

C0. Introduction

C0.1

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

Caring Deeply. Working Fearlessly. Changing Lives.™

At Biogen, our mission is clear: we are pioneers in neuroscience. Since our founding in 1978 as one of the world's first global biotechnology companies by Charles Weissmann, Heinz Schaller, Kenneth Murray and Nobel Prize winners Walter Gilbert and Phillip Sharp, Biogen has led innovative scientific research with the goal over the last decade to defeat devastating neurological diseases. Millions of people around the world are affected by multiple sclerosis, Alzheimer's disease, Parkinson's disease and amyotrophic lateral sclerosis (ALS). Many people also suffer from less common diseases such as spinal muscular atrophy (SMA) and progressive supranuclear palsy (PSP). We believe that no other disease area holds as much need or as much promise for medical breakthroughs as neuroscience.

Biogen has some of the world's best neurologists and neuroscientists. We engage with physicians and scientific leaders around the world with the aim to further medical research. Our focus on neuroscience, our deep scientific expertise and our courage to take risks make us leaders in the research and development of medicines to transform neuroscience to benefit society. Our technology and engineering capabilities create novel ways to seamlessly transition products from development to manufacturing with the intent of bringing our high-quality medicines to market faster.

We respect the contributions of health care providers caring for people living with neurological diseases. We honor the important role of caregivers, families and friends who care about them.

Biogen is committed to working with advocacy and patient organizations as they serve the communities they represent. Recognizing the challenges facing health care systems today, we collaborate with regulatory authorities and customers such as health care providers and payers, so that those in need can access our medicines. Professional, ethical, and compliant, we hold ourselves accountable to deliver value to our shareholders. Biogen contributes to the communities where we live. We are committed to our employees, diversity and inclusion, and environmental sustainability.

We care deeply about making a difference.

We work fearlessly. We do not give up even when challenged, pursuing innovation in all that we do.

We are humbled by the opportunity to change lives.

Biogen is listed on the Global Select Market of the NASDAQ Stock Market under the symbol BIIB. Our global headquarters in Cambridge, Mass., is also home to our research operations and small-scale manufacturing facility, with an international headquarters in Zug, Switzerland, and world-class manufacturing facilities in Research Triangle Park (RTP), N.C., and Hillerød, Denmark. Another large-scale manufacturing facility in Solothurn, Switzerland is under construction. We offer therapies globally through direct affiliate presence in more than 30 countries and a network of distribution partners in more than 70 additional countries.

C0.2

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

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2018	December 31 2018	Yes	3 years

C0.3

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

Argentina
Australia
Austria
Belgium
Brazil
Canada
Chile
China
China, Hong Kong Special Administrative Region
Colombia
Czechia
Denmark
Finland
France
Germany
Hungary
Ireland
Italy
Japan
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Republic of Korea
Singapore
Slovakia
Slovenia
Spain
Sweden
Switzerland
United Kingdom of Great Britain and Northern Ireland
United States of America
Uruguay

C0.4

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

USD

C0.5

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

Operational control

C1. Governance

C1.1

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

Yes

C1.1a

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

Position of individual(s)	Please explain
Director on board	Board-level Responsibility: The vision, commitment and oversight for our Global Impact Strategy starts at the very top of our organization. The Risk Committee of the Board of Directors oversees Biogen's risk governance framework and infrastructure. In 2018, this committee met five times and discussed topics such as information technology, cybersecurity, workplace safety, climate change and other material risks. Executive-level Responsibility: At the executive management level, our strategy is overseen by the Global Impact Executive Council, which is led by our executive vice president for Pharmaceutical Operations and Technology, and includes members of Biogen's senior leadership team. The duties of this group are governed by the Global Impact Executive Council Charter, which was revised in early 2017 and now includes, among other functions, setting strategy, approving goals, reviewing progress and aligning resources. The council meets at least once yearly.

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
Sporadic - as important matters arise	Reviewing and guiding risk management policies	The vision, commitment and oversight for our Global Impact Strategy starts at the very top of our organization. The Risk Committee of the Board of Directors oversees Biogen's risk governance framework and infrastructure. In 2018, this committee met five times and discussed topics such as information technology, cybersecurity, workplace safety, climate change and other material risks. To date climate change has not had an outsized impact on the organizations and is considered a secondary issue by stakeholders. Extreme weather events have occurred that resulted in re-evaluation of existing risk management measures such as in the supply chain with Hurricane Maria.

C1.2

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

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Operating Officer (COO)	Both assessing and managing climate-related risks and opportunities	Annually

C1.2a

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

At the executive management level, our strategy is overseen by the Global Impact Executive Council, which is led by our executive vice president for Pharmaceutical Operations and Technology (this role is the equivalent of a COO), and includes members of Biogen's senior leadership team. The duties of this group are governed by the Global Impact Executive Council Charter, which was revised in early 2017 and now includes, among other functions, setting strategy, approving goals, reviewing progress and aligning resources for issues that impact the organization globally including climate change. The council meets at least once yearly.

In 2017, Biogen also added its first Stakeholder Advisory Council, made up of external stakeholders who help to review trends, benchmark our peers and recommend improvements to goals and initiatives. Our Environmental, Health, Safety & Sustainability and Human Performance organization manages day-to-day execution of Biogen's Global Impact Strategy, although the breadth of our strategy extends beyond environmental matters to include patients, community investments and other key issues.

C1.3

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

Yes

C1.3a

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

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Monetary reward

Activity incentivized

Energy reduction project

Comment

The Biogen Innovation Fund provides funding for projects that provide innovative solutions to solve business challenges. Past award winners have included energy efficiency and environmental conservation projects.

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Monetary reward

Activity incentivized

Behavior change related indicator

Comment

BIG (Biogen Great) is Biogen's Recognition and Rewards Program. BIG has three over-arching criteria for recognizing the contributions of fellow employees: Living Our Values, Achieving Excellence and Teaming and Leading.

Who is entitled to benefit from these incentives?

All employees

Types of incentives

Monetary reward

Activity incentivized

Efficiency project

Comment

Our annual global EHS+S Awards recognize non-EHS+S employees who go beyond their regular duties to embrace and strengthen our commitment to sustainability, wellness and safety.

Who is entitled to benefit from these incentives?

Environment/Sustainability manager

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

Sustainability managers are required to develop annual goals / targets related to emissions reductions and energy reductions and are measured on that performance.

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	
Medium-term	2	5	
Long-term	5	10	

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	Annually	>6 years	In 2018, the Risk Committee of the Board of Directors convened five times and discussed critical topics such as such as information technology, cybersecurity, environmental, health, sustainability and other material risks.

C2.2b

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

Biogen's company-level risk management process is broad in scope and centralized within the Business Continuity and Risk Management organization. This organization develops plans and maintains the needed management infrastructure, procedures, and policies for situations that may significantly impact the business. Biogen considers risks associated with pending & future climate-related regulations/legislation, weather & environmental changes, and business continuity, including climatic impacts on water and electricity reliability, as well as regulations targeting carbon emissions. We have integrated processes into our business strategy to identify and manage these risks. For example, Biogen's disaster recovery plan has included contingencies for severe weather events that may be caused by or become more likely because of climate change. Additionally, we consider long-term climate change risks with the placement of new facilities, and most recently with the building of our new plant in Solothurn, Switzerland. Climate change risks and opportunities are also evaluated in the risk management processes of our global EHS+S group, and our Security and Supply Chain organizations. Our EHS+S Director reports annually to the Risk Committee of the Biogen Board of Directors about EHS+S risks and opportunities, including climate change. These evaluations are conducted annually in accordance with our Global Risk Assessment Procedure, which provides a systematic process to identify, assess and prioritize risks that could impact short to long-term site activities. Similarly, we conduct an annual supply chain risk assessment that evaluates the potential short to medium-term climate change risks and opportunities related to our supply chain. In particular, this assessment evaluates whether suppliers are located in areas of environmental sensitivity, including those areas subject to physical risk related to climate change. In general, substantive financial impact risks looked for during these assessments are those that can result in batch production losses, finished good losses, and unforeseen delays in production.

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	Biogen has significant operations located in areas with ongoing carbon-related regulations, specifically the Denmark carbon tax, Switzerland carbon tax, and EU ETS. While the biopharmaceutical industry has a low carbon intensity, changes in current regulations can present financial risks.
Emerging regulation	Relevant, always included	Biogen has significant operations located in areas with emerging regulations, specifically Massachusetts and the United States as a whole. While the biopharmaceutical industry has a low carbon intensity, introduction of new regulations have the potential to present financial risks.
Technology	Not relevant, explanation provided	Technological improvements that support a transition to a low carbon economy are viewed as potential opportunities rather than risks. However, these opportunities are not relevant to Biogen's core business strategy.
Legal	Not relevant, explanation provided	Biogen's business strategy and sphere of operation are unrelated to climate-related legal considerations.
Market	Not relevant, explanation provided	As a biopharmaceutical company, the cost of goods sold is a much smaller percentage of the sales price compared to most other sectors. As a result, market risks related to shifts in supply and demand of commodities, products and services are not sufficiently relevant at this time given Biogen's size.
Reputation	Relevant, sometimes included	Climate change is a serious risk to human health and our business. The World Health Organization identifies climate change as "the greatest threat to global health in the 21st century." The direct and indirect impacts to health are already being felt around the world due to extreme weather events, the spread of infectious diseases, and degradation of air quality. These impacts often burden the most vulnerable and least served portions of our society (e.g., children, elderly, and the poor) the hardest. As a science-based company focused on improving the quality of life, stakeholders may set expectations related to Biogen's efforts towards climate change. For example, Biogen operates in a highly competitive industry where human and intellectual capital is essential for success. Loss of highly-qualified employees to competitors due to falling short of expectations could place Biogen's research and development efforts at risk.
Acute physical	Relevant, always included	One of the most significant risk stems from changes in precipitation and usual weather patterns. Biogen's physical locations and its supply chain are exposed to increased volatile and extreme weather events (snow storms, hurricanes, and droughts).
Chronic physical	Relevant, sometimes included	Biogen's operational footprint is largely located in areas without known significant long-term climate impacts (e.g. droughts, and heat waves). As a result relevance is on a specific case-by-case basis such as new facility siting.
Upstream	Relevant, always included	Upstream disruptions within the supply chain present a continuous relevant risk to Biogen operations.
Downstream	Not relevant, explanation provided	Primary downstream risks are product security and counterfeiting rather than climate-related risks.

C2.2d

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

Climate-related risks and opportunities are evaluated using the What-If scenario tool to determine the most appropriate form of management (i.e. process change, further study, target setting, capital upgrade, etc). The What-If process considers the likelihood and severity of risks and opportunities and based on the financial ramifications, an appropriate management approach can be formulated.

The What-If process was applied to the previously discussed reputational risk and opportunity associated with stakeholder expectations. The outcome of the process was the decision to issue a position statement on climate change, engagement with global collaborative efforts to promote climate action and clean and renewable energy all backed up by a carbon neutrality commitment. In 2017, we marked our fourth consecutive year as a carbon neutral company and continue to maintain our reputation among employees as a climate-friendly place to work.

One example outcome from the what-if process was investment in incident management software and processes that allow rapid identification and communication to mitigate impacts to various asset types across the organization including personnel and products. Biogen has become a benchmark for many organizations that strive to respond to critical incidents effectively as demonstrated via Biogen's effective responses to events such as Hurricane Maria and the Massachusetts gas explosions. System examples include integrated data from International SOS' Travel Tracking system to help us understand where employees are traveling and Resilinc, a dynamic supply chain management tool to identify potential supply chain disrupting events.

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

<Not Applicable>

Company- specific description

The most significant risk consists of the establishment of federal/state legislation on greenhouse gas emissions that mandates GHG reductions and/or establishes a non-revenue neutral carbon tax (beyond those regions with carbon taxes already in place such as Switzerland and Denmark).

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1800000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The extent of financial impact on Biogen will ultimately depend on the exact approach taken by regulators. The impact assumes a \$30/MTCO₂e tax on carbon and \$0/MWH premium for long-term renewable electricity supply contracts. Additionally, there may be a supplier cost pass-through resulting from regulatory actions, but not quantifiable at this time.

Management method

To mitigate this risk, Biogen is taking proactive steps to source 100% of its electricity consumption from renewable sources as well as continuing to invest in sustainable innovation internally. The extent that our current renewable electricity strategy of purchasing and retiring RECs can mitigate this impact is less certain, but not quantifiable at this time. For the future, we are evaluating alternative purchasing strategies of renewable electricity such as a PPA or direct contract to further mitigate against this risk.

Cost of management

100000

Comment

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Supply chain

Risk type

Physical risk

Primary climate-related risk driver

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

Type of financial impact

Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

Company- specific description

A significant risk stems from changes in precipitation and weather patterns. Biogen's physical locations and its supply chain are exposed to increasingly volatile and extreme weather events (snow storms, hurricanes, and droughts). We have seen an increase in volatile and extreme events at two of our major locations in recent years, specifically in the form of hurricanes and snow storms. Each of these extreme events has impacted business operations and transportation of goods/services/employees.

Time horizon

Short-term

Likelihood

Very unlikely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1500000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The estimated financial impact assumes a 1-day unplanned shutdown of our RTP Drug Substance facility due to impacts to the facility or a key supplier. Small impacts around \$100,000 resulting from temporary office closers are a more likely occurrence.

Management method

Biogen is actively managing this risk via implementing redundancy into our sites and investing in the Resilinc supply chain disruption monitoring software system. This software was able to mitigate supply chain impacts resulting from the Maria Hurricane that impacted many of our biopharmaceutical supply chain partners in Puerto Rico. A Business Continuity Plan for Drought Conditions and Emergency Response plans are in place for inclement weather and wildfires. The estimated cost of management is based on our redundancy and software investments.

Cost of management

500000

Comment

Identifier

Risk 3

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

Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

Company- specific description

Changing climates could result in water scarcity issues that would limit water available for manufacturing operations in North Carolina.

Time horizon

Long-term

Likelihood

Very unlikely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

1000000

Potential financial impact figure – maximum (currency)

2000000

Explanation of financial impact figure

The estimated cost of obtaining a sufficient supply of water would be between \$1 and \$2 million annually. The estimated cost is based on trucking in 50 percent of the water needed by the manufacturing operations in North Carolina. This is an annual cost.

Management method

Biogen is managing this risk by working with stakeholders to ensure a sufficient supply of water and increasing water recycling at the RTP Drug Substance facility. On an annual basis we conduct water assessments to understand potential issues of water scarcity in the regions of operation. Additionally, a few years ago Biogen coordinated with the City of Cary to replace potable water use with grey water use for irrigation as a means to further reduce demand on the local water system.

Cost of management

50000

Comment

C2.4

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

Yes

C2.4a

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

Identifier

Opp1

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Type of financial impact

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

Company-specific description

Climate Change is a powerful issue that can be leveraged to communicate the importance of carbon emission reductions across our value chain. There is an operational cost savings opportunity embedded in that message as well as carbon reduction projects are also often energy reduction projects. Leveraging the message to obtain project funding to hasten reductions in operational cost is a key opportunity.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

25000

Potential financial impact figure – maximum (currency)

1000000

Explanation of financial impact figure

Depending on the portfolio of efficiency projects implemented, energy reduction savings are estimated to be between \$25,000 and up to \$1,000,000 annually.

Strategy to realize opportunity

To manage this opportunity Biogen applies carbon impacts to all process and operational projects to understand the holistic impact. Biogen's recently completed energy audits across all its manufacturing sites and incorporated carbon impacts to support the

prioritization of the projects as well as to make a case for budgetary funding. Our Green Chemistry program is also looking at and evaluating carbon impacts as part of its process. Recently Biogen collaborated with a contracted manufacturer to eliminate two process steps, which helped reduce the carbon impact of the materials needed for the process by 44%.

Cost to realize opportunity

5000000

Comment

Depending on the efficiency selected, costs are estimated to be between \$100,000 and up to \$5,000,000 one-time cost.

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Participation in carbon market

Type of financial impact

Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon

Company-specific description

A significant opportunity resulting from climate change could be financial benefits from carbon pricing legislation, specifically MA S2545, which was passed by the State of Massachusetts Senate. While the final passage and follow-up regulation wording remain uncertain, the positive financial impact could be significant to Biogen's MA tax bill due to GHG reduction measures that have been and are continuously being undertaken at the Cambridge headquarters, specifically the generation of power and steam using an efficient natural gas-fired cogeneration unit.

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

300000

Potential financial impact figure – maximum (currency)

500000

Explanation of financial impact figure

Preliminary estimations indicate Biogen would receive an annual net rebate of between \$150,000 and \$250,000 for each \$10/MTCO_{2e}. The bill indicates a starting fee of around \$20/MTCO_{2e}.

Strategy to realize opportunity

Biogen is monitoring possible legislation, continuing to be transparent regarding its emissions, and implementing measures reducing its overall environmental footprint. Examples of management efforts to reduce the overall environmental footprint are outlined in the energy efficiency improvements in section C4.3.

Cost to realize opportunity

10000

Comment

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Other

Type of financial impact

Benefits to workforce management and planning (e.g., improved health and safety, employee satisfaction resulting in lower costs)

Company-specific description

Reputational opportunities to attract and retain employees. Biogen operates in a highly competitive industry where human and intellectual capital is essential for success. Loss of highly-qualified employees to competitors would place Biogen's research and development efforts at risk.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

5000

Potential financial impact figure – maximum (currency)

1000000

Explanation of financial impact figure

The impact of any one hire or keeping one individual will vary depending on their criticality to a specific department or product. Estimated financial implications range could range from \$5,000 to \$1 million.

Strategy to realize opportunity

Biogen communicates its citizenship and sustainability activities to its employees and potential recruits to help bolster its reputation as a responsible corporate citizen. Specific examples include via Earth Day fairs, promotion of EV charging stations and Biogen Bus program as well as our through the annual Corporate Social Responsibility report.

Cost to realize opportunity

220000

Comment

Our budget varies depending upon the activities we are implementing. For example, in 2017, we spent about \$170,000 to offset our Scope 1 and 2 to maintain carbon neutrality and around \$50,000 on the Biogen Bus and EV charging stations programs.

C2.5

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

	Impact	Description
Products and services	Impacted for some suppliers, facilities, or product lines	Some of our products have had significant optimizations made to their manufacturing processes to reduce both the time and resource requirements to make a unit of product, in some case by up to 44%. In the next year, Biogen will open its newest manufacturing facility located in Solothurn Switzerland, which was designed with our next-generation manufacturing process that will significantly reduce resource usage to produce the same amount of product by up to 90 percent.
Supply chain and/or value chain	Impacted for some suppliers, facilities, or product lines	In September 2017 Hurricane Maria severely impacted our supply chain partners based in Puerto Rico. Due to the risk planning processes we have put in place, the ultimate impact of this event was minimized to the extent feasible and did not interrupt our manufacturing operations. It is difficult to anticipate the timing or scale of the next supply chain disrupting natural disaster, but as our supply chain becomes more global we will continue to monitor this potential risk.
Adaptation and mitigation activities	Impacted for some suppliers, facilities, or product lines	In 2006 our Cambridge facility installed a cogeneration plant to mitigate energy and steam disruptions. A few years ago a significant weather event caused a short-term disruption to the electrical grid, but had no impact to the facility as a result of the cogeneration unit. As the facility was primarily used for research and development activities during that time frame the impact is difficult to quantify.
Investment in R&D	Impacted	To reduce the dependency on natural resources, life cycle analysis and other management tools have been incorporated into the various research and development phases. As a result, the first-run production processes for new therapies are considerably more efficient than those of the past by an estimated 50 percent.
Operations	Impacted	The reputational opportunity associated with climate change has left a positive mark on campus operations. All Biogen operations are now powered by 100 percent renewable electricity. Sustainable transportation can be seen through the natural gas powered Biogen Bus and EV charging stations at the various facilities.
Other, please specify	Please select	

C2.6

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

	Relevance	Description
Revenues	Not impacted	At the present time, the risks and opportunities of climate change have had a de minimis impact on our revenues. Market approvals, health care / tax regulations, and health outcome are the primary drivers of our revenue.
Operating costs	Impacted for some suppliers, facilities, or product lines	Improvements in manufacturing efficiency as well as overall energy efficiency measures implemented have had a small, but measurable impact on our operating costs, estimated at 10 percent.
Capital expenditures / capital allocation	Impacted for some suppliers, facilities, or product lines	Biogen conducted energy audits at each major facility in 2016. The results of these audits were capital allocation plans to implement a number of the proposed efficiency improvements. The magnitude of the capital allocation is small compared to other areas of the company.
Acquisitions and divestments	Not impacted	Climate change-related risks and opportunities are relatively low for the biopharmaceutical sector as a whole. Recent industry acquisitions and divestment including the spin-off of Bioverativ are primarily related to IP and research and development strategies with climate change playing an insignificant part.
Access to capital	Not impacted	Climate change-related risks are relatively low for Biogen on a whole and were not a significant consideration during Biogen's most recent corporate bond sale.
Assets	Not impacted	Biogen does not have significant assets beyond its IP and physical facilities. Risk assessments have indicated the physical facilities are unlikely to be significantly damaged in the near or long-term future as a result of climate change and thus have not impacted our financial planning process.
Liabilities	Not impacted	Biogen's liabilities are predominately related to IP rather than physical assets that may be impacted by climate change-related circumstances.
Other	Please select	

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.

Climate change-related issues have positively influenced our corporate business strategy, specifically related to resource efficiency. A core component of our current business strategy is to create a leaner and simpler operating model, which includes lower operating costs through research and development and manufacturing process improvements. This strategy component is directly linked to our Science-Based Target to reduce absolute emissions by 35 percent by 2030. Our emission scenario analysis evaluated various levels of resource improvement to understand the appropriate emission target to select.

No substantial business decisions have been made at this time as a result of the integration of climate-related issues; however, evaluation of long-term renewable energy procurement as a means to simplify energy procurement compared to short-term energy hedging decisions may be considered in the medium-term. Without the integration of climate-change issues the long-term benefit of renewable energy procurement may have been overlooked.

C3.1d

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

Climate-related scenarios	Details
Please select	<p>Our Science-based Carbon Target utilized the Science Based Target Initiative's Sectorial Decarbonization Approach (SDA). The SDA methodology is based on the 2°C scenario (2DS) developed by the International Energy Agency (IEA) as part of its publication, Energy Technology Perspectives (ETP) 2014 (IEA, 2014). It was developed by CDP, WRI and WWF with the technical support of Ecofys as a consultancy partner. The methodology was created with input from a group of technical advisors, two public stakeholder workshops and one online workshop, and aims to provide businesses with a sector-specific and research-backed method to set their emissions goals. The accompanying SDA tool allows companies to enter their data and determine their science-based targets according to the method and is regularly updated with recent ETP data. Our carbon target provides us with a long-term perspective (out to 2030) on how our business must transform across all aspects as related to the emission of carbon. Given this long-term perspective, assumptions regarding company growth, the transition of utility grids to renewables, global transportation efficiency improvements, and supplier efficiency improvements. On an annual basis we review this long-term scenario analysis to determine which aspects of the company are on-track and which need further development and if prior assumptions need to be amended. The results of this analysis are reported to relevant executive team members and recently have largely reaffirmed the business objective and strategy surrounding the focus on identifying and implementing innovative improvements to the manufacturing process. Other notable findings from the analysis include additional work needs to be done towards reducing the impact of our suppliers and company vehicles. Specifically with the company vehicle finding, a strategy is being developed to integrate electric vehicles into our fleet. A resulting example on our innovative in manufacturing strategy is in 2017 Biogen opened a new facility in Research Triangle Park for the synthesis of antisense oligonucleotides (ASOs), which are modified RNA molecules used in the treatment of neurological disorders. This new ASO facility and manufacturing platform will produce materials for both our clinical pipeline and commercial products. Our prior ASO purification process used flammable solvents, such as ethanol and methanol, which created hazardous waste. Utilizing green chemistry best practices, a cross-functional team developed a new, more responsible process, replacing the use of ethanol and methanol with a method using salts and water. In addition, we also simplified our filtration process and replaced lyophilization with an ultrafiltration technology that enables a ready-to-fill drug substance. This improved purification process eliminates all solvents in downstream processing, removing over 1,500 liters of hazardous waste per kilogram of product produced. In addition, cycle times are decreased by 50 percent, and the amounts of material, water and energy used – and associated GHG emissions – are also reduced. Finally, the new approach significantly improves the product’s purity levels, making it industry-leading and ensuring we are able to deliver the best quality product for patients. The first clinical batch of ASO was successfully manufactured with this new process in November 2017.</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) +3 (upstream & downstream)

% emissions in Scope

100

Targeted % reduction from base year

35

Base year

2013

Start year

2016

Base year emissions covered by target (metric tons CO2e)

379288

Target year

2030

Is this a science-based target?

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

% of target achieved

0

Target status

Underway

Please explain

For more information, see our target on sciencebasedtargets.org. Full wording of our target is as follows: "Biogen commits to a 35% reduction of absolute emissions across its entire value chain (scopes 1, 2 and 3) by 2030 from a 2013 base-year. This science-based target supports Biogen's ongoing commitment to be a Carbon Neutral company. Biogen adjusted its approach to carbon neutrality in 2017 to align with industry best practice of operational carbon neutrality. Scope 3 emissions are noticeably higher as they are no longer 100% matched with renewable energy certificates. Consequently, Biogen is evaluating its strategy towards achieving its 35% Absolute Reduction by 2030 target.

Target reference number

Abs 2

Scope

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

% emissions in Scope

100

Targeted % reduction from base year

100

Base year

2014

Start year

2014

Base year emissions covered by target (metric tons CO2e)

0

Target year

2018

Is this a science-based target?

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

% of target achieved

100

Target status

Achieved

Please explain

This target is our Carbon Neutral Commitment, which we have maintained since 2014. Our approach emphasizes first reducing our operational footprint then working with suppliers to do the same and finally investing in renewable electricity and environmental projects that offset the remaining impact of our direct operational carbon emissions. In 2017 we also offset our employee commuting carbon impact.

C4.2

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

Renewable electricity consumption

KPI – Metric numerator

Percent of Electricity Consumed that is Renewably Sourced

KPI – Metric denominator (intensity targets only)**Base year**

2014

Start year

2014

Target year

2018

KPI in baseline year

100

KPI in target year

100

% achieved in reporting year

100

Target Status

Achieved

Please explain

As an early member of RE100, a collaborative initiative of businesses committed to achieving 100 percent renewable energy, Biogen's operations around the world have been powered by at or near 100 percent renewable electricity since 2014.

Part of emissions target

Renewable energy is a key component of our absolute emission reduction strategy.

Is this target part of an overarching initiative?

RE100

Target

Waste

KPI – Metric numerator

Waste to Landfill Diversion Rate

KPI – Metric denominator (intensity targets only)**Base year**

2014

Start year

2014

Target year

2018

KPI in baseline year

100

KPI in target year

100

% achieved in reporting year

100

Target Status

Achieved

Please explain

In 2014 Biogen established a target to eliminate all waste to landfill from its manufacturing operations by focusing on diverting all waste streams towards higher value disposition options such as reuse, recycling, composting, and waste-to-energy.

Part of emissions target

The generation and disposal of waste is a small portion of our overall value chain emissions; however, diverting waste away from

landfills towards higher value options such as reuse, composting, and energy generation supports our target to reduce absolute emissions.

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

C4.3

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

Yes

C4.3a

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

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	32	4100
To be implemented*	1	100
Implementation commenced*	9	700
Implemented*	10	1000
Not to be implemented	5	300

C4.3b

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

Initiative type

Energy efficiency: Building services

Description of initiative

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

300

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

100000

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

650000

Payback period

4 - 10 years

Estimated lifetime of the initiative

16-20 years

Comment

Biogen completed LED lighting upgrades at two of its manufacturing facilities.

Initiative type

Energy efficiency: Building services

Description of initiative

Building controls

Estimated annual CO2e savings (metric tonnes CO2e)

200

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

30000

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

10000

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Implemented a chilled water temperature reset strategy and integrated with PLC automation upgrade.

Initiative type

Energy efficiency: Building services

Description of initiative

HVAC

Estimated annual CO2e savings (metric tonnes CO2e)

300

Scope

Scope 1

Voluntary/Mandatory

Voluntary

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

70000

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

280000

Payback period

4 - 10 years

Estimated lifetime of the initiative

11-15 years

Comment

Converted building HVAC system from a constant to a variable air volume system.

Initiative type

Energy efficiency: Building services

Description of initiative

HVAC

Estimated annual CO2e savings (metric tonnes CO2e)

180

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

30000

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

50000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

Evaluated and reduced air changes rates for laboratory areas.

Initiative type

Energy efficiency: Processes

Description of initiative

Refrigeration

Estimated annual CO2e savings (metric tonnes CO2e)

20

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

7000

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

20000

Payback period

1-3 years

Estimated lifetime of the initiative

16-20 years

Comment

Replaced old -70/80C freezers with ENERGY STAR rated Stirling Ultra Cold units to reduce energy and heat load by approximately 70% compared to previous units. Investment amount represents the premium over non-ENERGY STAR units.

C4.3c

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

Method	Comment
Employee engagement	Each Biogen site is encouraged to have site energy teams responsible for engaging employees in energy conservation activities.
Internal incentives/recognition programs	Biogen offers internal incentives/recognition programs, such as The Biogen Innovation Fund, our annual global EHS+S Awards, and the BIG (Biogen Great) Recognition and Rewards Program.
Compliance with regulatory requirements/standards	Biogen prioritizes projects associated with ensuring compliance with regulatory requirements/standards.
Dedicated budget for other emissions reduction activities	Biogen dedicates a portion of its budget each year to maintain carbon neutrality.
Internal finance mechanisms	When Biogen replaces equipment at its end of life, it chooses more efficient technology as replacements.
Other	Biogen uses a forecasting tool to help select and prioritize projects that will help us reduce our environmental footprint.

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?

No

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 2013

Base year end

December 31 2013

Base year emissions (metric tons CO2e)

54081

Comment

Scope 2 (location-based)

Base year start

January 1 2013

Base year end

December 31 2013

Base year emissions (metric tons CO2e)

38019

Comment

Scope 2 (market-based)

Base year start

January 1 2013

Base year end

December 31 2013

Base year emissions (metric tons CO2e)

44177

Comment

C5.2

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

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

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

68448

Start date

January 1 2018

End date

December 31 2018

Comment

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)

61616

Start date

January 1 2017

End date

December 31 2017

Comment

Past year 2

Gross global Scope 1 emissions (metric tons CO2e)

61970

Start date

January 1 2016

End date

December 31 2016

Comment

Past year 3

Gross global Scope 1 emissions (metric tons CO2e)

60179

Start date

January 1 2015

End date

December 31 2015

Comment

C6.2

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

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?**Reporting year****Scope 2, location-based**

40172

Scope 2, market-based (if applicable)

61

Start date

January 1 2018

End date

December 31 2018

Comment

Our Scope 2 market-based figure consists of emissions related to purchased district steam for our Cambridge, MA facility and electricity from small offices located in nations where renewable energy certificate attributes are not available (e.g. South Korea, New Zealand). As an early member of RE100, a collaborative initiative of businesses committed to achieving 100 percent renewable energy, Biogen's operations around the world have been powered by renewable electricity since 2014. This past year, we purchased and retired renewable energy certificates equivalent to the amount of electricity consumed at each of our locations (except as noted above), including: • Green-e certified renewable energy certificates from U.S. wind farms • Guarantees of Origin from on- and offshore wind farms in Denmark • International RECs for Brazil and China • Renewable energy certificates from an Australian wind farms

Past year 1**Scope 2, location-based**

42408

Scope 2, market-based (if applicable)

59

Start date

January 1 2017

End date

December 31 2017

Comment**Past year 2****Scope 2, location-based**

45899

Scope 2, market-based (if applicable)

155

Start date

January 1 2016

End date

December 31 2016

Comment

Past year 3

Scope 2, location-based

38173

Scope 2, market-based (if applicable)

187

Start date

January 1 2015

End date

December 31 2015

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

325928

Emissions calculation methodology

1) Biogen engages with its top suppliers by carbon impact each year, suppliers engaged over the past three years represent over 41% of its purchased goods and services impact. 2) Trucost's environmentally extended input-output (EEIO) model is utilized to apply emissions factors to the remaining suppliers. based on corporate-wide spend data mapped to corresponding industry sectors. This model uses a combination of actual supplier data (where available) and industry-level data. 3) Biogen purchases and retires renewable energy certificates for a small portion of the estimated / actual electricity portion of this impact.

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

41

Explanation

Purchased goods and services are considered relevant due to the relationship and significance to Biogen's business. There are no boundary exclusions for this source; note that Biogen does combine other sources within this category, including upstream and downstream transportation and distributions, which are a minor component of the purchased goods and services Biogen purchases.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

51635

Emissions calculation methodology

1) Trucost's EEIO model is utilized to apply emissions factors to all suppliers based on corporate-wide spend data mapped to corresponding industry sectors. This model uses a combination of actual supplier data (where available) and industry-level data.

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

0

Explanation

Capital goods are considered relevant due to the relationship and significance to Biogen's business. There are no boundary exclusions for this source

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

Evaluation status

Relevant, calculated

Metric tonnes CO2e

11047

Emissions calculation methodology

1) Non-renewable electricity, purchased steam and fossil fuels well-to-tank and transmission losses were calculated using emissions factors from UK Defra. 2) Renewable electricity transmission and distributions losses were calculated using grid loss factors from the World Bank. There are no additive emissions associated with this step as renewable electricity has an emission factor of 0. 3) Upstream emissions associated with municipal water consumption is calculated using the UK Defra water supply emission factor.

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

100

Explanation

There are no boundary exclusions for this source

Upstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Biogen captures emissions associated with upstream transportation and distribution within its Purchased Goods and Services emission inventory. As such a separate calculation of this category is not relevant.

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

758

Emissions calculation methodology

Generated waste and wastewater discharge are multiplied by applicable waste type and disposal method UK Defra emission factor.

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

Explanation

There are no boundary exclusions for this source.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

27190

Emissions calculation methodology

Business travel primary data consisting of air, rail and vehicle use is provided by Biogen's travel vendors. For air travel, emission factors incorporating 9% uplift but no radiative forcing is utilized and passenger distance is measured for the reporting year based on the ticket date of the flight rather than the booking date. All rental vehicles are assumed to utilize gasoline. The following sources are considered de minimis: taxi and other car services such as Uber, nonnational rail, and boat.

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

100

Explanation

There are no boundary exclusions for this source.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

8133

Emissions calculation methodology

In early 2017, Biogen conducted a global employee commuting survey the results of which were used to determine average commuting distance and transportation split. These factors were multiplied by the number of employees and days of work for each Biogen location.

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

100

Explanation

There are no boundary exclusions for this source.

Upstream leased assets

Evaluation status

Relevant, calculated

Metric tonnes CO2e

0

Emissions calculation methodology

Based on floor space of each leased asset multiplied a standard intensity value for the building use type. Biogen did not have any upstream leased assets in 2018.

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

100

Explanation

There are no boundary exclusions for this source. As Biogen has in the past utilized upstream leased assets, this category remains relevant.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Biogen captures emissions associated with downstream transportation and distribution within its Purchased Goods and Services emission inventory. As such a separate calculation of this category is not relevant.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Determined to not be relevant because Biogen does not sell products for further processing.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Determined to not be significant based on the Lawrence Berkeley National Lab report "Optimization of Product Life Cycles to Reduce Greenhouse Gas Emissions in California" (2005) publication, which reports use-phase emissions of 0 kg CO2e for over the counter drugs. Biogen's prescription drugs were assumed to have the same emissions from use.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO2e

11574

Emissions calculation methodology

Trucost's EEIO model is utilized along with average waste disposal routes for United States and rest of world.

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

0

Explanation

There are no boundary exclusions for this source.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Determined to be not relevant because Biogen does not act as a lessor of owned properties to other parties.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Determined to be not relevant because Biogen does not have any franchises.

Investments

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

Determined to be not relevant because Biogen does not make the types of financial investments outlined in the Scope 3 guidance document for this category.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

All upstream categories covered above

Other (downstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Explanation

All downstream categories covered above.

C6.7

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

No

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

0.000008

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

108620

Metric denominator

unit total revenue

Metric denominator: Unit total

1345300000

Scope 2 figure used

Location-based

% change from previous year

5

Direction of change

Decreased

Reason for change

The considerable reduction in emission per unit of revenue in 2018 was largely related to improvements made to Biogen's next generation manufacturing processes allowing for greater production with less equipment.

C7. Emissions breakdowns

C7.1

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

Yes

C7.1a

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

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	67134	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	46	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	102	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	980	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	0	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (HCFCs)	135	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	0	IPCC Fourth Assessment Report (AR4 - 100 year)
NF3	0	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (CFCs)	51	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)
Argentina	19
Australia	17
Austria	69
Belgium	258
Canada	427
Chile	1
Colombia	3
Czechia	72
Denmark	4669
Finland	10
France	709
Germany	1425
Hungary	10
Ireland	2
Italy	590
Japan	270
Netherlands	53
Norway	10
Mexico	1
Poland	185
Portugal	52
Slovakia	41
Slovenia	8
Spain	238
Sweden	70
Switzerland	6583
United Kingdom of Great Britain and Northern Ireland	381
Brazil	17
United States of America	52253
Republic of Korea	2
New Zealand	1
China	2

C7.3

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

- By facility
- By activity

C7.3b

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

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Research Triangle Park, North Carolina - Drug Product	7028	35.898	-78.861
Research Triangle Park, North Carolina - Drug Substance	11842	35.898	-78.861
Cambridge, Massachusetts	28390	42.366	-71.087
Hillerød, Denmark	4611	55.922	12.276
Affiliate Offices (Various locations around the world)	5204	42.366	-71.087
US Commercial Fleet (Various locations)	4924	42.366	-71.087
Solothurn, Switzerland	6449	47.222448	7.57963

C7.3c

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

Activity	Scope 1 emissions (metric tons CO2e)
Stationary Fuel Combustion	58139
Mobile Fuel Combustion	9143
Fugitive Refrigerant Emissions	1166

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	34006	57	98652	98326
Denmark	4827	0	23242	23242
Argentina	36	0	95	95
Australia	131	0	172	172
Austria	15	0	102	102
Belgium	17	0	99	99
Brazil	13	0	109	109
Canada	21	0	140	140
Chile	1	0	2	2
Colombia	4	0	19	19
Czechia	32	0	59	59
Finland	7	0	57	57
France	23	0	436	436
Germany	160	0	357	357
Hungary	6	0	22	22
Ireland	4	0	9	9
Italy	93	0	280	280
Japan	66	0	120	120
Mexico	3	0	5	5
Netherlands	40	0	86	86
New Zealand	0	0	2	0
Norway	3	0	313	313
Poland	96	0	132	132
Portugal	30	0	105	105
Slovakia	15	0	92	92
Slovenia	15	0	58	58
Republic of Korea	4	4	7	0
Spain	72	0	290	290
Switzerland	201	0	7074	7074
United Kingdom of Great Britain and Northern Ireland	225	0	804	804
Sweden	2	0	136	136
China	5	0	10	10

C7.6

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

- By facility
- By activity

C7.6b

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

Facility	Scope 2 location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Research Triangle Park, North Carolina - Drug Product	9474	0
Research Triangle Park, North Carolina - Drug Substance	22132	0
Cambridge, Massachusetts	2369	57
Hillerød, Denmark	4807	0
Affiliate Offices (Various locations around the world)	1212	4
Solothurn, Switzerland	178	0

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)
Electricity	40115	4
Steam	57	57

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?

Increased

C7.9a

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

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change	0	Biogen continues to purchased renewable energy attribute certificates to match electricity consumption. This practice does not impact location-based Scope 2 calculations though.
Other emissions reduction activities	300	Decreased	0.4	Biogen conducts emission reduction activities related each year to lower resource uses by its facilities and production processes. Due to its 100% renewable electricity usage, the value presented here only considers changes in direct combustion of fossil fuels at the sites. These projects includes HVAC and steam production improvements with an aggregated estimated 300 MTCO2e reduction [300 / 68,509 = 0.4%].
Divestment	0	No change	0	No significant divestment impacting emissions were made in 2018.
Acquisitions	0	No change	0	No significant acquisitions impacting emissions were made in 2018.
Mergers	0	No change	0	No mergers occurred in 2018.
Change in output	685	Increased	1	Production of our treatment for spinal muscular atrophy (SMA), Spinraza , increased significantly in 2018. Emissions associated with Spinraza and as well as a ramp up of our biosimilars portfolio is estimated at 685 MTCO2e. [685 / 68,509 = 1.0%]
Change in methodology	0	No change	0	No methodology changes occurred in 2018.
Change in boundary	0	No change	0	No boundary changes occurred in 2018.
Change in physical operating conditions	0	No change	0	Weather variability has minor impacts to energy usage each year associated with building heating and cooling, but cannot be quantified apart from the more significant trends in production output.
Unidentified	0	No change	0	None
Other	6449	Increased	9.4	Biogen's new biologics manufacturing facility in Solothurn began operational testing in 2018. Biogen's aggregate emission increase is largely due to this new facility. Emissions related to the facility were 6,449 MTCO2e. [6,449 / 68,509 = 9.4%]

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	No
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)	HHV (higher heating value)	0	358198	358198
Consumption of purchased or acquired electricity	<Not Applicable>	132751	10	132761
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	236	236
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	132751	358443	491194

C8.2b

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

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of heat	Yes
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

HHV (higher heating value)

Total fuel MWh consumed by the organization

316524

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

36500

MWh fuel consumed for self-generation of steam

132057

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

147967

Comment

Cambridge facility contains a cogeneration plant to generate facility's steam needs as well as partial electricity need.

Fuels (excluding feedstocks)

Diesel

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

14612

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

14612

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Used in commercial fleet vehicles

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

24052

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

24052

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Used in commercial fleet vehicles

Fuels (excluding feedstocks)

Fuel Oil Number 2

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

3010

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

3010

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Comment

Backup generators

C8.2d

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

Diesel

Emission factor

2.62694

Unit

kg CO2e per liter

Emission factor source

UK Department for Environment, Food and Rural Affairs (DEFRA) - 2018 version 1.02 (GWP AR4 applied) - Stationary Fuel - Diesel (Biofuel Blend) (Volume) (Direct)

Comment

Fuel Oil Number 2

Emission factor

10.24409

Unit

kg CO2e per gallon

Emission factor source

USEPA Climate Leaders - 2015

Comment

Calculated with AR4 GWP as specified in https://www.epa.gov/sites/production/files/2015-12/documents/emissionfactors_nov_2015.pdf

Motor Gasoline

Emission factor

2.20307

Unit

kg CO2e per liter

Emission factor source

UK Department for Environment, Food and Rural Affairs (DEFRA) - 2018 version 1.02 (GWP AR4 applied) - Stationary Fuel - Gasoline / Petrol (Biofuel Blend) (Volume) (Direct)

Comment

Natural Gas

Emission factor

53.1148

Unit

kg CO2e per million Btu

Emission factor source

USEPA Climate Leaders - 2015

Comment

Calculated with AR4 GWP as specified in https://www.epa.gov/sites/production/files/2015-12/documents/emissionfactors_nov_2015.pdf

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	35000	35000	0	0
Heat	29200	29200	0	0
Steam	74000	73745	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

Wind

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

North America

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

3181

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

0

Comment

Biogen signed a supplier contract with Calpine Energy Solutions for 100% renewable power for our Weston, Massachusetts office facility.

Basis for applying a low-carbon emission factor

Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type

Biomass (including biogas)

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

North America

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

95285

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

0

Comment

In the United States and Canada, our operations are matched with 100% renewable electricity through the purchase and retirement of Green-e certified RECs.

Basis for applying a low-carbon emission factor

Energy attribute certificates, Guarantees of Origin

Low-carbon technology type

Hydropower

Biomass (including biogas)

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

Europe

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

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

0

Comment

In the EU, our operations are matched with 100% renewable electricity through the purchase and retirement of EECS Guarantees of Origin from low impact hydro in Switzerland and biogas in the United Kingdom.

Basis for applying a low-carbon emission factor

Energy attribute certificates, I-RECs

Low-carbon technology type

Biomass (including biogas)

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

Asia Pacific

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

10

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

0

Comment

In China, our operations are matched with 100% renewable electricity through the purchase and retirement of I-RECs from the Pizhou biomass plant.

Basis for applying a low-carbon emission factor

Energy attribute certificates, I-RECs

Low-carbon technology type

Solar PV

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

North America

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

6

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

0

Comment

In Mexico, our operations are matched with 100% renewable electricity through the purchase and retirement of I-RECs from the Aura Solar I project.

Basis for applying a low-carbon emission factor

Energy attribute certificates, I-RECs

Low-carbon technology type

Wind

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

Latin America

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

196

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

0

Comment

In South America, our operations are matched with 100% renewable electricity through the purchase and retirement of I-RECs from wind farms in Brazil.

Basis for applying a low-carbon emission factor

Other, please specify (Australian RECs)

Low-carbon technology type

Wind

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

Asia Pacific

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

173

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

0

Comment

In Australia, our operations are matched with 100% renewable electricity through the purchase and retirement of Australian RECs (large generation certificates) from a wind farm in Australia.

Basis for applying a low-carbon emission factor

Other, please specify (Japan Green Power Certificates)

Low-carbon technology type

Biomass (including biogas)

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

Asia Pacific

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

120

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

0

Comment

In Japan, our operations are matched with 100% renewable electricity through the purchase and retirement of Green Power Certificates from a biomass facility.

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

ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf

Page/ section reference

The ERM CVS assurance statement is publicly available here:

https://www.biogen.com/content/dam/biogen/ERM%20CVS%202018%20Assurance%20Statement%20Biogen%20-%2029Apr2019_FINAL.pdf. The referenced data table outlining assured data values, including all emission, energy, water and waste data, can be found here: https://www.biogen.com/en_us/gri-data-table.html

Relevant standard

ISAE3000

Proportion of reported emissions verified (%)

100

Scope

Scope 2 location-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

ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf

Page/ section reference

The ERM CVS assurance statement is publicly available here:

https://www.biogen.com/content/dam/biogen/ERM%20CVS%202018%20Assurance%20Statement%20Biogen%20-%2029Apr2019_FINAL.pdf. The referenced data table outlining assured data values, including all emission, energy, water and waste data, can be found here: https://www.biogen.com/en_us/gri-data-table.html

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

ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf

Page/ section reference

The ERM CVS assurance statement is publicly available here:

https://www.biogen.com/content/dam/biogen/ERM%20CVS%202018%20Assurance%20Statement%20Biogen%20-%2029Apr2019_FINAL.pdf. The referenced data table outlining assured data values, including all emission, energy, water and waste data, can be found here: https://www.biogen.com/en_us/gri-data-table.html

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- all relevant categories

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Attach the statement

ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf

Page/section reference

The ERM CVS assurance statement is publicly available here:

https://www.biogen.com/content/dam/biogen/ERM%20CVS%202018%20Assurance%20Statement%20Biogen%20-%2029Apr2019_FINAL.pdf. The referenced data table outlining assured data values, including all emission, energy, water and waste data, can be found here: https://www.biogen.com/en_us/gri-data-table.html

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
C8. Energy	Renewable energy products	ISAE 3000 International Standard for Assurance engagements and, for the GHG data ISO 14064- 3:2006: Specification with guidance for the validation and verification of greenhouse gas assertions.	Assurance process includes cross checking that the purchased Carbon Offsets, Renewable Energy Certificates (REC), Guarantees of Origin, International-RECs and Green Power Certificates were retired/managed according to Biogen's Sustainability Data Collection and Reporting Procedure, which includes the Carbon Neutral Methodology. ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf
C4. Targets and performance	Other, please specify (Carbon Neutral Commitment)	ISAE 3000 International Standard for Assurance engagements and, for the GHG data ISO 14064- 3:2006: Specification with guidance for the validation and verification of greenhouse gas assertions	Assurance process includes cross checking that the purchased Carbon Offsets, Renewable Energy Certificates (REC), Guarantees of Origin, International-RECs and Green Power Certificates were retired/managed according to Biogen's Sustainability Data Collection and Reporting Procedure, which includes the Carbon Neutral Methodology. ERM CVS 2018 Assurance Statement Biogen - 29Apr2019_FINAL.pdf

ERM CVS 2018
Assurance Statement
Biogen -
29Apr2019_FINAL.pdf

C11. Carbon pricing

C11.1

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

Yes

C11.1a

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

EU ETS

C11.1b

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

EU ETS

% of Scope 1 emissions covered by the ETS

8

Period start date

January 1 2018

Period end date

December 31 2018

Allowances allocated

0

Allowances purchased

5289

Verified emissions in metric tons CO2e

5289

Details of ownership

Facilities we own and operate

Comment

C11.1d

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

The EU ETS applies to our Hillerød manufacturing facility. Our strategy for complying with the requirements of the ETS are to 1) purchase allowances to cover the calculated verified emissions associated with the facility and 2) continue our innovation and energy efficiency work to reduce our obligations under the ETS. One example is Hillerød obtaining ISO50001 certification in 2016.

C11.2

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

No

C11.3

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

Yes

C11.3a

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

Objective for implementing an internal carbon price

Change internal behavior
Drive energy efficiency
Stress test investments

GHG Scope

Scope 1
Scope 2

Application

As part of Biogen's carbon neutrality strategy, we purchase and retire carbon offsets. The average price per offset serves as a real price on carbon to the business. One application of this internal price on carbon was against energy efficiency projects identified at all of our major facilities in 2016 to determine their full financial impact. We have also piloted the use of higher shadow prices to stress test long-term energy impacting projects.

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

1.3

Variance of price(s) used

Shadowing pricing used for stress testing investments has ranged from USD10 to USD50 based on the range of pricing included in previously bills circulated within the United States congress.

Type of internal carbon price

Shadow price
Offsets

Impact & implication

The impact of shadow pricing and offsets can be significant. As one example, in 2015 we assessed the finances of a cogeneration plant at one of our sites with the inclusion of a variety of shadow prices. The price on carbon ultimately has a meaningful impact on the long-term financial viability of the project.

C12. Engagement

C12.1

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

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

C12.1a

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

Type of engagement

Information collection (understanding supplier behavior)

Details of engagement

Collect climate change and carbon information at least annually from suppliers

% of suppliers by number

0.01

% total procurement spend (direct and indirect)

27

% Scope 3 emissions as reported in C6.5

34

Rationale for the coverage of your engagement

The intent of Biogen's multi-year supplier engagement program is to further understand the true impact of its largest suppliers from a climate impact perspective. Preliminary carbon emissions are calculated for all suppliers using Trucost's environmentally extended input-output (EEIO) model. The top non-capital goods suppliers are selected from the list for the engagement process. The engagement consists of requesting primary energy data from suppliers as well as more detailed life cycle analysis/footprinting data associated with the specific goods and services purchased by Biogen.

Impact of engagement, including measures of success

By engaging with 10 of our top impacting suppliers each year, Biogen was able to initiate discussions with suppliers about the importance of manufacturing in a sustainable manner and also better understand how suppliers are managing risks. The quantitative impact of this engagement was an aggregate emissions reduction of 4.5 percent through the use of actual carbon emission data from vendors as compared to estimates made by the EEIO model. Success is largely measured by securing positive engagement with the supplier through an open communication channel and receipt of company-level emission data at a minimum. Biogen achieved a 50% success rate for its 2018 supplier engagement typical of past engagement. Biogen procures goods and services from a variety of suppliers, both small and large. While many have established environmental performance programs, some do not. As a result, the supplier engagement program also provides incentivization for companies to further develop its environmental collection and reporting capabilities.

Comment

C12.1c

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

Approximately 70 percent of our carbon impacts are driven by goods and services provided by our supply chain partners. In order to meet our full value-chain emissions reduction goal, we have developed a strategy consisting of working closely with our high impact suppliers to better understand their contributions to our carbon footprint and their climate strategies. Since 2015, we have engagement with suppliers that collectively are responsible for around half our purchased goods and services emissions (Scope 3 - Category 1).

This initiative, which consists of sharing data to better understand the carbon impact of the goods and services we purchase, has resulted in more accurate accounting of our footprint and often a decrease in our overall carbon footprint. Examples of this engagement include Thermo Fisher Scientific and General Electric (GE), which provide materials for the production of our therapies. For this example, we learnt that the resins we purchase are more carbon intensive than the industry average, while media provided by GE has nearly half the carbon footprint of basic organic chemicals. We will continue to expand this work with suppliers, supporting their emissions reductions through the sharing of best practices and identifying opportunities for improvement.

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

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
Clean energy generation	Support with minor exceptions	At a local level, Biogen engages with policy makers on key issues as needed. In Cambridge, Biogen is a member of the Kendall Square EcoDistrict, which is working to drive sustainability actions within the square and larger Cambridge community such as through district-scale energy projects and bike infrastructure improvements. Biogen's Hillerød facility is collaborating through its Symbiosis network, where it has been working to address food waste, wastewater, safety and employee wellness efforts. We believe that leadership on climate change also means engaging stakeholders and being advocates for sustainable climate policies. To foster this, we are participating in advocacy initiatives with other likeminded businesses around the world to increase awareness that climate change is a business issue to be addressed. In recent years, we showed our support to a number of climate advocacy initiatives: RE100, the White House American Business Act on Climate Pledge, We Mean Business coalition, and the EPA Green Power Partnership.	Biogen seeks access to diverse energy sources, including the development of cost-effective renewable energy sources, to further diversify our portfolio, ensure reliability, eliminate our climate change impact, and strengthen our carbon neutrality strategy.

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?

All of our activities that influence climate change policy are managed by the global EHS+S and Government Affairs groups with oversight from the Global Impact Executive Council, which is led by our executive vice president for Pharmaceutical Operations and Technology, and includes members of Biogen's senior leadership team. Biogen's Climate Change Position Statement recognizes that climate change is a serious risk to human health and our business, and that international bodies and national governments have an important role to play in providing a framework for a transition to a low-carbon economy and fulfilling our collective obligations under the Paris Agreement. We use the Climate Change Position Statement to guide our engagement with stakeholders and to ensure that all of our direct and indirect activities are consistent with our overall climate change strategy.

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 voluntary sustainability report

Status

Complete

Attach the document

2017BiogenCorporateCitizenshipReport.pdf

Page/Section reference

Biogen's Corporate Sustainability Report can be found online here: <https://www.biogencsr.com/> Emission Data located in the GRI Data Table: https://www.biogencsr.com/en_us/gri-data-table.html Discussion on Climate located in the Environmental Section: https://www.biogencsr.com/en_us/environment.html

Content elements

- Governance
- Strategy
- Emissions figures
- Emission targets
- Other metrics

Comment

Publication

In mainstream reports

Status

Complete

Attach the document

FINAL_BIIB_Annual Report-full.pdf

Page/Section reference

Page 12 discusses our commitment to environmental sustainability

Content elements

- Strategy
- Emissions figures
- Emission targets
- Other metrics

Comment

Items discussed include our Science Based Target, approach to reducing emissions, our 100% renewable electricity commitment, and emission data related to our internal carbon target.

C14. Signoff

C-FI

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

C14.1

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

	Job title	Corresponding job category
Row 1	Senior Vice President Asset Development and Portfolio Management	Chief Operating Officer (COO)

SC. Supply chain module

SC0.0

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

Biogen uses a three-pronged approach to maintaining carbon neutrality: measuring and continually improving the accuracy of emissions data, driving reductions internally and working with our suppliers, and investing in reputable renewable electricity instruments and carbon offsets. Biogen became a carbon neutral company in 2014 and maintained that status in the last reporting year with a commitment to continue doing so moving forward. This is the result of a multiyear initiative that emphasizes measuring our emissions and improving data quality, reducing our operational carbon footprint, and working with suppliers to do the same. We then invest in environmental projects that offset the remaining carbon associated with our business.

Starting in 2015 we began working closely with our suppliers to better understand their contribution to our carbon footprint and demonstrate our interest in their climate strategy. In 2018 we engaged with 10 suppliers, which collectively represented 31 percent of our supply chain carbon emissions. This initiative has resulted in more accurate accounting of our footprint. In the future, we plan to expand our work with suppliers to focus on supporting their carbon footprint reductions through best practices sharing and identifying opportunities for improvement. For those vendors that supply products and services that relate directly to the safety and integrity of our products and the continuity of our manufacturing process, we have intensified our focus on implementing a proactive supply-chain assessment process. In 2018, we assessed over 900 supplier sites. This annual process evaluates the risks associated with our critical supplier base from an environmental, social and governance perspective across multiple factors, including water risks. Through this rigorous process we have not identified any at-risk suppliers, but we will continue to monitor these risks annually. We are also an active participant in the Pharmaceutical Supply Chain Initiative, which supports better social, economic and environmental outcomes for all those who make up the pharmaceutical supply chain.

SC0.1

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

	Annual Revenue
Row 1	13453000000

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	US	09062X1037

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

Johnson & Johnson

Scope of emissions

Scope 1

Allocation level

Facility

Allocation level detail

Production specific to Johnson and Johnson is conducted at Biogen's RTP Drug Substance and Hillerød manufacturing facilities. Allocation of greenhouse gases is based on the percentage of batch production by volume associated with Johnson and Johnson compared to the total for each facility during the calendar year. Each facility's total Scope 1 emissions are multiplied by this percentage to come up with the total allocation.

Emissions in metric tonnes of CO₂e

4098

Uncertainty (±%)

5

Major sources of emissions

Combustion of natural gas for steam and space heating.

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

This calculation assumes each facility's emissions are equally distributed per unit volume of batch production and that office-related activities at other Biogen locations are insignificant. Note: As part of Biogen's carbon neutrality commitment, Biogen purchases carbon offsets to neutralize 100% of its direct emissions. Thus, when including offsets, allocation to Johnson and Johnson would be 0 MTCO₂e.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 2

Allocation level

Facility

Allocation level detail

Production specific to Johnson and Johnson is conducted at Biogen's RTP Drug Substance and Hillerød manufacturing facilities. Allocation of greenhouse gases is based on the percentage of batch production by volume associated with Johnson and Johnson compared to the total for each facility during the calendar year. Each facility's total Scope 2 emissions are multiplied by this percentage to come up with the total allocation.

Emissions in metric tonnes of CO₂e

0

Uncertainty (±%)

0

Major sources of emissions

None

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

The same allocation method and assumptions are used for Scope 2 as Scope 1. There are no emissions associated with Scope 2 as 100 percent of the electricity consumed by the applicable Biogen facilities is from renewable sources and has been since 2014. This commitment to renewable electricity reduced the allocation of emissions to Johnson and Johnson from this source by 7509 MTCO_{2e}.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

Allocation is determined by identifying the number of Biogen employees at the RTP Drug Product and Hillerød facilities focused on the Johnson and Johnson products, which is calculated based on the breakdown of batch production by volume. The total percentage of Biogen employees focused on Johnson and Johnson products is then multiplied by the company-level emissions.

Emissions in metric tonnes of CO_{2e}

21573

Uncertainty (±%)

50

Major sources of emissions

Purchased goods and services and Capital Goods (Categories 1 and 2). Biogen includes upstream and downstream transportation and distribution (Categories 4 and 9) emissions within purchased goods and services for reference.

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

This methodology is limited in its accuracy as spend on purchased goods and services / capital goods specific to production at the two facilities of interest is unknown.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 3

Allocation level

Facility

Allocation level detail

Production specific to Johnson and Johnson is conducted at Biogen's RTP Drug Substance and Hillerød manufacturing facilities. Allocation of greenhouse gases is based on the percentage of batch production by volume associated with Johnson and Johnson compared to the total for each facility during the calendar year. Each facility's emissions are multiplied by this percentage to come up with the total allocation.

Emissions in metric tonnes of CO2e

681

Uncertainty (±%)

5

Major sources of emissions

Upstream and downstream waste, water, fuel and energy-related activities (Categories 3 and 5)

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

The same assumptions are used for this GHG source as Scopes 1 and 2. Biogen's purchasing of 100 renewably sourced electricity reduced the allocation of emissions to Johnson and Johnson from this source by approximately 1628 MTCO2e in 2018.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

The same allocation method and assumptions are used for this GHG source as Scope 3 Categories 1 and 2.

Emissions in metric tonnes of CO2e

1554

Uncertainty (±%)

50

Major sources of emissions

Business Travel (Category 6)

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

The accuracy of this method is limited as the specific number of employees working on the Johnson and Johnson account is unknown.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 3

Allocation level

Facility

Allocation level detail

Production specific to Johnson and Johnson is conducted at Biogen's RTP Drug Substance and Hillerød manufacturing facilities. Allocation of greenhouse gases is based on the percentage of batch production by volume associated with Johnson and Johnson compared to the total for each facility during the calendar year. Each facility's emissions are multiplied by this percentage to come up with the total allocation.

Emissions in metric tonnes of CO2e

770

Uncertainty (±%)

15

Major sources of emissions

Employee Commuting (Category 7)

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

The accuracy of this method is limited as the specific number of employees working on the Johnson and Johnson account is unknown.

Requesting member

Johnson & Johnson

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

There is no allocation of emission from these sources as they are either not relevant to Biogen, have 0 emissions (upstream leased assets), or are not relevant to Johnson and Johnson (product end-of-life).

Emissions in metric tonnes of CO2e

0

Uncertainty (±%)

0

Major sources of emissions

All other Scope 3 Categories (8, 10, 11, 12, 13, 14 and 15)

Verified

No

Allocation method

Allocation based on the volume of products purchased

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

There is no allocation of emission from these sources as they are either not relevant to Biogen, have 0 emissions (upstream leased assets), or are not relevant to Johnson and Johnson (product end-of-life).

Requesting member

CVS Health

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

Allocation of company-wide emissions is based on total sales to CVS Health as a percentage of total Biogen product sales (excludes revenue from products made by others and non-product revenues), calculated at 15%. While products purchased by CVS Health are made in three of Biogen's five major facilities, services provided by those other facilities and our global affiliate offices in support of product sales and customer use are significant and merit than inclusion within the allocation.

Emissions in metric tonnes of CO2e

9967

Uncertainty (±%)

Major sources of emissions

Combustion of natural gas for steam and space heating; Gasoline and diesel associated with fleet vehicle use

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

GHG sources are tracked via invoices (electricity, natural gas) or in some cases estimated (fleet vehicle fuel use) and have been verified by CVS ERM. The allocation calculation assumes emissions per dollar of product value is roughly equivalent and that office-related activities in non-product facilities support each product in a roughly equivalent manner. Note: As part of Biogen's carbon neutrality commitment, Biogen purchases carbon offsets to neutralize 100% of its direct emissions. Thus, when including offsets, allocation to CVS Health would be 0 MTCO_{2e}.

Requesting member

CVS Health

Scope of emissions

Scope 2

Allocation level

Company wide

Allocation level detail

Allocation of company-wide emissions is based on total sales to CVS Health as a percentage of total Biogen product sales (excludes revenue from products made by others and non-product revenues). While products purchased by CVS Health are made in three of Biogen's five major facilities, services provided by those other facilities and our global affiliate offices in support of product sales and customer use are significant and merit than inclusion within the allocation.

Emissions in metric tonnes of CO_{2e}

9

Uncertainty (±%)

10

Major sources of emissions

Purchases steam.

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

Electricity and purchased steam use is tracked from utility invoices and has been verified by ERM CVS. The same allocation method and assumptions are used for Scope 2 as Scope 1. There are no emissions associated with electricity consumption as 100 percent of the electricity consumed by the applicable Biogen facilities is from renewable sources and has been since 2014. This commitment to renewable electricity reduced the allocation of emissions to CVS Health by 5841 MTCO_{2e}. Additionally, Biogen purchases and retires carbon offsets for emissions associated with purchased steam, reducing CVS Health's allocation to 0 MTCO_{2e}.

Requesting member

CVS Health

Scope of emissions

Scope 3

Allocation level

Company wide

Allocation level detail

Allocation of company-wide emissions is based on total sales to CVS Health as a percentage of total Biogen product sales (excludes revenue from products made by others and non-product revenues).

Emissions in metric tonnes of CO2e

63529

Uncertainty (±%)

25

Major sources of emissions

Category 1 Purchased Goods and Services - 47462 MTCO2e Category 2 Capital Goods - 7519 MTCO2e Category 3 Upstream/Downstream Energy and Water - 1609 MTCO2e Category 5 Waste - 110 MTCO2e Category 6 Business Travel - 3959 MTCO2e Category 7 Employee Commuting - 1184 MTCO2e Category 12 Product End of Life - 1685 MTCO2e Categories 4, 8, 9, 10, 11, 13, 14, and 15 are either included within another category, de minimis, or not relevant.

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

Emissions are calculated from a variety of methodologies: Categories 1, 2 and 12 are based on Trucost's EEIO model based on Biogen's spend. Categories 3, 5 and 6 use UK DEFRA emissions factors against tracked electricity, natural gas, water, waste, and air travel values. Category 7 uses employee commuting surveys and UK DEFRA emission factors. Similar to Scope 1 and 2, the allocation calculation assumes emissions per dollar of product value is roughly equivalent and that office-related activities in non-product facilities support each product in a roughly equivalent manner. Uncertainty is higher as this assumption becomes more challenging when related to upstream and downstream emissions.

SC1.2

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

Biogen's 2018 data can be found publicly in its 2019 CDP Climate Change disclosure as well as in its 2018 Corporate Social Responsibility Report, available online at <<https://www.biogen.com>>

All Biogen greenhouse gas values were assured by an independent third-party against the ISAE 3000 standard and ISO 14064-3:2006: Specification with guidance for the validation and verification of greenhouse gas assertions standard.

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
Other, please specify (Breakdown of Scope 3 emissions)	While Scope 1 allocation could be improved further through the use of life cycle analysis techniques to identify the specific impact of each production process, Scope 3 provides the largest challenge. Purchased goods and services is by far Biogen's largest area of impact and presents a significant challenge in attempting to allocate spend to individual production processes. We have not evaluated ways to overcome this challenge at the present time.

SC1.4

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

Yes

SC1.4a

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

Biogen plans to strategically conduct additional submetering as well as life cycle assessments for certain production processes to better understand their impacts. This may allow Biogen to shift from towards product and production specific allocations.

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 2019-2020 CDP Action Exchange initiative?

No

SC3.2

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

No

SC4.1

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

No, I am not providing data

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	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