

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 nearly 1 billion people globally in 2017. Approximately 126 000 people of 145 nationalities work at Novartis around the world.

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 mission is to discover new ways 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 use science-based innovation to deliver better patient outcomes in growing areas of healthcare. We believe innovation leadership will be increasingly important to respond to future opportunities and challenges, as we strive to continue creating value for our company, our shareholders and society. We are implementing our strategy with a focus on further strengthening innovation, driving a digital transformation, and reinforcing our position in growing areas of healthcare.

In 2017, we focused on fully implementing the integrated drug development and manufacturing structures we established a year earlier. With these latest steps in our transformation, we believe our organization is now well positioned to drive forward our strategy – leading in innovation, harnessing new technology, and making the most of our global scale. 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. NIBR focuses on discovering new drugs that can change the practice of medicine. The Global Drug Development (GDD) organization oversees the development of new medicines discovered by our researchers and partners. GDD regularly evaluates the potential new products in our pipeline and ensures we allocate resources to the most promising development projects. It also drives the adoption of common standards and procedures, best practices and new technologies, with the aim of greater efficiency and effectiveness. The Innovative Medicines Division has two business units. Novartis Pharmaceuticals focuses on patented treatments in the areas of ophthalmology, immunology and dermatology, neuroscience, respiratory and cardio-metabolic. Novartis Oncology is focused on treatments for a variety of cancers and rare diseases. Sandoz offers patients and healthcare professionals' high-quality, affordable generics and biosimilars. With its Surgical and Vision Care businesses, Alcon offers one of the world's widest selections of eye care devices – from sophisticated equipment for delicate eye surgery to a wide portfolio of advanced contact lenses. Our global service and manufacturing organizations help us benefit from our global scale and support our efforts to improve efficiency. Novartis Technical Operations (NTO) handles manufacturing of innovative medicines and Sandoz products. NTO helps us optimize resource allocation and capacity planning across our production sites while further improving quality. Novartis Business Services (NBS) consolidates support services across our organization, helping drive efficiency, simplification, standardization and quality. NBS includes six service domains: financial reporting and accounting operations, human resources services, information technology, procurement, product lifecycle services, and real estate and facility management. It helps generate productivity gains.

Our corporate responsibility (CR) strategy fundamentally supports this company mission 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 will continue to do what we can to reduce or mitigate our environmental impacts. We apply a precautionary approach in all operations to minimize environmental impacts (emissions to air and water, waste to landfill, and efficient use of water and energy resources). We also manage risks proactively by implementing appropriate preventive and contingency measures.

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 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<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
Spain
Switzerland
Turkey
United Kingdom of Great Britain and Northern Ireland
United States of America
Other, please specify (Rest of world)

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) 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 responsible for setting the strategic direction of the group. This group typically meets 9 times per year and each meeting lasts 6 hours. Environmental sustainability includes climate management which is considered to be a material issue for the organization which needs to be balanced with other business issues and priorities. The Board chair is best placed to do this.
Board/Executive board	The Governance, Nomination and Corporate Responsibilities Committee oversees the company's strategy and governance on corporate responsibility which includes climate related issues. This task is subject to final Board approval. This group typically meets 3 times for year and each meeting lasts 6 hours. The Global Head of Corporate Responsibility updates the GNCRC regularly on CR strategy and performance. This group is responsible for identifying and investigating issues which are of strategic importance to the business and checking if they are appropriately managed. If they had concerns about the Novartis climate strategy these would be brought to the attention of the Board and the Executive Committee of the Novartis (ECN).
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 Corporate Responsibility report and its associated Environmental Data Supplement. The CEO ensures 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.

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	<ul style="list-style-type: none"> Reviewing and guiding strategy Reviewing and guiding major plans of action Monitoring and overseeing progress against goals and targets for addressing climate-related issues 	The Governance, Nomination and Corporate Responsibilities Committee typically meets three times per year. Climate change strategy is discussed periodically and any recommendations are subject to Board approval. In 2017 it was decided to review our climate strategy. The Executive Committee of Novartis, which includes the CEO and other C suite leaders, meets monthly. Climate related issues are scheduled as needed. In 2017 climate strategy, investments in renewable energy (power purchase agreements) and climate resilience were included as agenda items.

C1.2

(C1.2) Below board-level, provide the highest-level management 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	As important matters arise
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 (Sustainability Steering Committee)	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.

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

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 Head of HR 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 Group Head of HR 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 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.

The Head of Novartis Business Services reports directly to the CEO, is a member of the ECN and is responsible for the design of the corporate environmental sustainability strategy. Execution of the strategy is spread across the business, with resources and programs in various portions of the company.

A Sustainability Steering Committee has been 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 Global Head Technical Ops and Quality (ECN Member), the Global Head of Corporate Responsibility, the Head of TRD and Global Drug Development, the Chief Procurement Officer, the Group Head of Communications, the Head Group BPA & Treasury and the Head of Real Estate and Facility Services.

To better understand the needs and expectations of internal and external stakeholders, we conducted a third full materiality assessment (MA) over the course of 2017. The previous MA (conducted in 2006 and 2013) served as a starting point for this most recent assessment, which was conducted in 2017. Following best practice guidelines published by international standard setters – including Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), International Integrated Reporting Council (IIRC) and others – we conducted desk research to identify a set of important CR topics impacting our business, and prioritized the topics by surveying an inclusive list of internal and external stakeholders. In addition to the quantitative analysis, we gathered qualitative data captured through free text fields in the surveys, and we conducted more than 60 one-on-one interviews. As a result, we identified 30 topics in eight issue clusters, which were then ranked by internal and external stakeholders based on impact on and performance of Novartis. Using adequate statistical selection criteria, we identified 14 of these topics that Novartis plans to prioritize in the years to come: “Pollution, waste & effluents”, “Pharmaceuticals in the environment” and “sustainable use of resources”. This exercise gives us a clear direction for future environmental engagement and communication. This will prevent negative feedback or increased concerns from stakeholders on these emerging topics.

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.

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 Novartis Executive Committee, are rewarded for meeting division specific absolute emission reduction targets on total Scope1 and Scope2 GHG (in tons CO2e) and CO2 emissions from vehicles fleet (in tons CO2).

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Energy reduction target

Comment

The Global Head Corporate Responsibility is rewarded for the corporate absolute emission reduction targets on total Scope1 and Scope2 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). His 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

Energy reduction target

Comment

The Head of Novartis Business Services is rewarded for the corporate absolute emission reduction targets on total Scope1 and Scope2 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). His 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 Global Head of Technical Operations is rewarded for the corporate absolute emission reduction targets on total Scope1 and Scope2 GHG (in tons CO2e), energy efficiency and energy savings targets (savings from energy projects in USD, GJ and tCO2e). His 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 Scope1 and Scope2 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 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 CR to recognize significant contributions to the company goals in reducing carbon footprint through efficiency and behaviors, or other sustainability projects such as water footprint, sustainable packaging and waste reductions. Environmental Sustainability in "Corporate Responsibility Awards" Novartis Health, Safety and Environment (HSE) presents "HSE Awards" annually in multiple categories, one specifically for environmental projects. "Above and Beyond Awards" are processed for employees who tackle significant challenges in order to improve business performance. One of the quarterly awards in 2017 was to the cross-organizational team that secured Novartis' first Power Purchase Agreement, a new 100 MW wind asset in Texas, in recognition of both the climate benefit and the business benefit.

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	15	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. Climate risk categories are generally flooding due to heavy precipitation, sea level rise, water scarcity and heat events. 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.

Novartis manages risks proactively by implementing appropriate preventive and contingency measures. Risks include all climate change and environment-related potential risks and opportunities including natural disasters such as floods, drought, heat events, storms and earthquakes; health risks to people e.g., pandemic; safety risks such as fire and explosions; environmental risks such as sea level rise, water scarcity, spillage, soil contamination, water pollution; and climate risks related to business continuity. Risks can be catalogued at the site level and elevated to senior leadership, they can be identified during site assessments and audits, and they can be identified by more senior leadership in the organization. All of the relevant risk information is passed to Business Continuity staff, Risk staff and strategy staff in various portions of the company as applicable. Substantive impact level could be triggered by significant change in health/safety, environment, regulatory/compliance, operations/business, reputation/image and financial factors. Each one of those variables has a different level of change that triggers assessment as a medium or high risk, and the variables are considered in combination. Therefore, there is no single trigger that determines how serious the risk is considered. In general, from an environmental sustainability standpoint, anything that would trigger a 10% change in carbon footprint or a 10% change in program costs would be brought to the Executive Committee of Novartis (ECN) for review. The risk management matrix takes into account impact versus level of control.

Novartis is conducting both sensitivity and stress testing for climate and water. 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 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 has been 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. The current consolidated impact valuation is 2.2B USD globally, which incorporates far more variables than just climate risks but is in line with a holistic approach to impact valuation. While multiple risks are considered, not all are listed in this report. Financial impact of individual risks is still being developed, and there is not enough maturity in many of those numbers to assign a value that would be released in a publicly accessible report. Efforts to do so began in 2017 and have continued through this year.

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, both 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 obvious example of the increasing financial risk potentially posed by our carbon footprint. 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 alone 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.
Emerging regulation	Relevant, always included	Current regulations are always considered, both 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 obvious example of the increasing potential financial risk posed by our carbon footprint. 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 alone 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.
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, and we are already looking at this issue in markets like India.
Legal	Relevant, sometimes included	In many cases, there are legal requirements to be met regarding carbon emissions trading schemes or other emissions. Increasingly, more focus is being given to evolving legal risks that might occur related to financial disclosure of climate related financial risk. Formal financial disclosures can impact investor decisions, and as such, should meet rigorous standards for data integrity and review process before releasing this data. Failure to do so properly potentially represents risk to the company.
Market	Relevant, sometimes included	Market dynamics involving value creation for companies that focus on sustainable business are increasingly included in discussions. 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, to include events in China where poor air quality caused region wide factory shutdowns across all market sectors.
Reputation	Relevant, always included	Risks related to reputation are always considered. Novartis continues the work of a third party risk management workstream 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.
Acute physical	Relevant, always included	Sudden physical impact of climate change is always included in the consideration of risks. Acute physical risks include flooding from sea level rise, flooding from heavy precipitation events, water scarcity, heat events and changing storm patterns.
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.
Upstream	Relevant, sometimes included	Climate stress on system of 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 starting in 2017 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.
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.

C2.2d

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

Once identified, risks are assessed using scenario analysis and subject to stress-testing through worst case scenarios. The impact and level of control refer to the latter, and consider multiple impacts of a risk. The highest impact and level of control define the risk significance. Risks are assessed in terms of impact and level of control. Following the assessment, risks are classified as First, Second, or Third priority ones. Accordingly, risk treatment strategies are developed and implemented to ensure adequate risk control. The Third priority risks are those for which no further mitigation measures are considered necessary but only monitoring to assure the control level. Second-priority risks are those that either have controls in place but require strict supervision/monitoring (due to potential impact), or that have a low impact but have control weaknesses. First-priority risks have a potential material impact for the Group and require strengthening of controls or risk avoidance e.g. products with unfavorable risk/benefit ratio for patients. Substantive impact level could be triggered by significant change in health/safety, environment, regulatory/compliance, operations/business, reputation/image and financial factors. Each one of those variables has a different level of change that triggers assessment as a medium or high risk, and the variables are considered in combination. Therefore, there is no single trigger that determines how serious the risk is considered. In general, from an environmental sustainability standpoint, anything that would trigger a 10% change in carbon footprint or a 10% change in program costs would be brought to the Executive Committee of Novartis (ECN) for review .

Risks are then consolidated into a Corporate Risk Portfolio. The consolidated Corporate Risk Portfolio is presented to and discussed with the Risk Committee of the Board of Directors (BoD). Action plans for the risks above risk acceptance levels have been developed and are being implemented. Audit results are reported to HSE Governance Board at each meeting and to the BoD Risk Committee.

Novartis has taken a proactive approach towards existing and forthcoming legal schemes on greenhouse gas (GHG) emissions as set forth in its Corporate Energy and Climate Strategy (adopted by the Executive Committee of Novartis in June 2015 with GHG targets for 2020 and 2030 and reviewed in 2016). Novartis 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.

Information on risk exposure related to carbon pricing as a transition risk has directly impacted the 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.

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 driver

Policy and legal: 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 Energy and Climate Strategy (adopted by the Executive Committee of Novartis in June 2015 with GHG targets for 2020 and 2030 and reviewed in 2016). Novartis 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 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.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Potential financial impact

62000000

Explanation of financial impact

Previously, energy costs have exceeded USD 311M 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 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 just under €4 to just under €14. 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

In an effort to integrate these risks into normal business, Novartis has also endorsed an internal carbon price of USD100/tCO₂e as shadow price, anticipating the increase in real costs of carbon to rise to USD40-USD80/ton CO₂e by 2025, and to USD60-USD100/ton by 2030 as a result of both regulatory and carbon market dynamics. 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 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 used by procurement to adjust procurement and hedging strategies to reduce volatility and exposure.

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.

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 driver

Policy and legal: 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

Potential financial impact

1000000

Explanation of financial impact

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 paygrades in addition to external consultant fees. This is a conservative figure, and likely understates the true costs.

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 driver

Technology: Costs to adopt/deploy new practices and processes

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. For instance, on the Basel campus, most cooling is provided using non-contact cooling water from the Rhine River. During recent years, as the temperature of the Rhine has risen to levels not commonly seen before, the effectiveness of that cooling has been reduced to the point that employees have been specifically told how to deal with rising office temperatures during heat events that have increased in frequency and duration. Eventually, cooling on the Basel campus will need to be augmented by more energy intensive methods in order to be effective.

Time horizon

Long-term

Likelihood

Very likely

Magnitude of impact

High

Potential financial impact

62000000

Explanation of financial impact

Total energy costs were approximately USD 311M in 2017, 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 USD311M 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 calculated in 2017 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. Risks will be assessed annually and shared 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.

Cost of management

311000000

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 driver

Increased capital costs (e.g., damage to facilities)

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

Likely

Magnitude of impact

Medium

Potential financial impact

40000000

Explanation of financial impact

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 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 USD5M 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 modeling 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. 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 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.

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: Increased cost of raw materials

Type of financial impact driver

Other, please specify (Increased costs due to less biodiversity)

Company- specific description

Currently Novartis sells multiple products based on natural compounds. One specific example is Sandostatin, which generates more than USD 1.6 billion in net sales. 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

More likely than not

Magnitude of impact

Medium-high

Potential financial impact

1612000000

Explanation of financial impact

Current Novartis products based on natural compounds include Sandostatin, which generates more than 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 \$42B annual 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 developed 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, 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.

Cost of management

1000000

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 driver

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 USD311M 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 USD31M each year, quickly adding to over USD100M 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 ROI, this projections beyond a medium horizon are not provided. Calculations and programming for this expanded effort started in earnest in 2017 and continue into 2018.

Time horizon

Current

Likelihood

Virtually certain

Magnitude of impact

Medium-high

Potential financial impact

100000000

Explanation of financial impact

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 311M 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, costs in the EU ETS has increased from just under €4 to just under €14. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-€80 by 2025.

Strategy to realize opportunity

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. 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 driver

Reduced exposure to future fossil fuel price increases

Company- specific description

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.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

High

Potential financial impact

62000000

Explanation of financial impact

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 311M 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 USD100/tCO2e as shadow price, anticipating the increase in real costs of carbon to possibly rise to USD40-USD80/ton CO2e by 2025, and to USD60-USD100USD/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 driver

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 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.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium-low

Potential financial impact

40000000

Explanation of financial impact

Exploration of financial impact began recently, and data that could be shared publicly is not yet available. 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 USD5M in physical costs and disruption to business. It is not clear if that figure will prove to be accurate, but work started in 2017 in partnership with MIT to assess possible risks. Costs to realize opportunity are based on costs for risk assessments and limited physical adaptation.

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. Initial global risks are being assessed in partnership with the Massachusetts Institute of Technology, and can be shared with applicable production, research and facilities staff. A pilot program planned in 2017 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 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 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 modeled climate risk that don't involve proprietary data should be shared with the communities where our analysis is taking place. This would allow them to make progress in building resilience across the system of systems that are required to support normal business operations.

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 311M 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 just under €4 to just under €14. 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 risk 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.
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. Previously, energy costs have exceeded USD 311M 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 just under €4 to just under €14. 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 factored into your financial planning process.

	Relevance	Description
Revenues	Impacted	Previously, energy costs have exceeded USD 311M 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 just under €4 to just under €14. Multiple institutions expect the costs within the EU ETS alone to increase to between €40-€80 by 2021 and between €50-€100 by 2030.
Operating costs	Impacted	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 USD100 per ton provides a useful estimate of the increasing real costs of carbon in operations, and is guiding capital investments in efficiency and development of energy supply chain diversification to renewables. Previously, energy costs have exceeded USD 311M 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 just under €4 to just under €14. 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 may have a medium impact.
Capital expenditures / capital allocation	Impacted	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 USD100 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 evaluated	This has not been evaluated yet.
Assets	Not evaluated	This has not been evaluated yet.
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.

To better understand the needs and expectations of internal and external stakeholders, we conducted a third full materiality assessment (MA) over the course of 2017. The previous MA (conducted in 2006 and 2013) served as a starting point for this most recent assessment, which was conducted in 2017. Following best practice guidelines published by international standard setters – including Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), International Integrated Reporting Council (IIRC) and others – we conducted desk research to identify a set of important CR topics impacting our business, and prioritized the topics by surveying an inclusive list of internal and external stakeholders. In addition to the quantitative analysis, we gathered qualitative data captured through free text fields in the surveys, and we conducted more than 60 one-on-one interviews. As a result, we identified 30 topics in eight issue clusters, which were then ranked by internal and external stakeholders based on impact on and performance of Novartis. Using adequate statistical selection criteria, we identified 14 of these topics that Novartis plans to prioritize in the years to come including these environmentally relevant topics: “Pollution, waste & effluents”, “Pharmaceuticals in the environment” and “sustainable use of resources”. This exercise gives us a clear direction for future environmental engagement and communication. This should prevent negative feedback or increased concerns from stakeholders on these emerging topics.

Multiple opportunities exist related to climate change. Most importantly, a combined portfolio of actions that include greenhouse gas reduction for climate mitigation as well as collaborative efforts to create climate resilience in the communities we operate in and support will create a competitive advantage. That potential advantage includes components like financial benefit of avoiding carbon pricing and taxes when competitors do not, creating shareholder value by positioning positively with impact investors like BlackRock and Vanguard who along with others are increasingly prioritizing sustainability performance, and by using brand value as a sustainable company to recruit and retain the best talent instead of losing them to a more sustainable company. Discrete business opportunities may also exist in shifts in disease vectors, both in communicable diseases and in non-communicable diseases.

We have a dual strategy for GHG reduction, primarily from energy and fuel usage, i.e., 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 the shifting weather patterns in many regions. 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 effects 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 specifically caused a change in strategy to strive for much more rapid and complete adoption of renewables across our business. In the United States, a virtual power purchase agreement for 100 MW of wind generation was approved as a means of reducing our footprint, reducing our exposure to pricing and enhancing reputation. This one project offset over 70% of our Scope 2 emissions in the US market, and is the equivalent of taking about 48,000 cars off the road each year in the US market. After the success of that initial project in 2017, the company created a pipeline of possible renewable projects in Belgium, Ireland and Spain in 2017 while also starting the process to go to market for other projects in multiple countries.

The negative impact of climate change is also being considered, as the first round of more detailed climate risk assessments completed this year have been shared with staffs in production, finance and facilities to create a more holistic integrated risk management strategy. Applicable production and facilities staff have been provided initial data as a tool to 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 center production of critical medicines.

C3.1d

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

Climate-related scenarios	Details
Other, please specify (Paris Forever)	<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. 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 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 modeling 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 is 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.</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

% reduction from base year

30

Base year

2010

Start year

2015

Base year emissions covered by target (metric tons CO2e)

1488100

Target year

2020

Is this a science-based target?

No, but we are reporting another target that is science-based

% achieved (emissions)

72.4

Target status

Underway

Please explain

The Novartis long-term target is to reduce combined Scope1 and Scope2 (market-based) GHG emissions by 50% by 2030 based on 2010 emissions. The baseline of 1488kt has been corrected with respect to the actual 2010 emissions to include acquisitions and divestments made after 2010, incl. one major site divestment in 2016. The -30% by 2020 and -50% by 2030 Scope 1+2 targets have been confirmed to be science-based by response from the SBT initiative, being two major milestones to carbon neutrality in the second half of the 21st century, as expected by UN-FCCC. The status achieved in 2017 is 16.0% reduction of emission from our industrial operations plus 5.7% carbon sinks of additional GHG reductions achieved from our own forestry projects. The 21.7% reduction achieved after 7 years of the total 20 years' target period represents a reduction of 43.4% of the 50% reduction target.

Target reference number

Abs 2

Scope

Scope 1 +2 (market-based)

% emissions in Scope

100

% reduction from base year

50

Base year

2010

Start year

2015

Base year emissions covered by target (metric tons CO2e)

1488100

Target year

2030

Is this a science-based target?

Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% achieved (emissions)

43.4

Target status

Underway

Please explain

The Novartis long-term target is to reduce combined Scope1 and Scope2 (market-based) GHG emissions by 50% by 2030 based on 2010 emissions. The baseline of 1488kt has been corrected with respect to the actual 2010 emissions to include acquisitions and divestments made after 2010, incl. one major site divestment in 2016. The -30% by 2020 and -50% by 2030 Scope 1+2 targets have been confirmed to be science-based by response from the SBT initiative, being two major milestones to carbon neutrality in the second half of the 21st century, as expected by UN-FCCC. The status achieved in 2017 is 16.0% reduction of emission from our industrial operations plus 5.7% carbon sinks of additional GHG reductions achieved at our own forestry projects. The 21.7% reduction achieved after 7 years of the total 20 years' target period represents a reduction of already 43.4% of the 50% reduction target.

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 projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	45	26430
To be implemented*	18	4203
Implementation commenced*	1	220000
Implemented*	5	22597
Not to be implemented	0	0

C4.3b

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

Activity type

Low-carbon energy purchase

Description of activity

Other, please specify (Wind virtual power purchase agreement)

Estimated annual CO2e savings (metric tonnes CO2e)

220000

Scope

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

250000

Investment required (unit currency – as specified in CC0.4)

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 offtaker for 100MW of capacity from this 300 MW capacity project. Commercial operation date will be in 2019. This project is the first PPA for Novartis, and will offset over 70% of Novartis 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.

Activity type

Energy efficiency: Building services

Description of activity

Other, please specify (Compressed air and HVAC optimization)

Estimated annual CO2e savings (metric tonnes CO2e)

1000

Scope

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

75000

Investment required (unit currency – as specified in CC0.4)

200000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

Compressed air optimization and HVAC upgrades in Kundl, Austria. Standard industry approach to install the most energy efficient current systems, balance the system for optimal performance and leveraging set points for reduced energy intensity and reduce leaks in compressed air system.

Activity type

Energy efficiency: Building services

Description of activity

HVAC

Estimated annual CO2e savings (metric tonnes CO2e)

5000

Scope

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

75000

Investment required (unit currency – as specified in CC0.4)

200000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

HVAC upgrades in Slovenia. Standard industry approach to install the most energy efficient current systems, balance the system for optimal performance and leveraging set points for reduced energy intensity.

Activity type

Energy efficiency: Building fabric

Description of activity

Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)

5000

Scope

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

75000

Investment required (unit currency – as specified in CC0.4)

200000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

HVAC upgrades in Spain cluster. Standard industry approach to install the most energy efficient current systems, balance the system for optimal performance and leveraging set points for reduced energy intensity.

Activity type

Energy efficiency: Building services

Description of activity

HVAC

Estimated annual CO2e savings (metric tonnes CO2e)

6000

Scope

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

900000

Investment required (unit currency – as specified in CC0.4)

3000000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

NTO Beijing campus implemented a suite of tools and approaches in balancing the HVAC systems to include: Air Change Rate Optimization in cleanliness area with proper qualification, HVAC Night-shift mode, reducing fresh air for AHU from 100% to 20% (room function change), optimization of humidification of clean room based on risk assessment, optimized operation parameters of chillers and boilers, optimized operation parameters for air compressors, and the HVAC shut down in holiday periods. Combined with introducing new technology like Energy Management Systems, Heat Recovery of boiler flue gas and LED replaced fluorescent lamp the campus achieved a 20% reduction in Energy in energy intensity per building space (m2), and 38% Energy intensity per production volume (ton), resulting in 20% energy savings at the site.

Activity type

Process emissions reductions

Description of activity

Changes in operations

Estimated annual CO2e savings (metric tonnes CO2e)

5597

Scope

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

250000

Investment required (unit currency – as specified in CC0.4)

75000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Shanghai campus balanced efficient HVAC equipment installed in the last few years and also altered set points for cooling and other processes influencing energy consumption. Monthly energy performance review and analysis was implemented for saving opportunities and continuous improvement through an established feedback loop. Staff were able to save over USD1M and almost 6,000 tons of carbon without sacrificing occupant comfort levels. Standard industry approach to install the most energy efficient current systems, balance the system for optimal performance and leveraging set points for reduced energy intensity. Ongoing monitoring will allow the site to spot sub-par performance and repair or replace equipment as well as change processes.

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 USD100 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 Corporate Responsibility, Real Estate and Financial Services as well as Health, Safety and Environment.

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 16kgCO₂e/kg API compared to 35 to 48 kgCO₂e/kgAPI 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)

% 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 2010

Base year end

December 31 2010

Base year emissions (metric tons CO2e)

617900

Comment

The base year emissions have been corrected with respect to the actual 2010 emissions to cover acquisitions and divestments made after 2010, this includes one major site divestment in 2016.

Scope 2 (location-based)

Base year start

January 1 2010

Base year end

December 31 2010

Base year emissions (metric tons CO2e)

979900

Comment

The base year emissions have been corrected with respect to the actual 2010 emissions to cover acquisitions and divestments made after 2010, this includes one major site divestment in 2016.

Scope 2 (market-based)

Base year start

January 1 2010

Base year end

December 31 2010

Base year emissions (metric tons CO2e)

870200

Comment

The base year emissions have been corrected with respect to the actual 2010 emissions to cover acquisitions and divestments made after 2010, this includes one major site divestment in 2016.

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?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)

540198

End-year of reporting period

<Not Applicable>

Comment

C6.2

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

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

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?

Row 1

Scope 2, location-based

901046

Scope 2, market-based (if applicable)

710299

End-year of reporting period

<Not Applicable>

Comment

C6.4

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

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

4887000

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 2017 spend data. The analysis considers average emission intensities by industry sector and incorporates regional trade flows and inter-relationships to calculate emissions from purchased goods spend data. The amount reported includes all tiers of suppliers in the materials value chain.

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

17

Explanation

The emissions calculated with the further developed EEIO tool (EnScaN - Environmental Supply chain accounting Novartis) considers all tiers in the upstream value chain and is not limited to a few levels of tiers as the previously used analysis. For this reason the emissions are significantly higher than in the previous year. This study based on an input/output assessment was undertaken in spring 2017 using 2016 purchasing data. The first year Novartis conducted EEIO analysis was 2015. Since then Novartis performed the assessment on a yearly basis and refined the approach and the level of detail over time. In addition, Novartis is participating in the CDP Supply Chain program and obtaining data from suppliers. The input is used to further refine the environmental footprint and analyze / monitor the environmental performance of our suppliers.

Capital goods

Evaluation status

Not relevant, calculated

Metric tonnes CO2e

690000

Emissions calculation methodology

The emission data for this category was calculated in 2017 with 2016 data based on an extended input-output assessment. The analysis considered over 90% of our CapEx (capital goods) spend. To determine the emissions in this category, the expenses were matched based on the country and industry sector to emission intensities of these sectors in the specific countries.

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

0

Explanation

The emissions were calculated as described and evaluated as adequately accurate. However, emissions vary significantly year by year depending on the level of investments in various projects each year. Any trends bear the risk of being misleading or misinterpreted. In addition, the analysis revealed that 90% of the emissions in this category are beyond our direct suppliers. For these reasons the category is considered not relevant.

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

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

0

Emissions calculation methodology

N/A

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

0

Explanation

Compared to the total Scope 1,2 and 3 emissions for Novartis, these emissions are not considered relevant. The emissions were calculated to be 100kt CO2e but we see no significant reduction opportunities and very limited potential to influence. E.g. upstream emissions from fuels were already reduced as use of coal is avoided and other fossil fuels than gas are around 5%. We plan to re-evaluate this point in the future but for now the category is not considered relevant.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

424000

Emissions calculation methodology

An environmentally extended input-output assessment was performed in spring 2018 with 2017 data. All spend in this category was considered accordingly.

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

70

Explanation

The GHG emissions of this category were calculated based on a refined approach of the input/output assessment undertaken in spring 2018. The sector codes in the further developed EEIO tool (EnScaN - Environmental Supply chain accounting Novartis) differ from the sector codes used in the previous year and thus form the relevant industry emissions. Therefore, the results are not comparable to the results reported to the CDP in 2017. Using the EnScaN tool for the 2016 spend data shows that the emissions in 2017 are comparable to those in 2016. Novartis is participating in the CDP Supply Chain program and obtaining data from suppliers. The input is used to further refine the environmental footprint and analyze / monitor the environmental performance of our suppliers.

Waste generated in operations

Evaluation status

Not relevant, calculated

Metric tonnes CO2e

42000

Emissions calculation methodology

A procedure was established to calculate GHG emissions from reported waste data, based on emission factors determined from each of these waste types determined from their composition, climate-related properties, and disposal path. As this methodology uses primary data it is considered to be adequately accurate. Wastewater: Environmentally extended input output assessment was performed to assess the emissions of the wastewater accordingly. These emissions were only a small fraction of the emissions in category 5, and for this reason not considered in the final calculation methodology.

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

100

Explanation

Compared to the total Scope 1,2 & 3 emissions for Novartis, these emissions are not considered relevant (< 100 kt CO2e) for the inventory.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

239000

Emissions calculation methodology

Data was calculated from miles travelled in different flight distances (intercontinental, international, domestic) and booking classes for each individual flight, added to a total. It covers all flight travel for Novartis employees plus service providers on their trips for Novartis. An assessment performed showed that at least 80% of the emissions in this category are related to air travel. For this reason it was decided to only include the air travel in this category. Emissions from hotel and accommodation are not included as their reporting is optional based on the Scope 3 accounting standard and the mentioned assessment revealed that these emissions are negligible compared to the total emissions in this category.

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

100

Explanation

This Scope 3 aspect and related performance number is included in the environmental performance summary table in the Novartis CR Report page 48, which is part of the assurance scope.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

147000

Emissions calculation methodology

Novartis calculated this data on the basis of the regional distribution of employees (accurate primary data) and respective assumptions for GHG emission factors for private and public transport in each major geographic region. Based on this study in 2010, the average per capita emission was calculated. As the number of employees increased compared to the base year by less than 2% and no further substantial geographical changes have to be considered, the per capita emission factor is seen as representative to calculate the emissions for 2017, considering the actual number of employees.

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

0

Explanation

This Scope 3 category is relevant. However, analysis in the last couple of years revealed that other Scope 3 GHG categories are more significant in their scale.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

N/A

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

Explanation

Operational control approach is used: Emissions of Novartis leased assets are already part of Scope 1 and 2. In addition, company leased cars are included in Scope 1 and 2 and for this reason not relevant in this category.

Downstream transportation and distribution

Evaluation status

Not relevant, calculated

Metric tonnes CO2e

57000

Emissions calculation methodology

The calculation is based on the following assumptions derived from regional production types and volumes (accurate primary data):
1) All products are transported over 500km by train or 40t lorry (50% each)
2) All products are transported by small lorries on the last 25km
3) Products delivered to internal and external destinations are treated equally
4) 10% of all products are transported by ship for 5000 km
5) 3% of all products are transported by airplane for 5000 km

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

0

Explanation

Assessment performed - no further actions. Compared to the total Scope 1,2 and 3 emissions for Novartis, these emissions are not considered relevant (Approx 100 kt CO2e).

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

N/A

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

Explanation

Very few Novartis goods are processed further after they are sold. Related emissions are thus considered not relevant. To sell intermediate products is not our business model.

Use of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

111000

Emissions calculation methodology

The use of Novartis products does not generally result in GHG emissions, with the exception of an inhaler product that uses HFC R134a as a propellant. All quantities of HFC R134a used in the production of the inhaler product are measured. 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

The use of Novartis products does not generally result in GHG emissions, with the exception of an inhaler product that uses HFC R134a as a propellant. The emissions of this product were assessed and considered as relevant.

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

N/A

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

Explanation

Novartis' pharmaceutical products (tablets, injectables, etc.) are consumed by patients and no GHG emissions associated with the end of life of sold Novartis products occur by that. Novartis has only few medical device products (e.g. inhalers, surgery tools and contact lenses). The inhalers are considered separately in category 11 "Use of sold products". For the remaining products it was assumed that GHG emissions are not relevant.

Downstream leased assets

Evaluation status

Not relevant, calculated

Metric tonnes CO₂e

Emissions calculation methodology

Novartis calculated this data based on the assets that are leased out by Novartis (accurate primary data). As proxy data for the emissions the Novartis internal data is used as reference.

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

Explanation

Assessment performed - no further actions. The emissions are around 100 ktCO₂e and therefore not considered relevant.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

N/A

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

Explanation

Any GHG emissions associated with franchises are not considered relevant. Novartis is not in the franchise business.

Investments

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

N/A

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

Explanation

Any GHG emissions associated with investments are not considered relevant (Limited potential to influence and emissions are not relevant for the Novartis business goals).

Other (upstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

N/A

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

Explanation

In our screening of our relevant scope 3 activities no "other (upstream)" emissions were identified.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

N/A

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

Explanation

In our screening of our relevant scope 3 activities no "other (downstream)" emissions were identified.

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.
85561

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

0.00002546

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

1250497

Metric denominator

unit total revenue

Metric denominator: Unit total

49109000000

Scope 2 figure used

Market-based

% change from previous year

6.4

Direction of change

Decreased

Reason for change

Nominal total Scope 1 and Scope 2 GHG emissions have decreased between 2016 and 2017, from 1320.4 ktCO₂e in 2016 to 1250.5 ktCO₂e in 2017. This is due to the implementation of energy savings projects in 2017 that have led to emission reductions of 24.2 ktCO₂e in the calendar year combined with increased sourcing of renewable electricity, while sales have slightly increased from 48.5 mio USD in 2016 to 49.1 mio USD in 2017.

Intensity figure

6.66

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

1250497

Metric denominator

metric ton of product

Metric denominator: Unit total

187640

Scope 2 figure used

Market-based

% change from previous year

6.3

Direction of change

Decreased

Reason for change

Nominal total Scope 1 and Scope 2 GHG emissions have decreased between 2016 and 2017, from 1320.4 ktCO₂e in 2016 to 1250.5 ktCO₂e in 2017. This is due to the implementation of energy savings projects in 2017 that have led to emission reductions of 24.2 ktCO₂e in the calendar year combined with increased sourcing of renewable electricity, while production has slightly increased from 185600 metric tons in 2016 to 187640 metric tons in 2017.

Intensity figure

10.58

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

1250497

Metric denominator

full time equivalent (FTE) employee

Metric denominator: Unit total

118200

Scope 2 figure used

Market-based

% change from previous year

6.4

Direction of change

Decreased

Reason for change

Nominal total Scope 1 and Scope 2 GHG emissions have decreased between 2016 and 2017, from 1320.4 ktCO₂e in 2016 to 1250.5 ktCO₂e in 2017. This is due to the implementation of energy savings projects in 2017 that have led to emission reductions of 24.2 ktCO₂e in the calendar year combined with increased sourcing of renewable electricity, while the number of employees has slightly increased from 116800 Full Time Equivalentents (FTE) in 2016 to 118200 FTE in 2017.

C7. Emissions breakdowns**C7.1****(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?**

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	531210	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	8954	IPCC Fourth Assessment Report (AR4 - 100 year)
SF ₆	34	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

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

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	152779
Austria	79073
Germany	36699
United Kingdom of Great Britain and Northern Ireland	35141
Slovenia	31215
Spain	23384
Italy	22533
Turkey	14596
Japan	12122
Ireland	11902
China	11789
France	10636
Belgium	10250
Switzerland	9402
Poland	9206
Russian Federation	8782
Singapore	8013
Egypt	4223
India	4141
Indonesia	2901
Malaysia	1614
Other, please specify (Rest of World)	39798

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)	346167
Administration (onsite combustion and processes)	26304
Research and Development (onsite combustion and processes)	25172
Sales (vehicle emissions)	142556

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	265052	259245	598413	53269
Switzerland	83451	90591	441620	2121
India	58376	65353	75246	0
China	48126	48400	95542	0
Italy	41759	39721	161363	22978
Singapore	37305	32280	85089	0
Malaysia	35554	31988	51573	0
Slovenia	66532	27373	222570	29087
Indonesia	25782	22995	35038	0
Poland	14821	14230	20630	0
Turkey	21361	12750	48476	17146
United Kingdom of Great Britain and Northern Ireland	6227	9904	31112	0
Egypt	8765	8765	18515	0
Japan	9629	5434	17760	0
Ireland	19983	4012	48241	39432
Belgium	3980	3980	17493	0
Russian Federation	3139	3139	7927	0
Germany	40556	1675	96091	70335
Austria	56263	1633	341237	331331
France	1686	1463	23579	6176
Spain	22764	0	77577	0
Other, please specify (Rest of World)	29933	25368	89478	28508

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	734806	558568
Administration	76125	65590
Research and Development	90115	86141

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 CO ₂ e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	3961	Decreased	0.3	Proportion of renewable energy input increased by 0.3% between 2016 and 2017, contributing to an estimated change in emissions of 396 ktCO ₂ e. Calculation: (1320.4 ktCO ₂ e in 2016 * 0.3% = 3.96 kt)
Other emissions reduction activities	24197	Decreased	1.8	Nominal total scope1 and scope2 GHG emissions have decreased between 2016 and 2017 from 1320.4 ktCO ₂ e to 1250.5 ktCO ₂ e in 2017. The emissions reduction projects undertaken in 2017 achieved emission reductions of 24.2 ktCO ₂ e in 2017, equivalent to 1.8% reduction. Calculation: (24.2kt / 1320.4kt)*100= 1.8%
Divestment	0	No change	0	Novartis did not make any divestments in 2017
Acquisitions	0	No change	0	Novartis did not make any acquisitions in 2017
Mergers	0	No change	0	Novartis was not involved in any mergers in 2017
Change in output	0	No change	0	There were no major changes in output at Novartis facilities
Change in methodology	0	No change	0	No change in methodology.
Change in boundary	0	No change	0	Boundary did not change in 2017
Change in physical operating conditions	0	No change	0	Physical operation conditions did not change in 2017
Unidentified	0	No change	0	No unidentified change.
Other	41742	Decreased	3.16	The remaining 3.16% reduction in total gross GHG emissions can be attributed to the update of our emissions factors for sites located in the US based on most recent US eGRID data.

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)	41056	1889406	1930462
Consumption of purchased or acquired electricity	<Not Applicable>	600382	1591451	2191833
Consumption of purchased or acquired heat	<Not Applicable>	0	66153	66153
Consumption of purchased or acquired steam	<Not Applicable>	0	346585	346585
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	5469	<Not Applicable>	5469
Total energy consumption	<Not Applicable>	646907	3893595	4540502

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

C8.2c

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

Fuels (excluding feedstocks)

Natural Gas

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

1807439

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

1636679

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

170760

Fuels (excluding feedstocks)

Fuel Oil Number 2

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

40326

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

40326

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Fuels (excluding feedstocks)

Fuel Oil Number 5

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

5728

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

5728

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

Fuels (excluding feedstocks)

Other, please specify (Waste, fossil in nature)

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

35913

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

35913

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

Fuels (excluding feedstocks)

Wood

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

11936

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

11936

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

Fuels (excluding feedstocks)

Wood Waste

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

29120

MWh fuel consumed for the self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

29120

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

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 CO₂e 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 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

Other

Emission factor

0.102

Unit

metric tons CO₂e per GJ

Emission factor source

Company average, depends 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	91442	91442	0	0
Heat	0	0	0	0
Steam	79319	79319	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)

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

600382

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

0

Comment

Many of our sites are purchasing "low carbon energy". The figure reported here is the total amount of energy purchased that is generated from renewable energy sources. To report energy purchased from renewable sources, our reporting guidance 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-cr-performance-report-2017.pdf

Page/ section reference

Page 48 of the Novartis Corporate Responsibility Report 2017 contains the GHG Scope 1, combustion and process, and vehicles. Page 60 and 61 of the document provide the independent assurance report of the Corporate Responsibility 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-cr-performance-report-2017.pdf

Page/ section reference

Page 48 of the Novartis Corporate Responsibility Report 2017 contains the GHG Scope 2, purchased energy (market-based). Page 60 and 61 of the document provide the independent assurance report of the Corporate Responsibility 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-cr-performance-report-2017.pdf

Page/section reference

Page 48 of the Novartis Corporate Responsibility Report 2017 contains the GHG Scope 3 category 6, business travel. Page 60 and 61 of the document provide the independent assurance report of the Corporate Responsibility 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 48 of the Novartis Corporate Responsibility Report 2017 contains 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 Corporate Sustainability Report.
C5. Emissions performance	Year on year change in emissions (Scope 1)	ISAE3000	Page 48 of the Novartis Corporate Responsibility Report 2017 contains 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 Corporate Sustainability Report.
C5. Emissions performance	Year on year change in emissions (Scope 2)	ISAE3000	Page 48 of the Novartis Corporate Responsibility Report 2017 contains GHG emissions Scope 2 data (market-based) 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 Corporate Sustainability Report.
C5. Emissions performance	Emissions reduction activities	ISAE3000	Page 48 of the Novartis Corporate Responsibility Report 2017 contains halogenated and non-halogenated VOC emission reductions 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 Corporate Sustainability 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

26

Period start date

January 1 2018

Period end date

December 31 2018

Allowances allocated

116597

Allowances purchased

30000

Verified emissions in metric tons CO2e

143550

Details of ownership

Facilities we own and operate

Comment

Emissions covered: 26% (Scope 1 w/ vehicles) 36% (Scope 1 w/o vehicles) Scope 1 emissions (w/ vehicles): 540'198 t CO2e
Scope 1 emissions (w/o vehicles): 397'643 t 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 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 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?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit purchase

Project type

Hydro

Project identification

Yunnan Gaohe River 4th level Hydropower:Project number CN3747Yunnan Gaohe River 4th level Hydropower Project (hereafter referred to as the Project) lies in Kachang Town, Yingjiang County, Dehong Autonomous Prefecture, Yunnan Province, China. The Project is a hydropower station with 20MW (1*12MW+1*8MW) installed capacity and will achieve greenhouse gas (GHG) emission reductions by avoiding CO2 emissions from the business-as-usual scenario electricity generation of those fossil fuel-fired power plants connected into China Southern Power Grid. It is estimated the annual GHG reduction of the Project will achieve 68,241tCO2e.

Verified to which standard

CDM (Clean Development Mechanism)

Number of credits (metric tonnes CO2e)

68

Number of credits (metric tonnes CO2e): Risk adjusted volume

68

Credits cancelled

Not relevant

Purpose, e.g. compliance

Voluntary Offsetting

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 \$100 per ton 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, our customers

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

91

Rationale for the coverage of your engagement

The Category 1 “purchased goods and services” and the Category 4 “Upstream Transportation and Distribution” are fully covered through this engagement. Both categories add up to 91% of our Scope 3, thus the engagement covers 91% of our Scope 3 emissions. Novartis has hundreds of thousands of suppliers in its global network, so ongoing engagement is targeted at the largest key suppliers with greater amounts of spend in various key categories that drive carbon footprints. With the movement of suppliers in and out of our network on a regular basis, we will likely never have 100% engagement, but we should be able to accomplish most of our required impact by focusing on key portions of the supply chain, and then calculating required offsets to achieve the desired amount of carbon footprint reduction across our supply chain.

Impact of engagement, including measures of success

The engagement is an important approach to pre-screen future suppliers for possible risks including environmental impacts and risks. Suppliers might not be selected or action plans have to be aligned with Novartis and implemented accordingly. Measures of success will be based on engagement with suppliers that constitute the majority of our Scope 3 footprint. In the past, that has been based on spend data, and in 2017 efforts began to develop internal tools to consider in addition to spend data, primary data from our suppliers from the CDP climate change supply chain program to estimate our carbon footprint. The information provided by the suppliers should enable us to better identify impact hotspots and continue actions on these to reduce impacts and risks.

Comment

The engagement is our first and second line of defense.

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

20

Rationale for the coverage of your engagement

For information collection, key suppliers of raw materials, like chemicals, intermediates, active pharmaceutical ingredients, and packaging materials are considered. In addition, main logistics providers are part of the engagement. Novartis has hundreds of thousands of suppliers in its global network, so ongoing engagement is targeted at the largest key suppliers with greater amounts of spend in various key categories that drive carbon footprints. With the movement of suppliers in and out of our network on a regular basis, we will likely never have 100% engagement, but we will be able to accomplish most of our required impact by focusing on key portions of the supply chain, and then calculating required offsets to achieve the desired amount of carbon footprint reduction across our supply chain.

Impact of engagement, including measures of success

The response rate is measured as criteria of success. We aim for at least 80%. This rate was outperformed last year. Considering climate relevant data collection in general, we reached 91% response rate including the CDP responses. In addition, the quality of all responses is assessed through comparison with industry intensity emission values.

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.

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Run an engagement campaign to educate suppliers about climate change

% of suppliers by number

29

% total procurement spend (direct and indirect)

16

% Scope 3 emissions as reported in C6.5

33

Rationale for the coverage of your engagement

This engagement considers the contract manufacturers and the suppliers of raw materials, like chemicals, intermediates, active pharmaceutical ingredients. They make up 33% of our Scope 3 emissions and 29% of our suppliers. Novartis has hundreds of thousands of suppliers in its global network, so ongoing engagement is targeted at the largest key suppliers with greater amounts of spend in various key categories that drive carbon footprints. With the movement of suppliers in and out of our network on a regular basis, we will likely never have 100% engagement, but we will be able to accomplish most of our required impact by focusing on key portions of the supply chain, and then calculating required offsets to achieve the desired amount of carbon footprint reduction across our supply chain.

Impact of engagement, including measures of success

Novartis is engaging with suppliers through capability building webinars as CDP Supply Chain lead member. Last year Novartis hosted Webinars in English and Chinese language and encouraged suppliers to participate in CDP webinars and events. We had personal contact about sustainability with all the suppliers from which we collected environmental data last year. The high response rate, as described above, underpins the success of our engagement. Thus, the quality of the data and the response rate express the impact of the engagement. In addition, Novartis is engaging with suppliers via the Pharmaceutical Supply Chain Initiative (PSCI). The PSCI is performing workshops and webinars around sustainability and enables further capability building for the suppliers.

Comment

With some selected suppliers we started to discuss possibilities of collaboration and support.

C12.1b

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

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

Size of engagement

100

% Scope 3 emissions as reported in C6.5

2

Please explain the rationale for selecting this group of customers and scope of engagement

Our downstream emissions are 2% of our Scope 3 footprint. The main driver is one inhaler product that uses HFC R134a as a propellant. Because of the small overall footprint, the engagement of consumers is not as broad as with suppliers. The information described in the column to the right is available to all customers.

Impact of engagement, including measures of success

For engagement with our customers we have a customer service available. We provide country specific customer support. Customers can reach out via phone or email. Sustainability related questions are distributed internally and answered accordingly. In addition, Novartis provides feedback to customers via the CDP supply chain program. Our responses are available publicly.

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
Other, please specify (US participation in Paris Climate Accord)	Support	Novartis was a signatory to an open letter directly to President Trump and the Trump Administration urging them to stay in the Paris Climate Accord. The common sense of the matter requires that Novartis fulfill its part of our contract with society, and federal governments rightfully have a place in spurring and supporting innovation. Our associates expect us to represent their interests, and we did so through our actions.	The US should stay in the Paris Accord in order to provide leadership and stability in these efforts. Many Novartis associates live and work in the US, so this is a political issue that impacts them directly and impacts all of our associates globally.
Adaptation or resilience	Support	Novartis has been working 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 helped design and facilitate a climate resilience tabletop exercise hosted at Harvard University in January that highlighted constraints in interdependent systems. This work informed the creation of new working group efforts with the City of Cambridge to align needs and address shortfalls in Cambridge to build resilience to sea level rise, flooding events and heat events. Additionally, based on resilience planning efforts begun in 2017, Novartis hosted a screening of a documentary movie on sea level rise to advance public discussion and discussion within the company on the risks posed by climate change. That movie and the entire panel discussion is being made available and marketed internally to all Novartis associates globally, which is a potential audience of over 125,000 people.	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 has been and continues to be engaged with 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.	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 just closed a deal for a virtual offsite power purchase agreement for 100 MW of additional wind power generation at the Santa Rita project in Texas that will reduce over 70% of our carbon footprint in the US market for Scope 2 electricity, and 5 more PPAs are in initial phases or final negotiations for award as part of an aggressive move to renewables to reduce our carbon footprint.	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.	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 USD100 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.	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 100USD /tCO2e, 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.	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.

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Cap and trade	Support	We report GHG emissions from totally 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 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, 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, livable, and sustainable Cambridge.”

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, or are you attempting to, influence the 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. 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 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, or are you attempting to, influence the 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

(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 PPAs, country deep dives for Power Purchase Agreements in India and China, Energy and Climate, Energy Efficient Buildings, Water and Ecosystems Services and Development., Climate Policy Working Group, Low Carbon Technologies Partnership Initiative (LCTPI), and an emerging workstream on Natural Climate Solutions. Novartis experts regularly participate in WBCSD meetings and working group activities. 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. Recently we provided a case study on the challenges that a corporate customer faces in negotiating virtual offsite power purchase agreements. 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 2017 and 2018. This dialogue continues to provide motivation as well as new strategies to move forward with more ambitious sustainability goals. We have also been invited to contribute to the drafting of the Talanoa Dialogue which will be used as a method for private sector to engage state actors at the Conference of the Parties. iv. Actions advocating: Novartis will continue to work with WBCSD to promote the use of power purchase agreements and natural climate solutions as a large portion of corporate portfolios for greenhouse gas emissions reductions.

2) National Association of Environmental Managers (NAEM): Novartis is a member fo 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 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. Additionally, Novartis helped organize a tabletop exercise to assess climate resilience risks and address them in a proactive, collaborative fashion with industry and local government.

5) Novartis has funded the MIT Clean Energy Prize two 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 Finals in 2017 and 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.

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 mission is 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 Corporate Responsibility Leadership Team (CRLT) and its successor 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 Global Head 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 participate 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 HE 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-cr-performance-report-2017.pdf

Content elements

Strategy

Emissions figures

Other metrics

Other, please specify (materiality assessment)

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.

Novartis has long believed that it has an obligation to conduct business responsibly. This was reconfirmed early 2018 by our newly appointed CEO, Vas Narasimhan, when he communicated to analysts and investors that returning more to society than we take is one of the five key organizational priorities for Novartis moving forward. For that reason, any activity that impacts the environment, like climate, was reviewed and an environmental sustainability dimension built into emerging priorities. Decisions have subsequently been made considering economic, strategic and environmental aspects.

Novartis associates are committed to act as a catalyst for change internally as well as externally when it comes to sustainability. Credibility requires actual change, and that change must happen transparently. Sustainability cannot be addressed without recognizing and improving the interdependent system of systems that are required for basic functionality. Increases in world population, population density, energy demand and food requirements will drive resource constraints and pressures. Sea level rise, precipitation events, heat and drought will likely place even greater strain on limited resources and ecosystems while disease vectors change. The impact of climate change must be managed in order to relieve some of those pressures and maintain peace, security, rule of law and access to medicine.

That cannot be done by Novartis alone, it must be done in partnership with our associates, the governments and civic organizations where we work, the communities that we live in, and our extended supply chain. In order to achieve the goal of the Paris Accord and limit warming to 2 degrees or less, then bold action will have to take place. That bold action will demand leadership and will require new partners, new networks and new ways of engaging to solve problems. That is the approach that Novartis is taking to address our responsibility in addressing the global health crisis posed by climate change.

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	Other C-Suite Officer

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 eighth 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	49109000000

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.

Requesting member

Wal-Mart Stores, Inc.

Scope of emissions

Scope 1

Emissions in metric tonnes of CO₂e

3419

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are combustion of fossil fuels (primarily natural gas) for steam and hot water generation on-site. The main sources of emissions are production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC). Also included are emissions from company owned/leased vehicles.

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 1 emissions. The sales of products to Walmart for each Novartis division were multiplied with the corresponding divisional Scope 1 GHG emission intensities.

Requesting member

Wal-Mart Stores, Inc.

Scope of emissions

Scope 2

Emissions in metric tonnes of CO₂e

7646

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are from the generation of purchased electricity and steam by third parties which are used by our production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC).

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 2 emissions. The sales of products to Walmart for each Novartis division were multiplied with the corresponding divisional Scope 2 GHG emission intensities.

Requesting member

Wal-Mart Stores, Inc.

Scope of emissions

Scope 3

Emissions in metric tonnes of CO₂e

36630

Uncertainty (±%)

10

Major sources of emissions

This calculation is based on the following sources of Scope 3 GHG emissions: Purchased goods and services (estimated by an Input/Output model using 2017 data), waste disposal (calculated every year, based on actual waste data and carbon emission factors for various waste types), business travel (provided by travel service provider for business flights, reported on quarterly basis), employee commuting (estimated based on 2010 emission figures), upstream transportation and distribution (estimated by an Input/Output model using 2017 data). Other upstream Scope 3 emissions are considered non-material.

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

An approximation based on the methodology described by the WRI/WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting was used to calculate the Scope 3 emissions. The sales of products to Walmart for each Novartis division were multiplied with the corresponding divisional Scope 3 GHG emission intensities.

Requesting member

Wal Mart de Mexico

Scope of emissions

Scope 1

Emissions in metric tonnes of CO2e

11

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are combustion of fossil fuels (primarily natural gas) for steam and hot water generation on-site. The main sources of emissions are production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC). Also included are emissions from company owned/leased vehicles.

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 1 emissions. The sales of products to Walmart de Mexico for each Novartis division were multiplied with the corresponding divisional Scope 1 GHG emission intensities.

Requesting member

Wal Mart de Mexico

Scope of emissions

Scope 2

Emissions in metric tonnes of CO2e

38

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are from the generation of purchased electricity and steam by third parties which are used by our production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC).

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 2 emissions. The sales of products to Walmart de Mexico for each Novartis division were multiplied with the corresponding divisional Scope 2 GHG emission intensities.

Requesting member

Wal Mart de Mexico

Scope of emissions

Scope 3

Emissions in metric tonnes of CO₂e

118

Uncertainty (±%)

10

Major sources of emissions

This calculation is based on the following sources of Scope 3 GHG emissions: Purchased goods and services (estimated by an Input/Output model using 2017 data), waste disposal (calculated every year, based on actual waste data and carbon emission factors for various waste types), business travel (provided by travel service provider for business flights, reported on quarterly basis), employee commuting (estimated based on 2010 emission figures), upstream transportation and distribution (estimated by an Input/Output model using 2017 data). Other upstream Scope 3 emissions are considered non-material.

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

An approximation based on the methodology described by the WRI/WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting was used to calculate the Scope 3 emissions. The sales of products to Walmart de Mexico for each Novartis division were multiplied with the corresponding divisional Scope 3 GHG emission intensities.

Requesting member

Abbott Laboratories

Scope of emissions

Scope 1

Emissions in metric tonnes of CO₂e

662

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are combustion of fossil fuels (primarily natural gas) for steam and hot water generation on-site. The main sources of emissions are production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC). Also included are emissions from company owned/leased vehicles.

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 1 emissions. The sales of products to Abbott Laboratories for each Novartis

division were multiplied with the corresponding divisional Scope 1 GHG emission intensities.

Requesting member

Abbott Laboratories

Scope of emissions

Scope 2

Emissions in metric tonnes of CO₂e

673

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are from the generation of purchased electricity and steam by third parties which are used by our production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC).

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 2 emissions. The sales of products to Abbott Laboratories for each Novartis division were multiplied with the corresponding divisional Scope 2 GHG emission intensities.

Requesting member

Abbott Laboratories

Scope of emissions

Scope 3

Emissions in metric tonnes of CO₂e

6948

Uncertainty (±%)

10

Major sources of emissions

This calculation is based on the following sources of Scope 3 GHG emissions: Purchased goods and services (estimated by an Input/Output model using 2017 data), waste disposal (calculated every year, based on actual waste data and carbon emission factors for various waste types), business travel (provided by travel service provider for business flights, reported on quarterly basis), employee commuting (estimated based on 2010 emission figures), upstream transportation and distribution (estimated by an Input/Output model using 2017 data). Other upstream Scope 3 emissions are considered non-material.

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

An approximation based on the methodology described by the WRI/WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting was used to calculate the Scope 3 emissions. The sales of products to Abbott Laboratories for each Novartis division were multiplied with the corresponding divisional Scope 3 GHG emission intensities.

Requesting member

California Department of General Services (DGS)

Scope of emissions

Scope 1

Emissions in metric tonnes of CO2e

130

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are combustion of fossil fuels (primarily natural gas) for steam and hot water generation on-site. The main sources of emissions are production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC). Also included are emissions from company owned/leased vehicles.

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 1 emissions. The sales of products to DGS for each Novartis division were multiplied with the corresponding divisional Scope 1 GHG emission intensities.

Requesting member

California Department of General Services (DGS)

Scope of emissions

Scope 2

Emissions in metric tonnes of CO2e

171

Uncertainty (±%)

10

Major sources of emissions

Major emission sources are from the generation of purchased electricity and steam by third parties which are used by our production sites, as well as research and administration facilities, predominantly for clean room requirements and indoor heating, ventilation and air conditioning (HVAC).

Verified

Yes

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

The methodology described by the WRI/WBCSD GHG Protocol Initiative Accounting and Reporting (corporate-level allocation, market value method) was used to calculate the Scope 2 emissions. The sales of products to DGS for each Novartis division were multiplied with the corresponding divisional Scope 2 GHG emission intensities.

Requesting member

California Department of General Services (DGS)

Scope of emissions

Scope 3

Emissions in metric tonnes of CO2e

1373

Uncertainty (±%)

10

Major sources of emissions

Purchased goods and services (estimated by an Input/Output model using 2017 data), waste disposal (calculated every year, based on actual waste data and carbon emission factors for various waste types), business travel (provided by travel service provider for

business flights, reported on quarterly basis), employee commuting (estimated based on 2010 emission figures), upstream transportation and distribution (estimated by an Input/Output model using 2017 data). Other upstream Scope 3 emissions are considered non-material.

Verified

No

Allocation method

Allocation based on the market value of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

An approximation based on the methodology described by the WRI/WBCSD GHG Protocol Initiative standard for Scope 3 Accounting and Reporting was used to calculate the Scope 3 emissions. The sales of products to DGS for each Novartis division were multiplied with the corresponding divisional Scope 3 GHG emission intensities.

SC1.2

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

Published data used to complete SC1.1 includes Scope 1 and Scope 2 GHG emissions reported in the Novartis Annual Report and the 2017 Novartis Corporate Responsibility Report. Scope 3 GHG emissions data is partly included in the Corporate Responsibility Report and is fully published in the Novartis Climate response to CDP, which will also be made available on our website.

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?

No

SC3.1

(SC3.1) Do you want to enroll in the 2018-2019 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2017-2018 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services, if so, what functionality will you be using?

No, I am not providing data

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

No

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