strategy to become carbon neutral in own operations by 2025. The Novartis target is to reduce combined Scope 1 and Scope 2 (market-based) GHG emissions by 100% by 2025 based on 2016 emissions.

Scope 2 (location-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

1027800

Comment

In 2018, Novartis approved a new environmental sustainability strategy to become carbon neutral in own operations by 2025. The Novartis target is to reduce combined Scope 1 and Scope 2 (market-based) GHG emissions by 100% by 2025 based on 2016 emissions.

Scope 2 (market-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

785128

Comment

In 2018, Novartis approved a new environmental sustainability strategy to become carbon neutral in own operations by 2025. The Novartis target is to reduce combined Scope 1 and Scope 2 (market-based) GHG emissions by 100% by 2025 based on 2016 emissions.

C5.2

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

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)

548073

Start date

January 1 2018

End date

December 31 2018

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

According to the GHG Protocol Scope 2 Guidance

C6.3

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

Reporting year

Scope 2, location-based

899363

Scope 2, market-based (if applicable)

666798

Start date

January 1 2018

End date

December 31 2018

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?

No

C6.5

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

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

4856001

Emissions calculation methodology

The amount of Scope 3 GHG emissions for purchased goods and services reported here is the result of an analysis of the Novartis's third party spend on packaging, raw materials, services and other relevant categories across all business units in 2018. The amount includes all tiers of suppliers in the material's value chain. The environmental impacts are valued using damage-cost-based shadow prices. Annually, the shadow prices are determined by an inflation adjustment of the previous year's values. The emission is then calculated using EnScan (Environmental Supply chain accounting Novartis) which is based on Global Environmental Extended Input-Output Model (EEIO). The analysis considers average emission intensities by industry sector and incorporates regional trade flows and inter-relationships to calculate emissions from spend data. Finally, the emission values obtained for each category are aggregated and reported.

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

10

Explanation

Novartis initiated EEIO analysis in 2015 and since then Novartis performed the assessment on a yearly basis and refined the approach and the level of detail over time. In 2018, Novartis participated in the CDP Supply Chain program. Novartis spreads awareness about climate-related risks and enable its suppliers to share their activities and challenges around climate, water and waste. The input is used to encourage our suppliers to minimize the environmental impact of our activities and products over their life cycle. When removing Alcon emissions from the baseline due to their spin-off in 2019, Novartis cut emissions in this category by 4% from 2017 to 2018 in this category. The significant share of which comes from our steps towards environmental sustainable packaging and following best practices of inventory optimization.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

566675

Emissions calculation methodology

The emission is calculated using average spend-based method, wherein capital purchases of 2018 that constitutes over 90% of our capital expenditure goods across all Business Units are considered. Top categories identified are Construction, IT Hardware and Software, Production Equipment and Laboratory Supplies & Equipment. The emission factors for spend under these categories was obtained from PwC ESCHER (Efficient Supply Chain Emissions Reporting) model. In 2017, PwC did an analysis of Novartis' environmental impacts associated with global supply chain using an Environmental Extended Input-Output (EEIO) model. This model was developed and maintained by PwC using data from the Global Trade and Analysis Project.

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

0

Explanation

Though spend on Capital Goods may significantly fluctuate from year to year as Novartis is committed to R&D. Our efforts cut across the company resulted in 10% of reduction {Novartis without Alcon} in emissions in this category compared to 2017, as Novartis teams continue to find new ways to improve the effectiveness and efficiency of our operations.

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

Evaluation status

Relevant, calculated

Metric tonnes CO2e

338951

Emissions calculation methodology

Fuel and energy-related activities emissions reported here are derived from the data on upstream fuel consumption and energy purchased in 2018. Emissions are calculated using upstream emission factors per unit of consumption wherein upstream emission factors are obtained by excluding combustion emission factor from life cycle emission factor. We have considered emission losses associated with grid transmission and distribution of electricity. Novartis used 2018 UK Government's Greenhouse Gas Conversion Factors and IEA Statistics for transmission and distribution (T&D) Losses, IPCC Guidelines for emission factors.

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

0

Explanation

Novartis already had significant improvement in this category by resorting to use only clean energy. For on-site energy generation, coal is completely avoided while fossil waste fuels contributes less than 2% of fuel purchases. Novartis achieved 5% decrease in Energy Consumption per interior gross floor area as well as 5% decrease in energy consumption per employee headcount from last year (2017).

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

432012

Emissions calculation methodology

The amount of Scope 3 GHG emissions for this category is the result of an analysis of the Novartis's third party spend on warehousing and transportation in 2018. The emission is then calculated using EnScan (Environmental Supply chain accounting Novartis) which is based on Global Environmental Extended Input-Output Model (EEIO).

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

7

Explanation

Since 2018, Novartis initiated and engaged in keen analysis of its warehousing, distribution and transportation activities from emission and carbon footprint point of view. Novartis includes these insights into its decision making and is taking actionable steps to decrease its environmental footprint. In addition, Novartis is working on projects to improve the data needed for this category and analysing upstream supply chain of each site/plant separately.

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

42148

Emissions calculation methodology

The Scope 3 GHG emissions for this category is the result of data collected around amount and type of operational waste produced across all business units in 2018. All types of hazardous and non-hazardous waste related to the sites business operations (excluding construction debris) are considered. The emission factors are mapped using waste output-route based model assessed by external consultancy. For each waste type, output-routes considered are – Recycling, Treatment, Incineration with or without energy and Landfill. Finally, the emission values obtained for each category are aggregated and reported. Notes: 1. On-site incineration of fossil waste is considered in Scope 1 emissions (on-site energy generation). Thus excluded from Scope 3. 2. Treatment of wastewater generated in operations is not considered in reporting emissions since these are not material to the final emissions figure for this category. A previous study showed that this is less than 20% of emissions in this category.

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

100

Explanation

Recycling/reuse of total operation waste is going up year-on year and stood at 68.5%. The solvent waste is found to be the largest contributor to the greenhouse gas GHG emissions for this category (34%)

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

256025

Emissions calculation methodology

The Scope 3 GHG emissions for this category are obtained from our logistics solution partner. The data considers all aircraft travel related data for Novartis employees plus service providers on their trips for Novartis in 2018. The calculations are based on the guidelines provided by DEFRA/DECC's GHG conversion factors, including factoring of actual distance flown, uplift-factor and class of flight. A company-wide assessment showed that most significant emissions from transportation of employees for business-related activities by third-party relates to air travel, For this reason it was decided to include only air travel in this category.

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

100

Explanation

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

177628

Emissions calculation methodology

The Scope 3 GHG emissions for this category are derived using average-data model. The "per capita emission" factor used for this model is based on the assessment performed by an external consultancy in 2009. In this assessment, region wise commuting patterns of employees using private and public transport were studied and modelled. The average employee headcount for 2018 was multiplied with per capita emission to obtain the emission in this category.

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

0

Explanation

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>

Explanation

The emissions associated with leased assets (including leased cars) are under operational control of Novartis and are already part of Scope 1 and 2 emissions. Hence, this Scope 3 category is not considered to be relevant.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

61948

Emissions calculation methodology

The emission is calculated using distance-based method (the distance is multiplied by mass of goods transported and relevant emission factors that incorporate average fuel consumption, average utilization, average size and mass or volume of the goods and the vehicles, and their associated GHG emissions). The distance is based on the transportation model obtained from an assessment performed by external consultancy in 2009. Notes: 1> Above method is chosen as Novartis doesn't have access to fuel records from downstream transport vehicles and/or shipments do not consume entire vehicle/vessel. 2> Novartis doesn't have key over-the-counter (OTC) drugs, hence we have not considered patient travel data for pick-up of medical products.

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

0

Explanation

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>

Explanation

This Scope 3 category is not considered to be relevant as only a few Novartis products (pharmaceutical finished drugs) are processed further after they are sold. To sell intermediate products is not our business model.

Use of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

134850

Emissions calculation methodology

The use of Novartis products (Pharmaceutical Finished Drugs) does not generally result in GHG emissions, with the exception of a propellant based inhaler. All quantities of HFC used for its production in 2018 are measured. Life cycle GHG emissions are calculated using the IPCC emissions factor for HFC-134a.

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

100

Explanation

End of life treatment 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>

Explanation

This Scope 3 category is not considered to be relevant as Novartis' pharmaceutical products (tablets, injectables, etc.) are consumed by patients and therefore no GHG emissions associated with the end of life treatment of sold Novartis products occur by that. Novartis has only a few medical device products (e.g. inhalers, auto-injectors, surgery tools and contact lenses) of which the Scope 3 emissions from inhalers (major source) are already considered in category 11 "Use of sold products". For the remaining products, it was assessed that GHG emissions are not material.

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>

Explanation

Novartis screened the leased assets to conclude that leased out buildings are less than 1% of overall building inventory and emissions from them would not material to the overall category.

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>

Explanation

This category is not relevant as Novartis is not in the franchise business.

Investments

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>

Explanation

GHG emissions associated with Novartis's investment in other companies are not considered relevant. Novartis has limited potential to influence their emissions. This category is material to companies that provide financial services. Hence, this category is not significant to Novartis.

Other (upstream)

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>

Explanation

No other upstream emissions were identified during our screening of relevant Scope 3 activities.

Other (downstream)

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>

Explanation

No other downstream emissions were identified during our screening of relevant Scope 3 activities.

C6.7

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

Yes

C6.7a

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

Row 1

Emissions from biologically sequestered carbon (metric tons CO2)

64934

Comment

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

0.00002341

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

1214871

Metric denominator

unit total revenue

Metric denominator: Unit total

51900000000

Scope 2 figure used

Market-based

% change from previous year

8.1

Direction of change

Decreased

Reason for change

Nominal total Scope 1 and Scope 2 GHG emissions have decreased between 2017 and 2018, from 1250.4 kt CO2e in 2017 to 1214.9 kt CO2e in 2018 as a result of the implementation of energy savings projects combined with increased sourcing of renewable electricity in 2018 (+20%, from 2.34 GJ in 2017 to 2.82 GJ in 2018) while sales have increased from USD 49.15 million in 2017 to USD 51.9 million in 2018.

Intensity figure

9.99

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

1214871

Metric denominator

full time equivalent (FTE) employee

Metric denominator: Unit total

121663

Scope 2 figure used

Market-based

% change from previous year

5.6

Direction of change

Decreased

Reason for change

Nominal total Scope 1 and Scope 2 GHG emissions have decreased between 2017 and 2018, from 1250.4 ktCO2e in 2017 to 1214.9 ktCO2e in 2018 as a result of the implementation of energy savings projects combined with increased sourcing of renewable electricity in 2018 (+20%, from 2.34 GJ in 2017 to 2.82 GJ in 2018), while the number of employees has slightly increased from 118203 Full Time Equivalentents (FTE) in 2017 to 121663 FTE in 2018.

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 CO ₂ e)	GWP Reference
CO ₂	537361	IPCC Fifth Assessment Report (AR5 – 100 year)
HFCs	10712	IPCC Fifth Assessment Report (AR5 – 100 year)
SF ₆	0	IPCC Fifth Assessment Report (AR5 – 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 CO ₂ e)
United States of America	149389
Austria	71993
Germany	36428
United Kingdom of Great Britain and Northern Ireland	34354
Slovenia	32242
Spain	29656
Italy	27823
Turkey	14663
Ireland	12735
Japan	12196
Singapore	11703
Poland	11483
Russian Federation	11169
France	11167
Belgium	10285
China	9985
Egypt	6979
Switzerland	6489
India	3986
Indonesia	2887
South Africa	1591
Malaysia	1095
Other, please specify (Rest of World)	37776

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)
Manufacturing (onsite combustion and processes)	346706
Administration (onsite combustion and processes)	28572
Research and Development (onsite combustion and processes)	24582
Sales (vehicle emissions)	148213

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 in market-based approach (MWh)
United States of America	285303	151989	632539	57149
Switzerland	74952	76053	424790	6547
Austria	50088	0	303784	303780
Slovenia	67484	116621	225487	25878
Italy	37525	2304	144466	102263
Germany	44954	40551	108512	42357
China	44569	49721	87495	3252
India	59994	63801	77332	27800
Singapore	32801	30919	75115	0
Spain	21671	0	73591	53993
Turkey	22084	22084	50094	7243
Malaysia	34180	34180	49579	15
Ireland	20326	800	49103	46597
Indonesia	24678	21832	33537	0
United Kingdom of Great Britain and Northern Ireland	5528	6728	27617	0
Poland	16501	247	23124	20299
France	1175	884	22572	6758
Egypt	9579	9579	20234	0
Belgium	4304	3659	18917	0
Japan	9287	5946	17129	0
Russian Federation	3069	3069	7750	0
South Africa	7349	7349	7383	0
Other, please specify (Rest of World)	21961	18482	75932	28153

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 emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Manufacturing	732218	560060
Administration	78642	52903
Research and Development	88503	53835

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	14823	Decreased	1.2	The proportion of renewable energy input increased by 20% between 2017 and 2018 (in relation to our new Environmental Sustainability Strategy) equivalent to an absolute reduction of 14.8 ktCO2e or 1.2% (14.8 / 1250.4 *100) of the gross global emissions 2017 (1250.4 ktCO2e for scope 1 and 2 combined).
Other emissions reduction activities	19714	Decreased	1.6	The emissions reduction projects undertaken in 2018 will achieve emission reductions of 19.7 ktCO2e annually, equivalent to 1.6% reduction (19.7 / 1250.4 *100) of the gross global emissions 2017 (1250.4 ktCO2e for scope 1 and 2 combined).
Divestment	978	Decreased	0.1	The divestment of a site in September resulted in an emission reduction of 0.978 ktCO2e for 2018, equivalent to a 0.1 % reduction (0.978 / 1250.4 *100) of the gross global emissions 2017 (1250.4 ktCO2e for scope 1 and 2 combined).
Acquisitions	0	No change	0	no restatement linked to acquisitions in 2018
Mergers	0	No change	0	no involvement in mergers
Change in output	0	No change	0	no major change in output at Novartis facilities
Change in methodology	0	No change	0	no change in methodology
Change in boundary	0	No change	0	no change in boundary
Change in physical operating conditions	0	No change	0	no change in physical operating conditions
Unidentified	0	No change	0	no unidentified changes
Other	0	No change	0	no other changes

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 undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
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 MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	43754	1857766	1901520
Consumption of purchased or acquired electricity	<Not Applicable>	732084	1439198	2171282
Consumption of purchased or acquired heat	<Not Applicable>	0	323307	323307
Consumption of purchased or acquired steam	<Not Applicable>	0	61494	61494
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	6681	<Not Applicable>	6681
Total energy consumption	<Not Applicable>	782519	3681765	4464284

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	No
Consumption of fuel for the generation of heat	No
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

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

Fuels (excluding feedstocks)

Natural Gas

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

1778372

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

1599487

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

178885

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 2

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

38491

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

38491

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 5

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

4946

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

4946

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Fuels (excluding feedstocks)

Other, please specify (Waste, fossil in nature)

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

35957

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

35957

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Fuels (excluding feedstocks)

Wood

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

15364

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

15364

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Fuels (excluding feedstocks)

Wood Waste

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

28390

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

28390

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

C8.2d

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

Fuel Oil Number 2

Emission factor

0.056

Unit

metric tons CO2e per GJ

Emission factor source

International Energy Agency

Comment

Fuel Oil Number 5

Emission factor

0.06

Unit

metric tons CO2 per GJ

Emission factor source

International Energy Agency

Comment

Natural Gas

Emission factor

0.055

Unit

metric tons CO2e per GJ

Emission factor source

International Energy Agency

Comment

Wood

Emission factor

0

Unit

metric tons CO₂e per GJ

Emission factor source

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

Comment

Biomass is considered a carbon neutral fuel

Wood Waste

Emission factor

0

Unit

metric tons CO₂ per GJ

Emission factor source

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

Comment

Biomass is considered a carbon neutral fuel

Other

Emission factor

0.098

Unit

metric tons CO₂ per GJ

Emission factor source

Company average 2018 based on organic waste solvents mixture

Comment

C8.2e

(C8.2e) 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	98914	92233	6681	6681
Heat	0	0	0	0
Steam	86651	86651	0	0
Cooling	0	0	0	0

C8.2f

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

Basis for applying a low-carbon emission factor

Contract with suppliers or utilities (e.g. green tariff), supported by energy attribute certificates

Low-carbon technology type

Solar PV
Wind
Hydropower
Biomass (including biogas)

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

Other, please specify (worldwide)

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

732084

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

0

Comment

Many of our sites are purchasing green energy from renewable energy sources, mainly from wind, hydropower, biomass and solar sources. The figure reported here is the total amount of energy purchased worldwide, that is generated from renewable energy sources. Our reporting guideline stipulates that sites should obtain a certificate issued by a third party guaranteeing the renewable energy content of the energy mix.

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 and/or Scope 2 emissions and attach the relevant statements.

Scope

Scope 1

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

novartis-in-society-report-2018.pdf

Page/ section reference

Page 50 of the Novartis in Society Report 2018 contains the GHG Scope 1, combustion and process, and vehicles. Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.

Relevant standard

ISAE3000

Proportion of reported emissions verified (%)

100

Scope

Scope 2 market-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

novartis-in-society-report-2018.pdf

Page/ section reference

Page 50 of the Novartis in Society Report 2018 contains the GHG Scope 2, purchased energy (market-based). Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.

Relevant standard

ISAE3000

Proportion of reported emissions verified (%)

100

C10.1b

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

Scope

Scope 3- at least one applicable category

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Attach the statement

novartis-in-society-report-2018.pdf

Page/section reference

Page 50 of the Novartis in Society Report 2018 contains the GHG Scope 3 category 6, business travel. Page 60 & 61 provide the independent assurance report of the Novartis in Society Report. Please note that P50 of the Novartis in Society Report 2018 displays the emission value for Business Travel to be 425.70 kt whereas we are reporting 256.02 kt in C6.5 as these are the restated figures which we have obtained from our logistic partner. The same will be restated in 2019's report.

Relevant standard

ISAE3000

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
C5. Emissions performance	Year on year change in emissions (Scope 1 and 2)	ISAE3000	Page 50 of the Novartis in Society Report 2018 contains the total GHG emissions Scope 1 and Scope 2 data from the previous year, that is also verified during the assurance provision process. Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.
C5. Emissions performance	Year on year change in emissions (Scope 1)	ISAE3000	Page 50 of the Novartis in Society Report 2018 contains the total GHG emissions Scope 1 data from the previous year, that is also verified during the assurance provision process. Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.
C5. Emissions performance	Year on year change in emissions (Scope 2)	ISAE3000	Page 50 of the Novartis in Society Report 2018 contains the total GHG emissions Scope 2 data from the previous year (market-based), that is also verified during the assurance provision process. Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.
C5. Emissions performance	Year on year emissions intensity figure	ISAE3000	Page 50 of the Novartis in Society Report 2018 contains GHG emissions (Scope 1 and Scope 2) intensity data per sales and per associates, that is also verified during the assurance provision process. Page 60 and 61 of the document provide the independent assurance report of the Novartis in Society Report.

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 systems in which you participate.

EU ETS

% of Scope 1 emissions covered by the ETS

30

Period start date

January 1 2018

Period end date

December 31 2018

Allowances allocated

114711

Allowances purchased

0

Verified emissions in metric tons CO2e

141049

Details of ownership

Facilities we own and operate

Comment

Emissions covered: 20% Gross global Scope 1 emissions: 548,073 tons CO2e Facilities we own and operate: Kundl Lendava Menges Rovereto Ringaskiddy Grimsby

C11.1d

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

Novartis' target is to be carbon neutral in own operations by 2025, thus eliminating the need to comply with EU ETS. Novartis is aggressively pursuing absolute emissions reductions in order to position most effectively in markets with carbon pricing in place, and to proactively reduce exposure in markets that may adopt carbon pricing. Reductions through efficiency are the preferred approach, along with an aggressive shift to renewable energy supply in markets that can support it through generation capacity, financial and contractual structures. Where necessary, Novartis may purchase renewable attributes in order to comply with existing frameworks and emerging frameworks.

Previously, this had been done strictly using internal labor, and progress was updated in mid-year and then again at the end of the year as initial fiscal data was prepared for the annual report. Novartis gathers data through September to draft reports released in January, projecting data based on demonstrated trends in year and in previous years. This is known as a 9+3 approach. Once full end of year data is available and has been validated, then the company will restate the data at the end of the first quarter. We now leverage more detailed carbon footprint analysis through our commercial partner that executes the utilities procurement and active risk management programs to allow for more real time updates. We can then adjust as needed both in consumption and in the planned procurement of renewable attributes as needed to comply with this program. This should be the same strategy used as we become subject to other compliance frameworks.

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?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Stakeholder expectations
Change internal behavior
Drive energy efficiency
Drive low-carbon investment
Stress test investments
Identify and seize low-carbon opportunities

GHG Scope

Scope 1
Scope 2

Application

Price is applied to capital investments coming for review at the investment committees for the Real Estate and Facilities Services and for Novartis Technical Operations. These projects are then reviewed by the Executive Committee of Novartis, with the shadow price of carbon added into the net present value calculations so the decision makers can understand the long term impact of choices related to carbon footprint.

Actual price(s) used (Currency /metric ton)

100

Variance of price(s) used

Standard application of the USD 100 per ton (t) price is used to show impact on net present value when considering the increasing real costs of carbon. Costs can accrue through developing carbon tax schemes, carbon pricing schemes and the financial impact of climate change on physical operations and distributed supply chains.

Type of internal carbon price

Shadow price

Impact & implication

Novartis leadership has endorsed a carbon price of USD 100 per ton (t) of carbon dioxide equivalents, in line with revised estimates of the real cost of carbon over the next decade. This is designed to match the time frame most traditionally aligned with return on investment and net present value calculations. Building a carbon price into investment decisions is important as it helps identify projects that will most cost-effectively reduce GHG emissions. This shadow price of carbon informed consideration and approval of long term renewable power purchase agreements and efficiency investments being processed internally.

C12. Engagement

C12.1

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

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

C12.1a

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

Type of engagement

Compliance & onboarding

Details of engagement

Included climate change in supplier selection / management mechanism

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

% Scope 3 emissions as reported in C6.5**Rationale for the coverage of your engagement**

As the data suggests that the category 1 "Purchased Goods and Services" and the category 4 "Upstream Transportation and Distribution" constitutes about 80% of our Scope 3 emissions for 2018, thus it is important to assess our suppliers on meeting environment sustainability right from the beginning.

Impact of engagement, including measures of success

Supplier onboarding and compliance are enforced through various policies like Health, Safety and Environment (HSE) Policies, Novartis Third Party Code and Third Party Risk Management (TPRM) Programs. With our TPRM Program we identify new suppliers who are posing an elevated risk. Novartis follows-up with these suppliers in the form of audits or on-site assessments. The audit criteria includes requirements for suppliers which is aligned with the Pharmaceutical Supply Chain Initiative (PSCI). Our measures of success are performance indicators which tell us the percentage of suppliers we audit compared to the suppliers at risk and the percentage of reduction in Scope 3 emission per revenue (million USD). Note: The details and figures are publicly available in "Novartis in Society Report 2018", attached in C10.1b.

Comment

The engagement is our first and second line of defence.

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

2

% total procurement spend (direct and indirect)

10

% Scope 3 emissions as reported in C6.5**Rationale for the coverage of your engagement**

Both the internal assessments as well as the external assessments by consultancies underpin that the procurement spend is directly proportional to the Scope 3 emissions. With the growing business, if not cost cutting on procurement spend, it was deemed necessary to understand and gauge the suppliers from environment sustainability point of view. For information collection, key suppliers of raw materials such as chemicals, intermediates, active pharmaceutical ingredients, and packaging materials are considered. In addition, major logistics providers are part of the engagement. As Novartis has hundreds of thousands of suppliers in its global network ongoing engagement efforts target key suppliers having major influence on procurement spend. With the frequent movement of suppliers in and out of our network, we may miss 100% engagement, but we are confident that we will accomplish most of our required impact by focusing on key portions of the supply chain, and achieve our ambitious target on Scope 3 emissions.

Impact of engagement, including measures of success

In-line with our annual process of capturing climate related data, Novartis continued to transparently measure the performance and efforts of our suppliers. This mode of engagement not only helps us to understand the awareness level among suppliers but also has been successful to identify collaboration opportunities. The measure of success is the response rate of suppliers for this initiative. With the deadline still open for responses, the response rate is currently at 70%. Novartis scores the suppliers based on their past, current and planned efforts towards reduction in GHG emissions, and derive insights from this data and shares the information back with supplier to complete the loop. Novartis conducts regular workshops and events for suppliers to enable its supplier base with leading edge environmental solutions. One such area of improvement identified from information collection was in the opportunity to tap into more renewable energy. Novartis is conducting a specific workshop, in collaboration with NGOs, on renewable energy with leading industry renewable energy providers.

Comment

The data is used to complement the Scope 3 inventory. In addition, the data supports our efforts to measure the reduction of our environmental footprint more accurately in the mid to long-term. The quality of all responses is assessed through comparison with industry intensity emission values.

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

Novartis is a respected member of the Pharmaceutical Supply Chain Initiative (PSCI) - a group of pharmaceutical and healthcare companies sharing common vision of better social and environmental outcomes in the communities we serve. Novartis served as the chair of this group during 2018. Novartis supports its principles for responsible environment supply chain management and is taking responsibility towards a better future collaboratively. With PSCI, Novartis is continuously engaged in conferences, webinars, workshops, peer learning and resource library to build capabilities among suppliers. Novartis currently chairs the PSCI.

One such instance of this collaboration was the three-day training workshop held in in Shanghai. It brought together senior HSE managers from various pharmaceutical companies to share knowledge and provide practical training to third-party audit firms on how to carry out health, safety and environmental (HSE) audits according to the PSCI Principles, which outline the industry expectations on safe and environmentally sound practices in their supply chain. 55 Health & Safety and Environment auditors had attended this event. The workshop included the use of case studies, group exercises, and question and answer sessions.

Other climate-related engagement efforts include collaboration with a renewable energy company, Invenergy, to add 100 megawatts of wind power to the electrical grid. The 12-year agreement is expected to reduce our greenhouse gas emissions by more than 220,000 metric tons per year through the issuance of renewable energy attributes. Business processes are being created to allow access to renewable energy for our supply chain partners as part of our future power purchase agreements.

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?

- Direct engagement with policy makers
- Trade associations
- Funding research organizations
- Other

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Adaptation or resilience	Support	Novartis worked with various organizations throughout 2017 to advance the discussion on collaborative climate resilience. As a result of that planning, in partnership with the Cambridge Compact for a Sustainable Future, Novartis followed up in 2018 to create more Cambridge, MA community engagement on a Novartis and MIT designed climate resilience table-top exercise hosted at Harvard University that highlighted constraints in interdependent systems. This work informed the creation of new working group efforts with the City of Cambridge, MA to align needs and address shortfalls in Cambridge, MA to build resilience to sea level rise, flooding events and heat events.	New approaches to zoning and building codes, as well as updated models for flooding that take future changes into account as well as historical trends, must be put in place at city, state and municipal levels of government globally. Without strong support and guidance from elected leaders, communities will continue to build to the lowest acceptable standard, creating socio-economic crises and triggering climate justice challenges in the decades to come.
Clean energy generation	Support	Novartis continued to be engaged with the World Business Council for Sustainable Development (WBCSD) in drafting climate policy asks and the Talanoa Dialogues that will be the basis for engagement between private sector and public sector leadership in an effort to remove regulatory barriers for mobilization of private capital for deep penetration of renewables and energy storage in existing grids globally. In 2018, Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the Conference of the Parties.	Revised nation state regulatory structures that allow use of power purchase agreements and other contractual and financial arrangements to increase renewables and storage technology is critical to decarbonizing the grid, and potentially decarbonizing segments of the transportation sector.
Clean energy generation	Support	We continue to increase our portion of purchasing carbon-free or non-fossil based renewable electricity as a measure to further reduce our GHG emissions. Thereby, we give renewable based electricity a better market acceptance and higher chance to penetrate the electricity market. Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the Conference of the Parties. Novartis began planning in 2018 for a Pan-European Power Purchase Agreement (PPA) as a follow up step in decarbonizing our electricity as part of our goal of carbon neutrality in own operations.	Renewables based electricity can only gain broader acceptance if accepted by consumers. Increased renewable portfolio standards will allow us to more rapidly achieve our carbon reduction goals in bounded markets.
Energy efficiency	Support	We have implemented a comprehensive energy management and energy efficiency program, including energy audits, energy reporting and challenging energy use in capital projects. We have then used our experience to engage with peers in the pharmaceutical industry and other sectors to driver greater market pressure for delivery of new energy efficiency technologies. Throughout 2018, Novartis conducted multiple environmental sustainability site workshops to identify new opportunities for emissions reductions.	We consider energy efficiency and effective management measures on energy efficiency as a feasible tool for decision making and improvements. Legislative systems on energy efficiency and energy storage may additionally help to spread such best practice
Carbon tax	Support	We have voluntarily set an internal carbon price of USD 100 per ton CO2e as a shadow price for more effective and better aligned decision making on GHG emission reduction. We work with organizations such as the WBCSD, UN-Global Compact, Ceres, C2ES and others to support spreading the concept of carbon pricing. This includes private discussions in drafting communication to legislators as well as more public engagements at WBCSD conferences. In 2018, Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the Conference of the Parties.	We support the position of various advocacy organizations (e.g. the WBCSD) that allocating a true price to carbon will be effective in mitigating climate change. We have set and implemented our own shadow price on carbon of 100 USD per ton CO2e, sufficiently high to represent the true cost of climate change and to have a relevant influence on energy costs. A price of carbon in national markets will also increase the adoption of efficiency and renewables, scaling those assets in the local markets and making it more affordable to implement while also providing benefit through lower carbon intensity in the grid.
Mandatory carbon reporting	Support	We participate and contribute to initiatives conducted by the World Business Council for Sustainable Development (WBCSD), Global Reporting Initiative (GRI) and corporate sustainability reporting such as The GHG Protocol, Natural Capital / True Value Reporting that advocate for mandatory reporting frameworks. In 2018, Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the Conference of the Parties.	We consider standardized Corporate Reporting and carbon reporting an effective tool for disclosure to and engagement with stakeholders as well as internal decision making. If practical and in line with existing globally accepted approaches legislative systems on mandatory corporate reporting could be additionally beneficial to further increase the best practice corporate reporting to additional companies.
Cap and trade	Support	We report GHG emissions from 6 sites in the European Union as part of the EU-Emission Trading System (EU-ETS).We consider carbon emission trading an effective tool for supporting targets achievement of emission reductions.	We support the development of the EU-ETS to make it more effective and more practical. We also support the spreading of emission trading in other countries outside the EU.
Adaptation or resilience	Support	We support Task Force on Climate-related Financial Disclosures as a prudent planning tool for companies to understand the risk and benefit posed to the company. We are partnered with MIT Joint Program in designing, piloting and expanding a rigorous scientific approach to assessment and monetization of risk. In 2018, Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the Conference of the Parties.	In order to be truly effective, and to provide a level playing field, climate financial risk disclosure should be part of a regulatory framework that provides clarity and equal footing to all reporting companies in assessing and disclosing materiality.

C12.3b

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

Yes

C12.3c

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

Trade association

Cambridge Compact for a Sustainable Future. The City of Cambridge, MA, Harvard University, and Massachusetts Institute of Technology originally founded the Cambridge Compact for a Sustainable Future in 2013. They viewed the Compact as a community partnership and encouraged non-profits and businesses to join. Now, the Compact is at almost 20 members with the goal to keep growing. Compact members want to make larger, more meaningful contributions to the challenges global climate change presents. Every member signs the Compact and agrees to “work to create broader collaboration among themselves and with other community partners in order to leverage the combined capacities in research, teaching, innovation, entrepreneurship, and program development” to “create a more healthy, liveable, and sustainable Cambridge, MA.”

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The Compact supports strong regulatory pressures on climate mitigation to reduce greenhouse gas emissions, including carbon taxes and efficiencies.

How have you influenced, or are you attempting to influence their position?

We are using our Board position to influence broader discussions about collaborative climate resilience achieved through assessments of the vulnerability of interdependent systems of systems in Cambridge, MA. With greater knowledge, the city can then put appropriate zoning and building codes in place to build resilience while investing in infrastructure resilience efforts.

Trade association

A Better City. A Better City is a diverse group of business leaders united around a common goal — to enhance Boston, MA and the region's economic health, competitiveness, vibrancy, sustainability and quality of life. With 130 member companies across multiple sectors, A Better City operates between the private and public sectors using technical expertise and research capabilities to shape key policies, projects and initiatives. By amplifying the voice of the business community through collaboration and consensus across a broad range of stakeholders, A Better City develops solutions and influences policy in three critical areas central to the Boston region's economic competitiveness and growth — transportation and infrastructure, land use and development, and environment and energy.

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

A Better City supports strong regulatory pressures on climate mitigation to reduce greenhouse gas emissions, to include carbon taxes and incentives for efficiency. They are focused on clean, effective transportation development that will spur economic growth in Boston, and also on infrastructure investment that can build resilience across market sectors. They are key participants in Climate Ready Boston in partnership with the City of Boston.

How have you influenced, or are you attempting to influence their position?

We are using our Board position to influence broader discussions about collaborative climate resilience achieved through assessments of the vulnerability of interdependent systems of systems in Boston. With greater knowledge, the city can then put appropriate zoning and building codes in place to build resilience while investing in infrastructure resilience efforts.

C12.3d

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

No

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

1) World Business Council for Sustainable Development (WBCSD): Novartis primary method of engagement is being an active member of the WBCSD since its foundation in 1997, contributing to the work-streams of the WBCSD's focus areas and projects. Novartis actively contributes to work-streams on Power Purchase Agreements (PPAs), country deep dives for PPAs in India and China, Climate Policy Working Group, Low Carbon Technologies Partnership Initiative (LCTPI), and Natural Climate Solutions (NCSs). Novartis experts provide case studies and example to strengthen WBCSD's work towards international negotiations on Climate Policy with feedback on proposals and own contributions. We have also participated in WBCSD events to share our experiences and help provide benchmarking data and practical advice to attendees at multiple WBCSD events in 2018. This dialogue continues to provide motivation as well as new strategies to move forward with our ambitious sustainability goals. We contributed to the drafting of the Talanoa Dialogue which was used for private sector to engage state actors at the Conference of the Parties (COP). Novartis will continue to work with WBCSD to promote the use of PPAs and NCSs as a large portion of corporate portfolios for greenhouse gas emissions reductions. In 2018, Novartis spoke on panels in partnership with WBCSD on these issues at the Global Climate Action Summit and the COP.

2) National Association of Environmental Managers (NAEM): Novartis is a member of the Board of Regents for NAEM and helps shape the educational and advocacy agenda nationally for the group. We engage on environmental sustainability best practices to include Science Based Targets, carbon pricing, power purchase agreements, use of renewables and adoption of low/zero emission vehicles. Novartis influences agendas by sitting on the Board of Regents, and participates as plenary speakers or panel speakers at regional and national level NAEM events to share our experience in Science Based Targets, adoption of renewables and experiences in revisiting corporate environmental sustainability strategies. Novartis advocates for use of PPAs, deep penetration of renewables in regional grids, carbon pricing structures and a collaborative approach to developing climate resilience across interdependent systems of systems.

3) Pharmaceutical Supply Chain Initiative (PSCI). Novartis attends meetings and participates in work stream efforts as a partner with leading pharmaceutical companies seeking to improve sustainability across all levels of the extended supply chain. Pharma companies engaged in benchmarking and coordination to share best practices across wide range of sustainability and Third Party Risk Management issues. Novartis supports benchmarking with responses to questionnaires, participation in discussions, input to case studies and sharing best practices. Development of go/no-go vendor selection criteria on a range of sustainability issues will allow for more consistent engagement with reputable firms that share our focus on values based behavior that supports the communities that we work in.

4) Novartis has continued to lead the local effort to explore ways to achieve a Net Zero laboratory environment, which may have significant benefit to Cambridge, MA given the large number of labs in the Cambridge area due to a high concentration of academic research labs and commercial industry labs in the city. Novartis also worked to create a series of panels, exercises and follow on workflows to assess climate resilience vulnerabilities from a systems perspective. Novartis has hosted multiple meetings on campus, organized sessions to focus on design of Net Zero labs through adoption of technology and changes in behavior, and has spoken on panels and in meetings to advocate for adoption of technology and behaviors to reduce consumption and increase climate resilience across Cambridge, MA. Additionally, Novartis helped organize a table-top exercise to assess climate resilience risks and address them in a proactive, collaborative fashion with industry and local government.

5) Novartis has funded the Massachusetts Institute of Technology (MIT) Clean Energy Prize three years in a row now, and MIT created a specific Novartis award for one of the Grand Finalists in 2018. Novartis has also provided a judge for the Grand Finals in 2018, helping to identify promising startups that can transform clean tech industries.

6) Novartis provided sponsorship and funding for the Environmental League of Massachusetts (ELM) Earth Night 2018, and also

provided sponsorship and funding for the 2018 A Better City Norman B. Levanthal Excellence in City Building Awards.

7) Novartis formally joined the Environmental League of Massachusetts (ELM) in late 2018, and are involved in lawmaker education sessions with the Massachusetts state legislature on environmental sustainability issues to include climate mitigation and climate adaptation.

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?

At Novartis, our purpose is to reimagine medicine to improve and extend people's lives. Through our business, we make an important contribution to society: we discover and develop innovative healthcare products, targeting unmet medical needs. We collaborate with others to help address some of the world's greatest health challenges and focus our corporate responsibility work on two areas that underscore our mission: expanding access to healthcare and doing business responsibly. The Novartis Global Health and Corporate Responsibility Leadership Team (GHCRLT) comprised of leaders from each division and across multiple functions of the company, have guided this work. The GHCRLT is tasked with facilitating information-sharing between other CR-related governance bodies, such as the HSE Steering Committee, the Compliance Steering Committee and Corporate Affairs. For external advocacy, Corporate Affairs has developed a document describing eight advocacy principles as guidance for efforts regarding Corporate Responsibility (CR). The advocacy principles are based on and reflect the Novartis CR strategy, including doing business responsibly and addressing our ambitious environmental sustainability targets to limit the company's environmental impact. Advocacy principles are rooted in the business strategy, and thus are consistent. Both, advocacy principles and business strategy, evolve over time in line with the business and the external environment.

Additionally, active members and participants in the WBCSD activities are members of either top management or corporate functional managers of the Company:

World Business Council for Sustainable Development (WBCSD): The CEO is a Council member and the Global Head HSE&BCM and the Global Head of Environment are liaison delegates to the WBCSD. The Group Head Global Health & Corporate Responsibility and the Global Head HSE&BCM participate in Council meetings representing the CEO when not available. The Global Head of Environment, Head of Climate, and other experts in the global function participated in dedicated meetings and actively contribute to projects and work-group activities. Novartis signed the manifesto for Energy Efficient Buildings of the WBCSD; we are applying our GHG reporting to the GHG Protocol, developed by WBCSD and WRI, and we use the Global Water Tool for setting water efficiency targets and tailoring our water efficiency program.

These efforts and engagements are coordinated and shared through the responsible corporate governance structure as previously described that is involved with Novartis' environmental sustainability strategy, and is relayed into the strategy, risk, production, procurement and Health, Safety and Environment (HSE) communities as well as corporate responsibility and 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

novartis-in-society-report-2018.pdf

Page/Section reference

"Being a responsible citizen", pages 35 - 45

Content elements

Strategy

Emissions figures

Emission targets

Other metrics

Comment

C14. 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.

C14.1

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

	Job title	Corresponding job category
Row 1	Head of Novartis Business Services (NBS), reporting directly to the CEO and ensuring that the Company has effective operational and financial procedures in place. Corresponding to job category COO.	Chief Operating Officer (COO)

SC. Supply chain module

SC0.0

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

Novartis is responding to the CDP Supply Chain Survey for the 8th time in 2018.

It should be noted that the carbon footprint data contained in this survey is calculated on the basis of products sold to the respective client compared to the total Novartis sales for the year 2017. Novartis' manufacturing structures and materials supply chain is very complex. Product specific carbon and other environmental footprint data have been determined for a limited number of selected products. The Greenhouse Gas (GHG) emission data reported in the course of this questionnaire is therefore calculated based on GHG intensity numbers for Novartis Businesses (Divisions) multiplied with the spend of the requesting client company with each Division.

SC0.1

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

	Annual Revenue
Row 1	51900000000

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	CH	0012005267

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.

SC1.2

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

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	Novartis' manufacturing structures are very complex, in the sense that a wide variety of individual products are manufactured at a number of chemical, pharmaceutical, packaging and/or assembly facilities. Additionally, this is the case for our raw materials supply chain. Product-specific carbon and other environmental footprint data have been determined based on Life Cycle Analysis (LCA) methodologies for a limited number of selected products and on various environmental aspects (e.g., packaging material, volume). Due to the scale, diversity and complexity of Novartis product lines and customer pool, it is currently not feasible or practicable to allocate to individual customers. GHG data reported in the course of this questionnaire is therefore calculated based on GHG intensity numbers for Novartis Businesses (Divisions), multiplied with the spend of the requesting client company with each Division. This calculation is based on the methodology described by the WRI / WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting (corporate-level allocation, market value method).
Customer base is too large and diverse to accurately track emissions to the customer level	Novartis produces a variety of different products and product versions to a large number of diverse customers worldwide and the portfolio sold to these customers is complex. Therefore, the exact set of products sold to customers asking for input cannot be determined, and product-specific environmental footprint data has only been determined for a limited number of individual products. For these reasons, GHG data reported in the course of this questionnaire is calculated based on GHG intensity numbers for Novartis Businesses (Divisions), multiplied with the spend of the requesting client company with each Division. This calculation is based on the methodology described by the WRI / WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting (corporate-level allocation, market value method).

SC1.4

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

No

SC1.4b

(SC1.4b) Explain why you do not plan to develop capabilities to allocate emissions to your customers.

Due to the scale, diversity and complexity of Novartis product lines and customer pool, it is currently not feasible or practicable to allocate to individual customers.

SC2.1

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

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

Please select

SC3.1

(SC3.1) Do you want to enroll in the 2019-2020 CDP Action Exchange initiative?

Please select

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2018-2019 Action Exchange initiative?

Please select

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Please select

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

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

Please confirm below

I have read and accept the applicable Terms