Roadmap for Achieving Biogen’s Scope 3 Science-Based Target

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1 Several pieces of confidential business information have been removed or anonymized for this public version.
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Glossary

AD: Alzheimer’s disease  
BAU: Business-as-usual  
C: Celsius  
CO₂e: Carbon Dioxide Equivalent  
COP: Conference of the Parties  
CSR: Corporate Social Responsibility  
DJSI: Dow Jones Sustainability Index  
EHS: Environmental Health and Safety  
ERM CVS: ERM Certification and Verification Services, Inc.  
ESG: Environmental, social, and governance  
GHG: Greenhouse gas  
GMP: Good Manufacturing Practice  
GRI: Global Reporting Initiative  
GtCO₂: Gigatons of CO₂  
IPCC: Intergovernmental Panel on Climate Change  
MS: Multiple sclerosis  
PSCI: Pharmaceutical Supply Chain Initiative  
REC: Renewable Energy Credit  
SBT: Science-Based Target  
SBTi: Science-based target initiative  
UNFCCC: United Nations Framework Convention on Climate Change  
UN: United Nations  
WWF: World Wildlife Fund
Executive Summary

Background
Biogen is a multinational biotechnology leader in neuroscience with a portfolio of medicines for multiple sclerosis and the only approved treatment for spinal muscular atrophy (Biogen, 2017). The company is also a leader in sustainability initiatives in the biotechnology industry. In June 2017, Biogen strengthened its sustainability program by committing to a Science-Based Target (SBT) to reduce its absolute greenhouse gas (GHG) emissions 35 percent across its entire value chain (scopes 1, 2, and 3) by 2030 from a 2013 base-year. Scope 3 emissions reductions will be the most difficult to achieve because the majority of these emissions comes from suppliers, over which Biogen has little direct control. The purpose of this project, completed by four Master of Environmental Management students at Duke University’s Nicholas School of the Environment, is to help Biogen develop strategies to reduce its supply chain emissions in line with its SBT.

According to CDP (2019), the amount of GHG emissions from suppliers is significantly greater than most companies’ own emissions. Biogen’s own emissions account for approximately 30 percent of total emissions while the remaining 70 percent are from suppliers (Biogen, 2016). It is therefore imperative for Biogen to engage its suppliers to achieve its 35 percent GHG reduction target. Supplier engagement can include encouraging the measurement and reporting of GHG emissions, providing technical support, connecting suppliers with third-party programs and collaborations, and incorporating climate resilience into the supplier selection and contractual process (Norton, 2015).

Challenges
Scope 3 emissions are the largest component of most companies’ GHG emissions and the most difficult to reduce because it requires engaging with and collecting data from multiple parties such as suppliers (GHG Protocol, 2011). Although there is a wide range of opportunities to reduce emissions throughout the value chain, most companies focus their efforts on the most impactful scope 3 categories. To maximize emissions reductions and return on investment, companies should prioritize suppliers comprising about 80 percent of their direct spend and those with outsized emissions impacts (EPA, 2018).

Tackling supply chain sustainability in the pharmaceutical and biotechnology industry is not a simple task. Constant mergers and large production portfolios make mapping and engaging with the supply chain difficult. Biogen is a member of the Pharmaceutical Supply Chain Initiative (PSCI), but it is not currently focused on carbon reduction. Since Biogen does not have a large percentage of most of its suppliers’ business, it cannot exert a large amount of pressure on suppliers to make changes. Finally, unlike plastic use, carbon emissions are not always the most material environmental problem for pharmaceutical companies, leaving carbon emissions an afterthought for many EHS professionals in the industry.

Despite Biogen’s significant environmental commitments, other business areas are receiving more attention and displacing necessary resources. In 2017, Biogen introduced strategic priorities to reach its goal to become the global leader in neuroscience by developing transformational therapies to address the world’s most significant unmet medical needs. These priorities include creating a leaner operating model to streamline operations and reduce costs and reallocating resources to
prioritize research and development (Biogen, 2017a). The EHS group has therefore subsumed the sustainability function without increasing its headcount, thereby forcing sustainability responsibilities to compete for human resources and time. This poses a challenge for Biogen to reach its SBT because engaging with suppliers and monitoring their GHG emissions requires a high level of effort. Additionally, Biogen’s planned large-scale biologics manufacturing facility at Solothurn, Switzerland poses challenges to its environmental targets. Increased manufacturing capacity will increase absolute emissions.

**Recommendations**

The recommendations laid out in the paper focus on creating a roadmap for Biogen to meet its scope 3 emissions reduction goals. These recommendations, broken by scope and level of implementation difficulty (see Figure 1 below), were created by conducting original research of industry and general supply chain emissions reductions trends and by performing analyses of company data. No single action will lead to Biogen meeting its SBT on time. Meeting the SBT will require Biogen to adopt many of the suggested activities and to hold itself to one of the highest standards of any pharmaceutical-biotechnology company. By utilizing innovative approaches and creating coalitions with other pharmaceutical companies, Biogen can help create innovation that can spur internal change and progress throughout the entire industry.

We highly recommend Biogen consider transitioning an employee to a dedicated position for sustainability programs or creating this position to provide leadership to projects in multiple departments that the EHS team alone may not have the bandwidth to accomplish. This position could help lead Biogen through the complex and important process of meeting the company’s scope 3 target by adopting any combination of the recommendations in Figure 1.

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**Figure 1** Recommendations for Biogen to reduce supply chain emissions.
We provide an internal, external, and industry-wide roadmap that identifies the most critical components to reaching Biogen’s SBT. Our multi-faceted approach focuses on reducing scope 3 carbon emissions across all dimensions of Biogen’s supply chain. We recommend Biogen focus on addressing sustainability across multiple scopes: internally within Biogen, externally with Biogen’s existing and potential suppliers, and industry-wide to include other competitors, peers, and suppliers.

Internal to Biogen, we recommend Biogen focus on adapting internal strategy and corporate structure to address sustainability and carbon emissions reductions by increasing awareness among Biogen employees.

1. *Educate and engage employees on SBTs and emissions:* Biogen should take steps to educate employees on its SBT goals and create sustainability champions among employees by integrating employee education and engagement into the company’s broad sustainability strategies.

2. *Create interactions between sustainability and supply chain teams:* The sustainability/EHS team within Biogen should work to educate the supply chain and procurement teams about what information and interactions with suppliers are beneficial and could be added to Supply Chain’s existing conversations with suppliers.

3. *Fully align sustainability with supply chain:* Supply Chain could take on the information gathering and relationship management with supplier companies. Involvement of the Supply Chain team is critical since they are the ones with existing relationships with suppliers and they carry out the selection, renewal, and auditing processes.

At the supplier level, we recommend Biogen focus on engaging suppliers to reduce their own scope 1 and 2 emissions, since these emissions are what make up Biogen’s scope 3 emissions.

4. *Gather important information from suppliers:* Biogen should identify someone within each supplier company to discuss sustainability issues or to clarify data that Trucost uses in its assessment. Once this contact has been established, Biogen should consider sending out additional surveys to suppliers about what their actual emissions are and what they are doing to reduce them in the future.

5. *Educate suppliers on sustainability initiatives:* Biogen can go beyond information gathering and begin to educate suppliers about the financial and environmental benefits of reducing their own scope 1 and 2 carbon emissions.

6. *Support suppliers in sustainability initiatives:* The most ambitious practices for encouraging participation in sustainability initiatives include rewarding suppliers for improved performance and recognizing them for their sustainability efforts. Biogen should also consider providing financial support to suppliers where possible to help them improve energy efficiency and procurement of renewable energy that they may not be able to do alone due to their size or business model.

At the industry level, we recommend the company transition its focus to the entire industry by identifying synergies with other organizations to create joint projects or organizations to maximize emissions reductions in the entire pharmaceutical-biotechnology industry.
7. **Identify suppliers already working on emissions reductions:** Biogen should identify suppliers that are already collaborating with their customers or working in larger organizations to reduce their emissions. Biogen should work with these companies to find collaborative ways to reduce emissions throughout their shared supply chain.

8. **Partner with organizations outside of the industry:** We recommend that Biogen partner with organizations outside of the pharmaceutical industry to help reach some of the more aggressive recommendations and goals.

9. **Work with other businesses to create an industry consortium:** The most aggressive and far-reaching recommendation is for Biogen to support a collaborative effort seeking to reduce carbon emissions among suppliers throughout the entire pharmaceutical industry.

Given that funding and staffing decisions can take a long time at a company of Biogen’s size, within the next year, Biogen should begin the process of setting aside the necessary resources to implement these recommendations. Biogen should designate funding for project activities such as using surveying platforms, joining industry collaboration groups, and increasing the work hours for an EHS team member to lead this process or creating a new position for this process. Biogen also must decide which suppliers to engage based on factors such as existing relationships, greenhouse gas impact, and how much money it is spending with them. Last, Biogen should select organizations to partner with by considering which of its competitors are implementing the recommendations and which third party organizations are best suited to work with Biogen.

It is important for Biogen’s viability as a company to implement some of these recommendations and tackle supply chain emissions. Reducing supplier emissions has a positive economic impact. Based on a CDP Supply Chain program survey of 5,600 suppliers, suppliers realized $19.3 billion in annual monetary savings from taking action to reduce emissions (CDP, 2019). In addition, studies show that companies that embrace sustainability experience higher financial performance than companies that do not, whether that is through improving operational efficiencies, unlocking process and logistics savings, attracting more investors, or building a more loyal customer and employee base (Ameer & Othman, 2011). Moreover, reducing company-wide GHG emissions is important from an investment perspective. More and more investors are requiring companies to develop environmental, social, and governance (ESG) criteria. Many of Biogen’s top investors—Blackrock, Vanguard, and Clearbridge Investments—integrate ESG criteria into their portfolios.

In addition, Biogen has a reputation to uphold. Biogen’s commitment to sustainable practices has been recognized through numerous awards such as being ranked on the Dow Jones Sustainable World Index (DJSI) in 2018, where Biogen was recognized as Biotech industry leader. Because Biogen is recognized as a leader in ESG, limiting Biogen’s sustainability actions could harm its reputation and financial performance. For example, according to Robinson et al. (2011), the stock price of a company is negatively impacted if the organization is removed from the DJSI.

Lastly, addressing supply chain emissions mitigates risk. Climate change presents a high risk for supply chains across the globe. According to BSR (2018c), these risks include cost variability, increasing lead times, and diminishing service and product quality. Selecting and encouraging suppliers to reduce their climate-related risks also reduces risks to impacts on companies’ operations, revenues, and expenditures in the face of extreme weather events and gradual global warming (Whelan & Fink, 2016).
1. Background
   a) Science-Based Targets (SBTs)

As part of its climate change mitigation commitment, Biogen has established a goal for greenhouse gas (GHG) reductions via the Science Based Target Initiative (SBTi). Biogen began the SBT-setting process in 2013 by defining a goal reducing GHG emissions by 2020. It then submitted its targets in 2016, which underwent the SBTi review process between 2016 and 2017 (Biogen, 2016). In June 2017, Biogen’s SBT of a 35 percent reduction of absolute emissions or total emissions across its entire value chain (scopes 1, 2, and 3) by 2030 from a 2013 base-year was approved by SBTi (Figure 2).

Biogen selected 2013 as a base-year for its reduction goals because it was the first year the company had comprehensive scope 3 emissions data and the first year Biogen began addressing emissions. Their first step to address emissions was purchasing renewable energy certificates (RECs) to offset all scope 2 emissions starting in 2014.

Biogen selected 2030 as the target-year to give the company more time to achieve significant scope 1 and 3 emissions reductions, and to guarantee Biogen had enough time to make the required investments. The targets were set following the “Sectoral Decarbonization Approach (SDA)-other industry” methodology (see Table 2 in Appendix 1 for further information). All 15 scope 3 categories were included in the target, but seven were deemed irrelevant or were included in another category. Biogen has already achieved a 70 percent reduction in scope 1 and 2 emissions intensity from a 2006 baseline. They did this through efficiency measures and by planning to procure on- and off-site renewable energy (CDP, 2017).

What is an SBT?
SBTs are managed by the SBTi, which is a collaboration between CDP, World Resources Institute, UN Global Compact, and the World Wildlife Fund. Companies set SBTs to transition to a low carbon economy as set in the Paris Agreement and IPCC 1.5 Special Report. Depending on when companies submit their SBTs, companies adopt targets to reduce GHG emissions that are in line with the level of decarbonization required to keep global temperature increase to 2 degrees C, well-below 2 degrees C, or 1.5 degrees C above pre-industrial temperatures (CDP, 2018a & SBTi, 2019).

Figure 2 Biogen’s Science Based Target Timeline (Biogen, 2018).
b) Scope 3 emissions

While Biogen made the emissions quantification for scope 1 and 2, Trucost, a company specialized in carbon and environmental data and risk analysis, made the quantification for scope 3 (Trucost, 2015). Since 2013, Biogen has hired Trucost to assess its value chain GHG emissions as well as supply chain carbon and water footprints. Trucost uses its proprietary Environmentally Extended Input-Output (EEIO) cradle-to-gate life cycle assessment (LCA) model to estimate the impacts of capital and purchased goods and services procured by Biogen. This approach is in accordance with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Trucost, 2015).

What are Scope 3 Emissions?
Scope 3 emissions are indirect emissions that occur in a company’s value chain that are not directly owned or controlled by the company. Scope 3 emissions include, but are not limited to, purchased goods and services, business travel, employee commuting, waste disposal, use of sold products, transportation and distribution (up- and downstream), investments, and leased assets and franchises. Scope 3 emissions are the largest component of most companies’ GHG emissions and the most difficult to reduce because it requires engaging with and collecting data from multiple parties such as suppliers (GHG Protocol, 2011).

The Trucost data model (Figure 3) is based on Biogen’s data, supplier data from the Trucost Environmental Register, data proxy for prices, and its own LCA methodology which presents an estimation of each supplier’s GHG emissions. Table 3 in Appendix 1 shows several actions that companies can take to reduce their emissions in each of the 15 scope 3 categories. Like many other companies, purchased goods and services is by far the most impactful scope 3 category for Biogen, making up approximately 70 percent of the company’s scope 3 emissions in 2016 (Biogen, 2016).

Figure 3 The Trucost data model (Trucost, 2015).
In addition to the work of Trucost, Biogen uses ERM Certification and Verification Services, Inc. (ERM CVS) to review the data presented in its Corporate Citizenship Report including scope 1 and 2 emissions. However, ERM CVS is not able to test in detail or certify the reliability of the Trucost model used to perform the calculations for scope 3 categories 1, 2, and 12 (ERM Certification and Verification Services, Inc., 2017). By 2017, Biogen had worked to gather more information on the emissions of 10 suppliers beyond the data provided by Trucost. This group of suppliers represent 36 percent of Biogen’s scope 3 emissions (Biogen, 2017b).

c) Challenges to advance the SBTs
Because Biogen has shifted its priorities towards supporting its new business areas, the sustainability group in Biogen is struggling to gain a space inside the company. Even when the company maintains its environmental commitments, other strategic priorities are getting more attention and displacing needed resources. Biogen executives are prioritizing creating a leaner model and creating more commercial value opportunities (Biogen, 2017a). For example, Biogen approved a corporate restructuring in 2017 which affected the sustainability team structure (Biogen, 2017a). The sustainability position was eliminated and the responsibilities under this role were assumed by the EHS group. Biogen also did not hire more employees to undertake these responsibilities. Consequently, sustainability is competing for human resources and time.

Furthermore, supplier engagement and monitoring related to GHG management require a high level of commitment within the company and, therefore, from employees throughout the company. Because of Biogen’s new strategy, Biogen’s employees must focus on improving business results; therefore, they do not have an incentive to participate in new activities like sustainability. This lack of employment engagement might delay the work on SBTs possibly up to 2020. Another factor impacting Biogen’s carbon emissions footprint and SBT is the current construction of its large-scale biologics manufacturing facility at Solothurn, Switzerland. This project will expand Biogen’s manufacturing capacity and, as a result, absolute emissions are expected to increase.
2. Literature and Industry Review

   a) Third-Party Organizations Helping Companies Address Supply Chain Emissions

Thanks in large part to SBTi, many companies are beginning to look into how to reduce GHG emissions throughout their supply chains. However, since addressing value chain emissions is an emerging topic, internal expertise and resources to address scope 3 emissions are lacking at most companies. Therefore, most successful value chain programs are supported by third-party organizations that assist with supplier strategy, outreach, and engagement. Many of the companies included in the Case Studies from Other Industries section of the Appendix were assisted by these third-party organizations. Following are a list of organizations that could help Biogen survey and engage with its suppliers and a list of organizations that could help Biogen form an industry collaboration. Less important to Biogen at this stage of its SBT journey are a list of third-Party Knowledge-Sharing and Consensus-Building Programs and a list of third-Party Organizations to Refine and Implement a Scope 3 Strategy, both included in Appendix 2.

Supplier Surveying Organizations

- **CDP Supply Chain** is a voluntary global disclosure platform to evaluate supplier engagement and recognize best practices in supply chain emissions reductions. Members of the program identify suppliers to receive online questionnaires to determine their emissions and then CDP collects and publishes these emissions data to better inform investor and stakeholder decision-making. In 2017, 4,800 companies reported emissions reductions that saved them $14 billion (CDP, 2018). CDP Supply Chain uses a single questionnaire in order for the survey to be generalizable across industries.

- **Ecovadis** is a supplier reporting system that helps companies reduce risk and drive innovation throughout their supply chains. Its single assessment, which includes the four major pillars of Corporate Social Responsibility (CSR) (human labor, ethics, procurement/supply chain, and sustainability) helps companies and suppliers understand, share, and improve their CSR performance (Ecovadis, 2018). Many companies use Ecovadis to get a basic analysis of their suppliers' CSR efforts and then use a more targeted data collection platform like CDP Supply Chain to get specific climate data. Ecovadis recently partnered with GSK, Teva, and Takeda to form the Responsible Health Initiative to collaborate on creating technologies to increase the transparency, efficiency, and sustainability of the global health value chain (Sustainable Brands, 2019).

- **Ecodesk** is an ESG data platform, used by many pharmaceutical companies like GSK, which allows companies to assess their suppliers and monitor their compliance against desired ESG standards (Ecodesk, 2018). Unlike competitors CDP Supply Chain and Ecovadis, Ecodesk is more customizable and can be tailored towards the pharmaceutical industry. Companies using Ecodesk follow a six-step process: (1) decide which environmental metrics to focus on, (2) identify which suppliers to collect data from, (3) create the survey, (4) contact and engage the suppliers, (5) analyze the data, and then (6) monitor performance (Ecodesk, 2018). Ecodesk is free and simple for suppliers to use and allows them to effectively track and manage their environmental performance.

- **Resilinc** is a supply chain risk management tracking system that aims to make supplier, site, and part information quickly and easily accessible to key decision makers to allow companies to predict and proactively protect their supply chains from major disruptions (Resilinc, 2019). Suppliers exchange information with their customers in real time using a single online platform. Biogen has been using Resilinc since 2016 to map its supply chain and perform
scenario planning for disruptive events. For example, Biogen leveraged the Resilinc platform during Hurricanes Harvey, Irma, and Maria and the Mexico City Earthquake to maintain stability throughout its global supply chain (a case study and webinar is available on the Resilinc website, Resilinc, 2018). Although sustainability information is not currently collected using Resilinc, the company is eager to help Biogen add this data collection to its existing platform. Procter & Gamble already uses Resilinc to automate its sustainability-related data collection efforts with suppliers, which Biogen could use as a model (P&G, 2019). Although this option would require more initial work and potentially be incompatible with existing and future industry data collection efforts, using Resilinc may be the easiest option and yield the greatest results since Biogen’s internal teams and its suppliers already use it and are familiar with it.

Organizations with which to Collaborate

- **Businesses for Social Responsibility (BSR)** helps clients work with supply chain, sourcing, and procurement teams to develop inclusive, resilient, and transparent value chains (BSR, 2018b). BSR’s support ranges from high-level strategy to on-the-ground implementation. BSR assisted with Walmart’s Project Gigaton (see case study on Walmart in Appendix 2) and works with companies like Coca-Cola and Mars through its Climate-Resilient Value Chains Leaders Platform (Stearns, 2018). Under this new Platform, BSR assists companies in monitoring, diagnosing, addressing, and then sharing solutions on climate risk throughout supply chains. BSR also recently introduced the CoLab Initiative to “mobilize the collective power of business to solve some of the world’s biggest sustainability challenges,” wherein BSR “ideates, designs, and scales collaborations that have transformational impacts and contribute to realizing the Sustainable Development Goals” (BSR, 2018a).

- **The Environmental Defense Fund (EDF)**, partly through its recently-re launched Supply Chain Solutions Center, works with upwards of 400 companies to scale energy efficiency solutions, develop SBTs, advance renewable energy procurement, and identify other GHG emissions reductions opportunities across supply chains. The Supply Chain Solutions Center serves as a digital hub for guidance on addressing a myriad of sustainability issues throughout the supply chain. EDF offers an internship matching program, called Climate Corps. Organizations can apply to host a fellow. The fellow serves in an intern-capacity to work on a specific project for the company (EDF, 2019).

- **SustainAbility** is a consultancy and think tank, recently acquired by ERM, that works with clients to facilitate dialogues and collaborations with stakeholders. Partner and member companies include pharmaceutical companies Novo Nordisk, Novartis, and AstraZeneca (SustainAbility, 2018).

- **The Sustainability Consortium (TSC)**, made up of over 100 global companies, helps survey and engage supply chains and provides resources to those suppliers (TSC, 2018). TSC leads the scope 3 data collection process for Walmart and their Project Gigaton initiative (see case study on Walmart in Appendix 2).

b) Industry Overview

Tackling supply chain sustainability in the pharmaceutical and biotechnology industry is not a simple task. Constant mergers and large production portfolios make mapping and engaging with the supply chain difficult. Biogen is a member of the Pharmaceutical Supply Chain Initiative (PSCI), which is described in the Recommendations section and in Appendix 2, but it is not
currently focused on carbon reduction. Since Biogen does not have a large percentage of most of its suppliers’ business, it cannot exert a large amount of pressure on suppliers to make changes. Finally, unlike plastic use, carbon emissions are not always the most material environmental problem for pharmaceutical companies, leaving carbon emissions as an afterthought for many EHS professionals in the industry.

DJSI and RobecoSAM identified the difficulties of the biotechnology industry (RobecoSAM, 2018).

Biotechnology companies are facing scrutiny related to the pricing and reimbursement of their products as governments seek to slow the rise in healthcare costs and as public criticism of drug pricing practices remains vocal. Companies must demonstrate the value of their products and ensure that their corresponding pricing is economically and medically justified and sustainable for those paying for them. The biotechnology industry relies heavily on human capital for innovation and the continuous development of novel medicines. The industry is characterized by extensive R&D and a high risk of failure in product development, which makes attracting and retaining the most talented researchers and scientists essential and makes intellectual property management critical. Finally, business ethics, competitive practices and product quality and safety remain important aspects. Violations have the potential to cause significant reputational and financial damage, the impact of which has grown due to the increased speed of information flow resulting from social media and tighter regulatory oversight.

c) Competitor Benchmarking
We compared Biogen to 21 other pharmaceutical and biotechnology companies. The companies were identified by Biogen as competitors or peers of interest. The data from the benchmark comes primarily from CDP. CDP is an organization that supports companies to disclose and manage their environmental impacts. Companies were evaluated on the activities they published in the CDP and in their sustainability or annual reports. The companies we compared Biogen against are shown in Table 4 in Appendix 2.

Among the companies benchmarked, only nine had committed to SBTs. Of those nine, only two included scope 3 or supplier engagement in their targets. None of the companies who had not set an SBT had set a scope 3 carbon reduction goal. Biogen has the most aggressive scope 3 reduction goal, while AstraZeneca, Johnson & Johnson, Lundbeck, Merck, Novo Nordisk, and Pfizer have more aggressive scope 1 and 2 reduction goals.

Based on the benchmarking, the following companies were identified to offer Biogen guidance in choosing a future path. When conducting future research, Biogen can look to these companies to benchmark their efforts. The relevant initiatives of these companies and others are included in the Industry Case Studies section of Appendix 2. The status of the projects these companies are working on is located in Figure 12 of Appendix 4. Based on the analysis of competitors, Biogen can use the following companies as benchmarks as they look to improve scope 3 emissions reduction efforts:

- Where Biogen Currently Is: Celgene, Lundbeck, AbbVie
- Where Biogen Should Strive to Be: Baxter, AstraZeneca, and Abbott
- Aspirational Goal for Biogen to One Day Become: GSK, Novartis, Novo Nordisk

We also gathered information from CDP tools for supplier engagement; specifically, about supplier carbon emissions reduction strategies. Over a third of the companies had individual supplier surveys that captured carbon emissions recommendations. Of CDP Supply Chain, EcoVadis, and EcoDesk, more companies used CDP Supply Chain as a standard survey. (See full results in Table 5 in Appendix 2.)

The Industry Case Studies section of Appendix 2 includes important initiatives other companies are partaking in. Biogen can use lessons learned from these organizations when planning and justifying its initiatives over the next 10 years. A full list of the efforts companies publicly disclose is available in the Company Profile Database², which contains companies’ scope 3 reduction and supplier engagement goals and progress. This information was identified from CDP CC3 (Scope 3 Goals) and CC14 (Scope 3 Reduction, Supplier Engagement) response categories from 2017 responses. An example of the database is located in Figure 11 of Appendix 2.

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² The Company Profile Database can be found in a separate Excel file provided to Biogen.
3. Biogen’s Supplier Analysis

a) Methodology

To make specific recommendations, we identified key suppliers (Figure 4) to concentrate the GHG reduction efforts by analyzing the 2017 Trucost database that maps Biogen’s scope 3 emissions. By 2017, Biogen had over 400 suppliers distributed in 60 categories of products or services (Appendix 3, Table 6). Those suppliers were ranked based on their 2017 GHG emissions measured in tons of carbon dioxide equivalent (CO₂e). From these rankings, we obtained the top 10 suppliers based on GHG contribution. We then ranked the suppliers by the amount of money Biogen spent with each supplier in 2017 and obtained the top 10 suppliers by expenditure. Seven suppliers fall under both top 10 GHG contribution and expenditure. Following the approach in Figure 4, we identified 13 key suppliers as shown in Figure 5.

These key suppliers are also accountable for more than half of the total scope 3 emissions and the expenditure. For reference, ten percent of Biogen’s suppliers are accountable for 80 percent of the scope 3 emissions. Another way to analyze the data is to group the suppliers by their product/service category. Following the same method but ranking the top 10 categories by emissions and expense contribution (Figure 6), we identified 11 key categories, that group more than half of Biogen’s suppliers.
Using the first approach will allow Biogen to identify specific suppliers to engage with in the early stages. Biogen can create customized pilot projects and build one-on-one relationships with these suppliers. Alternatively, using the second approach will inform Biogen which categories have the greatest GHG reduction potential and how to develop more general projects (e.g. reducing the use of plastics). It can also help Biogen take advantage of current improving projects developed by operational areas to better account for their potential scope 3 GHG reductions. These approaches are not mutually exclusive; Biogen could work with specific providers (e.g. promote the use of clean energy in certain company) while developing additional projects for the specific categories.

It is important to note that the results shown here are based on 2017 data. As evidenced by historical data, scope 3 emissions change year-by-year (Appendix 3, Table 7 and Table 8). Therefore, when Biogen is ready to engage with suppliers on the scope 3 reductions, it must review the results and apply these methods to the latest available data to update the key suppliers and categories.

b) Key Suppliers Analysis
Using the list of top suppliers described in the previous section, we analyzed the top 25 suppliers based on GHG emissions and total spend. Thirty-three suppliers fall in one or both categories. Supplier companies were analyzed based on their CDP Climate Change 2017 submissions and SBT commitments. The CDP data points that were targeted were Targets and Initiatives (CC3) and Scope 3 Emissions (CC14). For SBT updates, we searched for companies taking action. If a company did not report, we used a supplier’s holding company or subsidiary as a proxy if available. We prioritized targets for 2035 if two goals were listed to better meet the timescale of this project.

3 It is important to note that CDP recently transitioned to a new system. CDP 2017 CC3 and CC14 entries map to C4 and C12, respectively. These are the locations that Biogen should look when updating the data in future years. Given that we only could access default accounts, we had limited access to view a company’s CDP report. (To receive additional access, Biogen could email CDP).
When CDP and SBT resources were not available, we used information published on the supplier’s website to fill in any data gaps.

Of the 33 companies studied, all but two report some environmental initiatives, and 21 report to CDP. Seven mention setting SBTs, or a goal to set a SBTs. Based on what companies report, we identified those who are likely to form an industry partnership and those that collaborate with customers. Additionally, we analyzed the companies based on what initiatives they are already working on. Potential industry collaborators were selected based on companies that were both active in supply chain engagement/management and whose business focused primarily on pharmaceuticals and biotechnology. The results are shown in Table 10 in Appendix 3.

One unique aspect to the pharmaceutical sector is the presence of Good Manufacturing Practice (GMP) suppliers. GMP suppliers face more difficulties in reducing GHG emissions because they have to ensure to regulators that any modifications to processes or products do not alter GMP compliance. As shown in Table 9 in Appendix 3, by 2017, Biogen’s GMP suppliers represented 23 percent of its scope 3 emissions. Four of these GMP suppliers are also part of the group of key suppliers identified with the approach in Figure 4. In general, GMP suppliers could still be engaged in GHG reduction initiatives, but their results might not be as immediate as other types of suppliers. Therefore, it is important to engage them early enough to give them time to adjust their products or processes to Biogen’s requirements.
4. Recommendations

Biogen’s journey to meet its SBT will require a bold stance to affect behavior at every level of production in the value chain (scope 3). We provide an internal, external, and industry-wide roadmap that identifies the most critical components to reaching Biogen’s SBT. Our multi-faceted approach focuses on reducing scope 3 carbon emissions across all dimensions of Biogen’s supply chain. We recommend Biogen focus on addressing sustainability across multiple scopes: internally within Biogen, externally with Biogen’s existing and potential suppliers, and industry-wide to include other competitors, peers, and suppliers.

In each level of scope for addressing the SBT, we provide Biogen three recommendations, one that can be accomplished most easily, one that will be mildly difficult, and one that will likely take significant resources to accomplish. Each recommendation is presented below (Figure 7) in order of what level of scope the recommendation engages and the anticipated level of difficulty. We based our recommendations on extensive competitor benchmarking, qualitative industry analysis, and quantitative supplier analysis. Many of Biogen’s competitors are already putting many of these recommendations into practice, as shown in Figure 12 of Appendix 4.

When considering how to accomplish these tasks, we highly recommend Biogen consider transitioning an employee to a dedicated position for sustainability programs or creating this position. This role would provide leadership to projects in multiple departments, such as supply chain or procurement, that the EHS team alone may not have the bandwidth to accomplish. Furthermore, this position could help lead Biogen through the complex and important process of meeting the company’s scope 3 target by adopting any combination of the below recommendations. In the meantime, Biogen should increase an EHS team member’s hour to provide this leadership.

![Figure 7 Biogen’s Recommended Roadmap to Achieving its SBT.](image-url)
a) Biogen-Level Recommendations: Addressing Sustainability Within Biogen

We recommend Biogen focus on increasing awareness within the company of sustainability and carbon emissions reductions. Biogen should also consider adapting internal strategy and corporate structure to address carbon emissions reductions by increasing awareness among Biogen employees.

Educate and Engage Employees on SBTs and Emissions

Biogen employees are largely unaware that the company has committed to an impressive and aggressive SBT. Biogen should take steps to educate employees on its SBT goals and create sustainability champions among employees by integrating employee education and engagement into the company’s broad sustainability strategies. This will not only increase awareness and provide support to initiatives related to SBTs, but can also create allies beyond the teams directly related to this project. These employees can make decisions that support the SBT within their day-to-day jobs. We provide recommendations for specific actions Biogen can take to educate employees in achieving its SBTs. The recommendations are summarized in Table 1. The full text of our project and program recommendations can be found in Appendix 4, Supplement 1: Employee Education.

| Table 1 Summary of Employee Education and Engagement Recommendations |
|---|---|
| **Educate** | **Engage** |
| Monthly Lunch and Learns | Create a Green Team |
| Earth Day Activities | Healthy Competition |
| Signage | Employee Recognition |
| Incorporate Sustainability into Employee and Manager Training | Funding for Sustainability Projects |

Create Interactions Between Sustainability and Supply Chain Teams

The next level of difficulty is to create more interactions between the sustainability and procurement or supply chain teams. Since Supply Chain works with suppliers on a day-to-day basis within Biogen, they have essential connections and knowledge of how to most effectively deal with suppliers. The sustainability/EHS team within Biogen should work to educate the supply chain and procurement teams about what information and interactions with suppliers are beneficial and could be added to supply chain’s existing conversations with suppliers.

In the past, members of Biogen’s EHS and Sustainability teams have communicated with their counterparts at specific suppliers. By reinitiating sustainability-related conversations by the supply chain and procurement teams, Biogen can 1) identify who within the company would be responsible for carbon-reduction initiatives and carbon emissions information, 2) gather more accurate emissions profiles for the company’s own emissions as more and more suppliers are working to reduce their own scope 1 and 2 emissions, and 3) begin to form future relationships that can be utilized for recommendations outside of the scope of Biogen. We recommend the sustainability team initiate these conversations and train Supply Chain on how to adopt some of these responsibilities to integrate SBT-related efforts as efficiently and seamlessly as possible.

Fully Align Sustainability with Supply Chain

Companies that have been successful in aligning sustainability in different departments have their supply chain and sustainability teams take primary ownership of supply chain emissions reduction
initiatives. According to a report by EY & UN Global Compact (2016), the procurement team owns supply chain sustainability initiatives in 47 percent of the 70 surveyed companies, while the sustainability team owns the initiatives in just 26 percent of companies, suggesting that Biogen should seriously consider placing the scope 3 goal within the procurement team.

If possible, we advise Biogen takes the integration between sustainability and supply chain teams one step further; we recommend Supply Chain take on the information gathering and relationship management with suppliers. Involvement of the Supply Chain team is critical since it has existing relationships with suppliers and carries out the selection, renewal, and auditing processes. Biogen’s top suppliers typically have a key account manager who can liaise with their internal departments to address any questions and issues. As stated previously, Supply Chain already manages supplier relationships, so transitioning the supplier engagement aspect of Biogen’s SBT efforts to supply chain would be a natural fit.

To get Supply Chain on board, it helps to have support from senior leadership, business goals, and incentives—such as bonuses or paid time off—to encourage the team to help meet the company’s scope 3 target (EY & UN Global Compact, 2016; Roberts, 2018). As stated previously, before engaging suppliers, the Supply Chain team should be aware of Biogen’s environmental goals, what the company wants from its suppliers, and why the scope 3 goal is important.

b) Supplier-Level Recommendations: Increase Engagement with Suppliers

We recommend Biogen focus on engaging suppliers to reduce their own scope 1 and 2 emissions, since these emissions are what make up Biogen’s scope 3 emissions.

Gather Important Information from Suppliers

Biogen has already had success gathering some detailed information from a few suppliers. We recommend Biogen revisit this initiative. Biogen should identify someone within each supplier company to discuss sustainability issues or to clarify data that Trucost uses in its assessment. In the past, Biogen has found that suppliers’ actual emissions are lower than those estimated by Trucost. Once this contact has been established, Biogen should consider sending out additional surveys to suppliers about what their actual emissions are and what they are doing to reduce them in the future.
Surveys signal to suppliers the importance of measuring emissions and either directly or indirectly encourages them to manage the emissions they must measure for the survey. Most companies have chosen CDP Supply Chain, Ecovadis, Ecodesk, or their own internal systems to survey suppliers. See the third-party resources section for descriptions of each. If Biogen plans to survey its suppliers, the Supply Chain team should be aware of how the survey works and how suppliers can complete it.

Other companies find it valuable to have supplier codes of conduct or sustainability scorecards for their supply chain teams to evaluate and enforce sustainability standards (i.e. the stick approach). Such a code of conduct could require suppliers to take certain actions to support fair labor standards, develop environmental policies, operate ethically, and monitor their progress. A survey of 519 global suppliers by Ecovadis & Affectio Mutandi (2018) found that customers’ CSR requirements had a positive effect on their organizations: 41 percent of suppliers responded that CSR requirements raised awareness in their companies and an additional 38 percent responded that CSR requirements prompted their companies to implement new programs.

Biogen already has two surveys for its suppliers, but neither focus on sustainability or the environment. Biogen could modify these two surveys—the Scout Questionnaire and the Supplier Diversity Survey—or it could turn to a new, environmentally-focused survey such as CDP Supply Chain, Ecovadis, or Ecodesk. Biogen had previously ruled out CDP Supply Chain and Ecovadis and has expressed interest in using Ecodesk, which many other companies in the pharmaceutical space already use. Recently, the Supply Chain and procurement teams have begun using Resilinc for data gathering. Whatever survey it chooses, Biogen should encourage suppliers to measure their emissions, identify opportunities for improvement, and set their own goals.

**Educate Suppliers on Sustainability Initiatives**

Biogen can go beyond information gathering and educate suppliers about the financial and environmental benefits of reducing their scope 1 and 2 carbon emissions. Regardless of the supplier engagement method, many companies find it important to emphasize their goals and shared business opportunities (i.e., using rewarding approaches) and to let suppliers decide how to get there, with or without their assistance (Norton, 2015). This can be conducted similarly to how Biogen engages and educates employees internally, but with more focus on the general business case for pursuing energy efficiency and renewable energy projects.
If a company begins its engagement process by surveying suppliers, it can emphasize its goals and explain how measuring emissions throughout the supply chain can both help meet those goals and also reduce the suppliers’ energy costs. As mentioned previously, the mere process of bringing up sustainability topics with suppliers can give them the message that sustainability is important and could provide the impetus necessary for suppliers to improve efforts in that area, especially if a company provides a supplier with most of its business. Other organizations find success in developing platforms or holding conferences to share supplier best practices. Appendix 4, Supplement 2: Starting Point for Suppliers gives Biogen an example of a communication instrument that offers a set of recommendations for suppliers that are not familiar with the different ways to reduce GHG emissions and resources to continue their research.

Support Suppliers in Sustainability Initiatives
The most ambitious practice for encouraging participation in sustainability initiatives include rewarding suppliers for improved performance and recognizing them for their sustainability efforts. Meaningful recognition of suppliers can validate their efforts and improve interest and participation (see case study on Clif Bar, Appendix 2). This can take the form of a CSR clause that ensures that sustainability efforts are incorporated into negotiations, are included in supplier assessments, and are discussed throughout the entire agreement. Suppliers that reduce their environmental impacts could be rewarded with more business or other perks such as longer-term contracts, greater access to the value chain, company leadership, or preferred supplier status. However, Biogen should be prepared to terminate the contract if the clauses are breached (Ecovadis & Affectio Mutandi, 2018).

Biogen should also consider providing financial support to suppliers where possible to help them improve energy efficiency and procurement of renewable energy that they may not be able to do alone due to their size or business model. Many companies seeking to reduce their supply chain emissions have implemented comprehensive supply chain green power programs for their suppliers. Apple, Clif Bar, IKEA, and BT have set up programs that either provided low-cost financing or independent energy experts to help their suppliers procure renewable energy (see case studies on Apple and Clif Bar, Appendix 2).

By building knowledge and financial support of green power internally and throughout the supply chain, companies can grow corporate demand for renewable electricity in new regions; create opportunities for collaboration, demand aggregation, and knowledge sharing; and leverage influence beyond their own power procurement (RE100, 2017). Biogen can find support for these initiatives by partnering with organizations, such as financial organizations. This is discussed in the next section.

c) Industry-Level Recommendations: Foster Industry-Level Collaboration
We recommend the company expand its focus to include the entire industry by identifying synergies with other organizations to create joint projects or organizations to maximize emissions reductions in the entire pharmaceutical-biotechnology industry.
**Identify Suppliers Already Working on Emissions Reductions for Partnerships**

The easiest way to begin to tackle this recommendation is by expanding on the recommendations of the previous scope by identifying suppliers that are already collaborating with their customers or working in larger organizations to reduce their emissions. These suppliers are likely already aware of the benefits of reducing emissions along the pharmaceutical supply chain and have some of the skills and connections to tackle reductions in their own scope 1 and 2 emissions. These suppliers can serve as partners for Biogen. Biogen should work with these companies to find collaborative ways to reduce emissions throughout their shared supply chain.

By conducting an analysis of how suppliers are already reducing emissions, we recommend Biogen target the following list of companies. These companies are Biogen’s top suppliers, by spend and greenhouse gas emissions, that are already working with their customers to meet environmental goals:

- Supplier 1
- Supplier 2
- Supplier 3
- Supplier 4
- Supplier 5
- Supplier 6
- Supplier 7

**Partner with Organizations Outside of the Industry**

We recommend that Biogen partner with organizations outside of the pharmaceutical industry to help reach some of the more aggressive recommendations and goals. Upwards of 70 percent of companies choose to work with peers, industry associations, and NGOs on supply chain sustainability programs (EY & UN Global Compact, 2016). Biogen should identify one or more partners from organizations such as the International Finance Corporation, CDP, or EDF, which have helped support businesses conducting challenging sustainability efforts.

Certain organizations outside of the pharmaceutical industry are beginning to provide suppliers with the financing they need to reduce their emissions. Financing can be an obstacle for projects even if there is a fairly quick payback. This support has become essential for suppliers who want to reduce their emissions, but do not have the credit history or working capital to make the necessary investments. These programs are successful because when banks and lenders have the...
assurance that these suppliers have long-term relationships with major companies that want them to reduce their emissions, they are more likely to loan the suppliers the capital to make energy efficiency or renewable energy improvements.

We recommend Biogen begin this process by forming a partnership with one organization to support suppliers in the company’s direct supply chain. Biogen could work with an organization to consider expanding its efforts into a pharmaceutical industry-wide effort, as discussed in the next recommendation.

**Work with other Businesses to Create an Industry Consortium**

The most aggressive and far-reaching recommendation is for Biogen to support a collaborative effort seeking to reduce carbon emissions among suppliers throughout the entire pharmaceutical industry. One company alone may be less likely to have the needed resources to accomplish desired programs and projects. Recognizing the limitations of influence over suppliers in its complex, international supply chain, Biogen must build coalitions and partnerships with other industry players that share its vision for sustainable pharmaceuticals. Coalitions enjoy greater influence over suppliers and manufacturers. Economies of scale are more easily achieved, lowering the cost of introducing any new efforts to reduce emissions. Moreover, coalitions directly influence suppliers by setting an industry-wide standard; members work with a common set of guidelines, which is consistently messaged to suppliers.

Another project that is unlikely to be impactful with one company alone is a dashboard that companies and suppliers can use to plan, track, or project emissions reductions. Novartis (EDF Climate Corps, 2018), GSK (2 Degrees Network, 2018), and Walmart (Walmart Sustainability Index, 2019) all have examples of dashboards they use to work with suppliers and monitor environmental impacts. We recommend Biogen work with an industry collaboration group to make a dashboard that gathers supplier data, predicts emission trajectories, and provides suppliers with resources to reduce environmental impact. An example of such a platform is included in Appendix 4, Supplement 3: Supplier Dashboard. An EDF Climate Corp Fellow completed similar work for Novartis. This program was discussed previously and can be a potential asset for Biogen.

Despite the difficulty in achieving a collaboration of this size, organizations already exist that can serve as the framework for an industry-wide initiative. We recommend that Biogen seek out existing coalitions and programs. Two potential starting points are PSCI and the Responsible Health Initiative (RHI). Both of these entities focus on engaging suppliers to create transparency. We recommend Biogen take a leading role in one of these organizations and encourage them to include carbon emissions in their efforts.

- **PSCI** has already taken strides to improve the pharmaceutical supply chain. Up to now, PSCI’s efforts have focused primarily on labor and pollution in the supply chain. The existing framework can be expanded to include tackling carbon emissions. Biogen can take a larger role in pushing this agenda forward; a single company can prompt the industry to adopt new ways of business. Biogen should encourage PSCI to follow the UN Global Compact’s framework on responsible engagement. PSCI should identify the industry’s broader, long-term climate change risks and opportunities, and the specific near-term options for influencing policy (UN Global Compact, et.al, 2013). Doing so enables companies in the industry to
establish legitimate policy positions and engagement strategies. After identifying these positions, PSCI should take steps to align its actions and member companies’ actions to the industry stance on climate policy, which builds consistency and accountability. Last, PSCI should ensure transparency by urging member companies to disclose their climate policy positions, actions to advance these positions, and outcomes of the actions. Additional information about PSCI is located in Appendix 2.

- **RHI** is a collaboration between EcoVadis, GSK, Teva, and Takeda to collaborate on technologies to improve the visibility, efficiency, and sustainability impacts of the global health supply chain. This initiative utilizes EcoVadis’ platform to create a common methodology for gathering and sharing CSR performance, implementing shared tools, and harmonizing industry standards for online CSR assessments. The three companies plan to collaborate on technologies, share best practices, and act collectively on shared needs, goals, and opportunities in sustainability. The goal is to work together to reduce risk and create visibility in the supply chain (Sustainable Brands, 2018).

As stated earlier, an advantage of being a member of an industry association such as PSCI is that companies with little influence can join a group of like-minded companies to enhance their influence through collaboration. The association acts as a voice for the industry, which represents large and broad industry interests (PSCI, n.d., UN Global Compact, 2013). Companies in industry groups are able to directly influence suppliers by setting an industry-wide standard for suppliers. According to the UN Global Compact (2013), being a member of an industry association also enables companies to indirectly influence climate policy, which has a multitude of benefits:

- **Corporate strategy**: The company profits from both creating a market and actively participating in new low-carbon economies.
- **Government and public affairs**: The company creates trusted relationships with policymakers and creates more regulatory certainty.
- **Finance and legal**: The company enhances shareholder value, improves investor relations, and more effectively attracts and allocates financial resources.
- **Reputation and public relations**: The company builds and sustains public and stakeholder trust and license to operate.

When building a network, Biogen should not stop at organizations involved in PSCI or RHI. Biogen can leverage its own peer and supplier relationships to gain support from other like-minded players in the industry. The following companies were identified from Biogen’s top key suppliers as organizations that are already collaborating to meet climate-related goals:

- Supplier 1
- Supplier 2
- Supplier 3
- Supplier 4
- Supplier 5
- Supplier 6
- Supplier 7
5. The Business Case for Tackling Supply Chain Sustainability

a) Biogen’s supply chain emissions surpass its own
According to CDP (2019), GHG emissions from suppliers are greater than most companies own emissions. For the biotechnology, health care, and pharmaceutical sector, there is a 5.8 ratio of supply chain GHG emissions (scope 3) to companies’ own GHG emissions (scope 1 and 2). In Biogen’s case the scope 3 emissions account for more than 70% of the total carbon footprint of Biogen (Biogen, 2016). It is therefore imperative for Biogen to engage its suppliers to achieve its 35 percent GHG reduction target.

b) Economic impact
Based on a CDP Supply Chain program survey of 5,600 suppliers, suppliers realized $19.3 billion in annual monetary savings by taking action to reduce emissions (CDP, 2019). Companies such as 3M, Nike, and P&G have reaped some of those benefits in new and highly profitable products and business lines by investing in sustainability innovation. Furthermore, studies show that companies that embrace sustainability also experience higher financial performance than companies that do not, through improving operational efficiencies, unlocking process and logistics savings, attracting more investors, or building a more loyal customer and employee base (Ameer & Othman, 2011).

c) Investors
In recent years, investors have begun requiring companies to develop ESG criteria and many of Biogen’s top investors (Appendix 5, Table 11) are committed to this new trend. For example, Blackrock, which is the biggest stockholders of Biogen (9.5%), recently published its 2019 CEO letter requiring companies to commit to positive societal actions for second year in a row (Fink, 2019). Vanguard, Biogen’s second top investor (8.7%), considers ESG criteria in its investments decisions and has even created an exchange traded-fund (ETF) that screens for certain ESG criteria, which includes competitors Pfizer and Abbott (Vanguard, 2019). Similarly, Clearbridge Investments, Biogen’s fifth-largest investor (5.0%), includes Merck as part of its Dividend Strategy ESG, one of several portfolios that integrate ESG criteria (Clearbridge, 2019).

d) Corporate reputation
Biogen’s commitment to sustainable practices has been recognized through numerous awards, such as its 2018 DJSI ranking, where Biogen was recognized as Biotech industry leader (see the complete list in Appendix 1). Because Biogen is recognized as a leader in ESG, limiting Biogen’s sustainability actions could harm its reputation and financial performance. For example, according to Robinson et al. (2011), the stock price of a company is positively impacted when added to DJSI, and negatively impacted if removed from the DJSI.

e) Risk management
Climate change presents a high risk for supply chains across the globe. According to BSR (2018c), these risks include increasing cost variability, increasing lead times, and diminishing service and product quality. Selecting and encouraging suppliers to reduce their climate-related risks also reduces risks to impacts on companies’ operations, revenues, and expenditures in the face of extreme weather events and gradual global warming (Whelan & Fink, 2016). Engaging suppliers in climate change actions also strengthens business-to-business relationships and enables companies to create mitigation plans.
6. Conclusion

The purpose of this project was to help Biogen develop strategies to reduce its supply chain emissions in line with its SBT. We conducted original research of industry and general supply chain emissions reductions trends and performed analyses of company data to generate recommendations for Biogen to meet its scope 3 emissions reduction target. Biogen faces many challenges to achieve these reductions. At an industry level, there are various characteristics of the pharmaceutical and biotechnology industry that make it difficult for companies to tackle supply chain sustainability. Constant mergers and large production portfolios make mapping and engaging with the supply chain difficult. Unlike plastic use, carbon emissions are not always the most material environmental problem for pharmaceutical companies. Last, companies like Biogen do not have a large percentage of most of their suppliers’ business, so cannot exert a large amount of pressure on them to make changes. At a company level, Biogen has competing business strategies which divert attention and resources away from its significant environmental commitments. Additionally, Biogen’s planned large-scale biologics manufacturing facility at Solothurn, Switzerland poses challenges to its environmental targets; increased manufacturing capacity will increase absolute emissions.

Based on original research of industry and general supply chain emissions reductions trends and analyses of company data, we provide an internal, external, and industry-wide roadmap that identifies the most critical components to reaching Biogen’s scope 3 SBT. When considering how to accomplish these tasks, we highly recommend Biogen transition an existing employee to a dedicated sustainability position or hire a new one. This position would provide leadership to projects in multiple departments that the current EHS team does not have the bandwidth to accomplish. Furthermore, this position could lead Biogen through the complex and important process of meeting the scope 3 target by adopting any combination our recommendations.

Altogether, there are nine recommendations that are broken down by scope and level of implementation difficulty. Biogen should focus on addressing sustainability across all dimensions of its supply chain: internally, externally with existing and potential suppliers, and industry-wide to include other competitors, peers, and suppliers. Given that funding and staffing decisions can take a long time at a company of Biogen’s size, within the next year, Biogen should begin the process of setting aside the necessary resources to implement these recommendations. Biogen should designate funding for project activities such as using surveying platforms, joining industry collaboration groups, and increasing the work hours for an EHS team member to lead this process or creating a new position for this process. Biogen also must decide which suppliers to engage based on factors such as existing relationships, greenhouse gas impact, and how much money it is spending with them. Last, Biogen should select organizations to partner with by considering which of its competitors are implementing the recommendations (Figure 12, Appendix 4) and which third party organizations are best suited to work with Biogen (Appendix 2).

It is important for Biogen’s viability as a company to implement some of these recommendations and tackle supply chain emissions. Economically, reducing supplier emissions has a positive economic impact and investors are requiring companies to develop environmental, social, and governance (ESG) criteria. From a business perspective, addressing supply chain emissions mitigates risk posed by climate change. Last, Biogen has a reputation to uphold given that its commitment to sustainable practices has been recognized through numerous awards.
Appendix 1: Background

a) Climate Change and Science Based Targets

I. An Introduction to Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC, the leading international body for the assessment of climate change) Fifth Assessment Report (2014) the warming of Earth’s climate since the mid-19th century is undisputable. Each of the last three decades has been progressively warmer since 1850. In addition, since the 1950s, many of the observed changes in Earth’s climate are unprecedented over decades to millennia; this includes warming of the atmosphere and ocean, melting sea and ice, and rising sea levels. Changes in the climate system are a response to anthropogenic GHG emissions, which have increased significantly since the pre-industrial era and have resulted in unprecedented atmospheric concentrations of carbon dioxide, methane, and nitrous oxide. These gases all lead to a warming of Earth’s surface temperature. Carbon dioxide concentrations have increased by 40 percent since pre-1750 levels. Moreover, approximately half of the total anthropogenic carbon dioxide emissions between 1750 and 2011 occurred in the last forty years.

Anthropogenic emissions of carbon dioxide primarily come from fossil fuel combustion and land use change. In the time periods 1970 to 2010 and 2000 to 2010, carbon dioxide emissions from fossil fuel combustion and industrial processes contributed to approximately 78 percent of total increased GHG emissions (IPCC, 2014).

Due to the negative, nondiscriminatory, and global impact of climate change, national governments are working together to strategize on how to best address climate change. The United Nations Framework Convention on Climate Change (UNFCCC) is the prominent international environmental treaty, which has 165 signatories and 197 parties (United Nations Treaty Collection, n.d.). In December 2015, UNFCCC parties convened at the Conference of the Parties (COP) 21 to discuss climate change issues and policies. During this meeting, leaders reached an agreement to keep global temperature rise by the end of the century to below 2 degrees Celsius (C) above pre-industrial levels and to take steps to limit the temperature rise to 1.5 degrees C (United Nations Climate Change, n.d.). This temperature target was created in reference to the IPCC’s recommendation that global temperature rise should be limited to below 2 degrees C. The target is an ambitious goal given that the IPCC’s fifth assessment (2014) states that in order to keep anthropogenic global temperature increase below 2 degrees C, cumulative carbon dioxide emissions from all anthropogenic sources since 1870 will have to remain below 2,900 Gigatons of CO2 (GtCO2). In 2017, 2,200 GtCO2 had already been emitted (IPCC, 2018).

By the end of the 21st century, even if moderate steps are taken to reduce atmospheric GHG concentrations, it is likely that global surface temperature will still exceed 1.5 and 2 degrees C relative to 1850 to 1900. In October 2018, the IPCC published a special report on global warming of 1.5 degrees C. The report states that global warming is likely to reach 1.5 degrees C between 2030 and 2052 if the Earth continues to warm at the current rate. It is also important to note that because of the lifetime of GHGs and the climate system feedback loop, climate change impacts will persist for many centuries even if anthropogenic greenhouse emissions stop. Therefore, climate change will continue to occur due to past, present, and future emissions.
II. Business Sector Contributions to Climate Change
Corporations are the single largest emitter of anthropogenic GHGs. According to a recent study by Heed (2013), 63 percent of carbon dioxide and methane emissions between 1750 and 2010 (the same timeline as the IPCC fifth assessment report) are directly linked to ninety companies. Of these emissions, half have been produced since 1986. Furthermore, according to a subsequent study (Ekwurzel, 2017), the increased rise in atmospheric carbon dioxide concentration from these 90 companies have contributed to the rise in global mean surface temperature and global sea level. These studies show that corporations are the main contributor to climate change and that their GHG emissions have been increasing rapidly in the most recent decades.

III. What are Scope 1, 2, and 3 Emissions?
The GHG Protocol Corporate Standard provides requirements and guidance for organizations regarding preparing a GHG emissions inventory. In this protocol, GHG are classified into three “scopes” (GHG Protocol, 2011). Separating GHG emissions into scopes helps companies categorize emissions into those they can control versus those they can only influence and helps avoid double counting of emissions (see Figure 8). Scope 1 emissions are direct emissions from owned or controlled sources. This includes stationary combustion, mobile combustion, process emissions, and fugitive emissions. Scope 2 emissions are indirect emissions from the generation of purchased energy consumed by the company. These emissions are generated upstream from the company. Scope 3 emissions are all other indirect emissions that occur in a company’s value chain. They are a result of the company’s operations but are not directly owned or controlled by the company. Scope 3 emissions include, but are not limited to, purchased goods and services, business travel, employee commuting, waste disposal, use of sold products, transportation and distribution, investments, and leased assets and franchises. Scope 3 emissions are the largest component of most companies’ GHG emissions and the most difficult to reduce because it requires engaging with and collecting data from multiple parties such as suppliers (GHG Protocol, 2011).

Figure 8 Overview of GHG Protocol scopes and emissions across the value chain (GHG Protocol, 2011).
IV. What is a Science Based Target?

Science-based targets (SBTs) are managed by the SBT Initiative (SBTi), which is a collaboration between CDP, the World Resources Institute, the UN Global Compact, and the World Wildlife Fund. When SBTi first started, companies set SBTs to transition to a low carbon economy as set forth in the Paris Climate Agreement. Companies adopt targets to reduce GHG emissions that are in line with the level of decarbonization required to keep global temperature increase below 2 degrees C compared to pre-industrial temperatures (CDP, 2018a & Science Based Targets Initiative, 2018). In February 2019, SBTi announced that it would adopt the IPCC’s recommendations in the IPCC 1.5 Special Report, which strongly suggests that global temperature increase be limited to 1.5 degrees C (SBTi, 2019). SBTi’s new guidelines now require that new targets submitted for validation to be consistent with preventing warming to from going above 2 degrees C or 1.5 degrees C compared to pre-industrial levels. Moreover, to ensure targets remain aligned with the most recent climate science, starting in 2025, it will be mandatory that companies review and revalidate their targets every five years from the date of the original target approval. SBTi will then publish the level of ambition of all targets, classifying them under 1.5 degrees C, well-below 2 degrees C, or 2 degrees C. While there are no concrete consequences for companies not meeting their targets, the NGO community is determined to hold companies accountable for their efforts. If a company fails in meeting its target on time, it should be transparent about its efforts and offer an updated path to getting there to ensure it was appropriately aggressive.

As opposed to reducing intensity emissions, or emissions per dollar, SBTs require companies to reduce their absolute GHG emissions or total emissions. SBTi (2018) requires that companies pursue absolute emissions targets because intensity, or per-unit, emissions targets do not necessarily result in absolute emissions reductions if total units produced increase. Companies are, however, allowed to set intensity emissions in some cases (see section on Company Considerations under Setting an SBT). In addition, it is difficult to determine a single activity metric that covers all of a company’s diverse operations.

Because of rising concerns about climate change, there have been many signals, especially from the UNFCCC, that the global economy is transitioning to a low carbon economy. SBTi (2018) and Thinkstep (2018) identify four main benefits that companies can reap by setting SBTs and aligning with this transition to a low carbon economy:

1. **Reduce Risk**: Companies that commit to reducing their absolute GHG emissions in line with SBTs can become more resilient and competitive in a low-carbon economy by capitalizing on a range of opportunities beyond saving costs. This will prepare them for potential laws, as well as make them aware of risks that will worsen by climate change.
2. **Innovate**: Because SBTs are long-term goals, companies may become more innovative over time to adopt to a low-carbon economy.
3. **Improve Brand**: Setting SBTs builds the credibility of companies’ sustainability goals and enhances their reputation to stakeholders.
4. **Increase Profitability**: By setting SBTs, companies are better prepared for changing emissions and energy policies and regulations. Moreover, these companies can also influence policy through their low-carbon business practices or through direct legislative intervention.
Due to the changing trajectory of the global economy towards decarbonization, it is important for Biogen and other companies to actively participate in climate policy either directly or indirectly. Doing so will satisfy investors who recognize the urgent need for companies to align their business practices to the Paris Agreement goals (Scott, 2018). Although the Trump Administration intends to withdraw the U.S. from the Paris Agreement in 2020, the U.S. is actively involved in the UNFCCC negotiations and intends to stay an active participant after it withdraws (UNFCCC COP24, personal communication, December 2018). Moreover, it is imperative for U.S.-based businesses to stay apprised of the global economy’s transition to decarbonization because most U.S. companies have formal business relationships with companies operating outside of the U.S.

For instance, in Europe, a group of investors representing assets of $2 trillion, wrote a letter to 55 companies outlining investor expectations for lobbying. The companies were asked to review their relationships with key trade associations and lobbying organizations and to ensure that their formal company positions support the implementation of the Paris Agreement (Scott, 2018). The investors also included three large risks companies face if their corporate lobbying does not align with the Paris Agreement goals. The first is regulatory risks. If companies delay action now, there will be need for stronger and more drastic regulatory interventions later. Companies will incur much higher costs in the face of these regulations. The second is systemic economic risks. By delaying implementation of the Paris Agreement, the physical risks of climate change will increase. This will develop a systemic risk to economic stability, and therefore create uncertainty and volatility into investor portfolios. The third is reputational and legal risks. If companies are viewed as delaying or blocking climate policy, their stakeholders such consumers and investors might stop supporting them. In addition, this might result in legal risk, if companies provide misleading information.

Included in the list of companies to whom investors sent letters are the pharmaceutical companies Bayer and BASF (Scott, 2018). In the past decade, the pharmaceutical industry has begun to recognize that it must step up to address challenges posed by climate change (Neville, 2019). Yet, only three out of 120 pharmaceutical companies have the best climate change policies as judged by CDP (Scott, 2018).

Industry associations offer companies the option to engage with climate policy either directly or indirectly. There are many ways companies can engage with industry associations from creating working groups to directly influencing policy to serving as a member or chair of the group board (Figure 9). Seventy-one percent of 403 companies in the Global 500 engage with policymakers on climate change legislation through industry groups (UN Global Compact, et.al, 2013).
V. Setting an SBT

Company Considerations

According to the Science-based Target Setting Manual (2017), if a company decides to set a SBT, there are six approved methods it can choose from (Table 2): Absolute emissions contraction, Sectoral Decarbonization Approach (SDA), Greenhouse Gas Emissions per Value Added (GEVA), Climate Stabilization Intensity Targets (CSI), Context-based Carbon Metric (CSO), and Corporate Finance Approach to Climate-stabilizing Targets (C-FACT). The methods vary in the type of target the company will pursue, company sector, and allocation approach. Companies can pursue absolute (total emissions), economic intensity (emissions per unit value-added), or physical intensity (emissions per unit of product) targets. Although SBTi prefers that companies use an absolute emissions target, companies can employ an emissions intensity target if it leads to reductions in line with the climate science or if modelled with an approved SBTi method. There are two allocation approaches, which determine how emissions are allocated at the company-level. In the convergence approach, companies within a specific sector reduce their emissions intensity to a common value. The emissions allocation of individual companies depends on the company’s initial carbon intensity and growth rate relative to other companies in the sector. In the contraction approach, all companies reduce their absolute or economic emissions intensity at the same rate.
### Table 2 Summary of SBT Methods (Labutong, et.al, 2017).

<table>
<thead>
<tr>
<th>Information</th>
<th>Absolute Emissions Contraction (CSI)</th>
<th>Context-Based Metric (CSO)</th>
<th>C-FACT</th>
<th>GEVA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base Year</strong></td>
<td>Flexible</td>
<td>2005</td>
<td>Flexible, prefers 2005</td>
<td>Flexible, prefers 2010</td>
<td>Flexible, from 2010 onward</td>
</tr>
<tr>
<td><strong>Target Year</strong></td>
<td>Flexible</td>
<td>Flexible through 2050</td>
<td>Flexible through 2050</td>
<td>Flexible through 2050</td>
<td>Flexible through 2050</td>
</tr>
<tr>
<td><strong>Emissions scenario</strong></td>
<td>Flexible</td>
<td>Flexible, although IPCC Fourth Assessment Report used in current implementation</td>
<td>Flexible, although IPCC Fourth Assessment Report used in current implementation</td>
<td>IEP 205</td>
<td></td>
</tr>
<tr>
<td><strong>Level of sector differentiation</strong></td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Sectoral</td>
</tr>
<tr>
<td><strong>Allocation Mechanism</strong></td>
<td>Contraction (absolute)</td>
<td>Contraction (intensity)</td>
<td>Contraction (intensity)</td>
<td>Contraction (absolute)</td>
<td>Contraction (intensity)</td>
</tr>
</tbody>
</table>

### SBTi Process
The SBTi has also established several steps in the SBT-setting process (SBTi, 2018). Companies must submit a commitment letter to SBTi. After SBTi approves the company’s commitment, the company must develop SBTs. The company then submits its targets to SBTi for validation. If SBTi approves the targets, SBTi announces the company’s commitment. To date, more than 550 companies have committed to set SBTs and 201 have approved SBTs.

### SBTi Requirements
There are several requirements for committing to set SBTs (SBTi, 2018):

1. First, companies must choose a base-year, which will determine how much they will reduce emissions compared to past company emissions. SBTi recommends choosing the most recent year in which verifiable emissions data is available for scope 1, 2, and 3 emissions and is representative of the company’s GHG profile.
2. The company must then set a boundary for its targets. The target must cover all company-wide scope 1 and scope 2 emissions and all relevant GHGs as required in the GHG Protocol Corporate Standard, although it can exclude up to five percent of scope 1 and 2 emissions. In terms of scope 3 emissions, companies must complete a scope 3 screening before setting their GHG emission reduction targets covering all relevant scope 3 categories as defined by the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. The company must explicitly state which scope 3 categories it will target and justify why it will not target other categories. If scope 3 emissions cover a significant portion (greater than 40 percent of total scope 1, 2 and 3 emissions) of a company’s overall emissions, companies are required to set an ambitious and measurable scope 3 target with a clear time-frame.
3. The target boundary must include the majority of value chain emissions (e.g., top 3 categories, or 2/3 of total scope 3 emissions). All of the targets must cover a minimum of 5 years and a maximum of 15 years from the date of announcement of the target. The targets must be forward-looking and cannot include progress already made to date on reducing emissions.
4. Companies must also set a level of ambition. At a minimum, the target must be consistent with the level of decarbonization required to keep global temperature increase well below 2 degrees C compared to pre-industrial temperatures. Companies cannot use offsets to count as progress towards achieving their SBTs; they must take direct action. In terms of approaches to reducing scope 2 emissions, companies must disclose if they are using a location or market-based approach. While the location-based approach reflects the average emissions of energy consumption on the local electric grid, the market-based approach reflects the specific emissions impacts of the electricity products a company chooses.

5. After publishing an SBT, the company will publicly disclose company-wide GHG emissions inventory on an annual basis and also its progress on the targets.

**Alternative Emissions Reductions Strategies**

SBTs are not the only option companies have for setting emissions reduction goals. We researched five other comparable options. SBTs are a stronger option because they are (1) grounded in science that is agreed upon internationally, (2) the target is standard and accepted by over 150 countries, (3) the targets are comprehensive, rigorous, and reach across the entire value chain, (4) and they are managed by reputable organizations in the sustainability space.

1. **RE100**: Companies can commit to 100 percent renewable electricity to reduce their greenhouse gas emissions (C2ES, 2017a).

2. **Carbon Neutrality**: Becoming carbon neutral means achieving net zero carbon emissions by balancing carbon emissions with an equivalent amount of sequestered or offset carbon. Companies can become carbon neutral by reducing their energy consumption, purchasing clean or renewable energy, investing in carbon offset projects, or purchasing carbon credits (Natural Capital Partners, n.d.).

3. **Internal Carbon Pricing**: An internal price on carbon assigns a monetary value to carbon, which informs investment decisions and business operations. Internal carbon pricing prepares companies for the low carbon economy transitions by providing incentives to explore low carbon intensive alternatives. Similar to the benefits of SBTs, internal carbon pricing helps companies build resilient supply chains, gain a competitive edge, and showcase corporate leadership (C2ES, 2017b).

4. **Climate Action Plan**: Climate action plans outline the goals and activities that companies will take to reduce their GHG emissions. Climate action plans vary between different companies depending on their priorities and capacity (C2ES, 2017a).

5. **The Dow Jones Sustainability Indices (DJSI)**: Companies can participate in the DJSI to receive a sustainability score and learn from top-ranked businesses. RobecoSAM created the Corporate Sustainability Assessment (CSA) methodology. The Index tracks the stock performance of the world's leading companies. It considers economic, environmental, and social criteria, which is the basis for the DJSI (DJSI, n.d.). The global sustainability benchmarks help both companies who want to increase the sustainability of their business practices and investors who consider sustainability in their portfolios (DJSI, n.d.).

The CSA methodology begins with a financial materiality framework. For each of the 60 industries, the financial materiality analysis results in a materiality matrix that determines which CSA sustainability criteria are applicable to the industry and how the criteria should be weighted (RobecoSAM, 2018). Companies are invited to complete the industry-specific
questionnaire, which focuses on financially-relevant economic, social, and environmental criteria (RobecoSAM, 2018). In addition, RobecoSAM tracks and monitors companies’ sustainability performance on a daily basis through a Media and Stakeholder Analysis (MSA) (RobecoSAM, 2018). The MSA assesses controversies, which could negatively impact a company’s reputation or financial well-being. Using these two data sources, RobecoSAM calculates company’s sustainability scores, which reflect a company’s awareness of sustainability issues and implementation of strategies to address these issues (RobecoSAM, 2018). The top 10 percent of ranked companies are included in DJSI World.

According to Novo Nordisk’s Company Benchmarking card, for the pharmaceutical industry, RobecoSAM measures the following environmental criteria: climate strategy, environmental policy and management systems, environmental reporting, and operational eco-efficiency.

b) Company

I. Introduction to Biogen

Biogen is a global biotechnology company focused on “discovering, developing and delivering worldwide innovative therapies for people living with serious neurological and neurodegenerative diseases” in four core areas: multiple sclerosis (MS), Alzheimer’s disease (AD), movement disorders, and neuromuscular disorders. (Biogen, 2017a). Biogen’s key products include Tecfidera (for MS), Tysabri (for MS), Avonex (for MS), and Rituxan (for rheumatoid arthritis). Founded in 1978, Biogen became a public company in 1983 and is listed on the Nasdaq Stock Market. As of January 2018, there were approximately 665 shareholders (Biogen, 2017a). Biogen has more than 7,000 employees distributed between its Cambridge, Massachusetts headquarters and its manufacturing facilities in the Research Triangle Park (RTP), North Carolina; Hillerød, Denmark; and Solothurn, Switzerland. (Biogen, 2017a). The Switzerland facility is under construction and expected to start operations in 2019. With an investment of $1 billion, it will increase the manufacturing capacity in a total volume of 74,000 L (Biogen International, 2019).

The company operates in the U.S., Canada, Australia, New Zealand, Japan, Europe, and Central and South America (MarketLine, 2018), reaching 70 countries with product distribution. In the U.S., the products are distributed through wholesale distributors of pharmaceutical products, mail order specialty distributors, and shipping service providers (Biogen, 2016). By 2016, the U.S. market represented around 72 percent of the company’s revenue and the European market represented 16 percent (MarketLine, 2018).

Between 2012 and 2016, Biogen recorded strong revenue and profit margin growth. 2017 was a record year for Biogen’s revenue, reaching $2.3 billion (Fitch Solutions Macro Research, 2018); however, its profit margin decreased 10 percent compared to 2016 values (Marketline, 2018a). In July 2017, Biogen set three goals for the short term: optimize the MS treatment business to increase earnings, advance in their spinal muscular atrophy (SMA) area, and create a leaner operational model (Biogen, 2017a). Biogen aims to redistribute $400 million annually from its operation and capital expenditures by 2020 to prioritized projects in research and development. In order to do that, Biogen established a set of strategies including the creation of a leaner and simpler operating model, improving the MS business, and expanding its portfolio.
As part of the new priorities of the company, Biogen shook up its C-suite in 2017, electing Michel Vounatsos as Chief Executive Officer; Jeffrey Capello as Executive Vice President and Chief Financial Officer; Ginger Gregory as Executive Vice President and Chief Human Resources Officer; and Chirfi Guindo as Executive Vice President and Head of Global Marketing, Market Access, and Customer Innovation.

In March 2019, Biogen halted its studies on its leading Alzheimer’s treatment because an independent monitoring committee determined that there was little chance that the trials would succeed. This led to a $18 billion decrease in its market value in late March 2019 and great loss for many of its investors (Darie, 2019). It is currently unclear what Biogen’s next steps are to recover from the trial failure. Prior to the Alzheimer’s treatment trials, investors had been pressuring Biogen to diversify its projects to hedge risks from the trials (Darie, 2019). It is predicted that this pressure will continue, and Biogen might consider acquiring smaller biotechnology companies such as Sage Therapeutics, Inc. (Nisen, 2019).

II. Structure
In order to understand the internal stakeholders for this project, it is useful to understand Biogen’s organizational structure. Based on the interviews with Biogen’s team, we identified the following six organizational areas:

1. Global Marketing, Market Access, and Customer Innovation
2. Pharmaceutical Operations and Technology
3. Research and Development
4. Finance
5. Legal
6. Human Resources

The sustainability and procurement functions of Biogen play important roles for the achievement of the scope 3 SBT. The Environmental Health and Safety (EHS) and sustainability functions are part of the Pharmaceutical Operations and Technology area. Hector Rodriguez leads the EHS and sustainability team, which includes our project champions: Jennifer Wright (Director, Global EHS & Sustainability) and Mandy Stone (Manager, EHS and Product Stewardship).

The Pharmaceutical Operations and Technology team is led by Paul McKenzie, who is also in charge of asset management, technical development, global manufacturing, supply chain operations, quality, and engineering. Additionally, he oversees the construction and operation of the new Biogen manufacturing facility in Switzerland. The procurement functions are part of the finance area, which is led by Jeffrey Capello. Procurement classifies the different products into categories and designates “source category managers” to oversee the operations related to the acquisition of the resources of the respective category.

III. Guiding principles
Biogen follows a set of principles and policies to ensure ethical business conduct and transparency. To reflect that commitment, the organization has established a set of guidelines including the Code of Business Conduct, Human Rights Position Statement, U.K. Modern Slavery Statement,
Corporate Governance Principles, and Political Contributions Policy. Three policies are relevant to understanding Biogen’s commitment with the scope 3 reduction project:

1. **Environmental, Health, and Safety (EHS) Policy**: Expresses Biogen’s intention to have a safe and healthy environment, while reducing its environmental impact.

2. **Climate Change Position**: In this document Biogen recognizes the risks of climate change, its responsibility as a business to act on climate change, and the role of different entities to address this issue.

3. **Sustainability Policy**: Establishes business success, environmental stewardship, and social responsibility as three strategic principles to incorporate sustainability into Biogen actions.

**IV. Materiality Assessment**

Biogen conducts materiality assessments every two years to identify critical issues for the company and its stakeholders. In its 2016 materiality assessment, Biogen identified 18 relevant issues to be addressed (Figure 10), grouped into six topics: patients, products, environment, workplace, community and government, and ethics (Biogen, 2017c).

Figure 10: Biogen’s GRI Materiality Matrix (Biogen, 2017c)

From those 18 issues Biogen established three of them as priorities, which are focused on the patient aspect:

1. **Access to treatments**
2. **Investments in research and development (R&D)**
3. **Improving patient outcomes**

Here we present three of the material aspects that would be addressed while working on scope 3 emissions:
1. **Product Stewardship**: This refers to the quality and safety of the products, the prevention of counterfeits, and the impact of chemistry on the environment and in the manufacturing of products. Biogen complies with all applicable regulations to minimize adverse impacts on health, safety, environment, and society.

2. **Responsible and Sustainable Supply Chain**: Biogen’s Code of Business Conduct, Human Rights Position Statement, and U.K. Modern Slavery Statement set the guidelines for ethical business and supplier relationships. Biogen has also developed evaluation processes to identify environmental, social, and governance (ESG) risks in the supply chain. The evaluation includes:
   - ESG risk screens for critical supplier sites,
   - water risk basin-level screen for a subset of critical supplier sites,
   - human rights country-level risk screen against entire procurement spend, and
   - monitoring compliance with new requirements around the world (e.g. human trafficking legislation).

In 2017, 942 critical supplier sites were evaluated for ESG risks addressing five factors: criticality of the service or good being supplied; the level of financial spend; the social risk profile; the environmental risk profile; and the governance risk profile, including potential for corruption.

In addition to the supplier review, Biogen is member of the Pharmaceutical Supply Chain Initiative (PSCI), an organization focused on increasing the capabilities and responsibility of the pharmaceutical supply chain. PSCI’s initiatives include a shared audit program for suppliers common to several PSCI members. (See section on PSCI for more information).

3. **Climate Change**: Acknowledging its significant carbon footprint, Biogen has been working on initiatives like energy efficiency measures and investments in renewables towards carbon neutrality. Additionally, Biogen has been reaching out to certain suppliers and encouraging them to measure and report their carbon emissions.

**V. Sustainability**

Biogen is a leader in sustainability initiatives in the biotechnology industry and has been conferred several awards & recognitions including (Biogen, 2017b):

- Biotech industry leader in the Dow Jones Sustainable World Index (DJSI) 2018 rankings
- RobecoSAM Silver Class and Industry Mover (RobecoSAM, 2018)
- 100 Best Corporate Citizens for 2017 by CR Magazine
- One of 167 leading businesses committed to 100 percent renewable power via RE100
- The Sustainability Yearbook – RobescoSAM Bronze Class (2017)
- #15 in the U.S. on Newsweek’s 2017 Green Rankings
- One of the Top 100 green power users in the Environmental Protection Agency’s Green Power Partnership
Biogen is technically under the biotechnology industry group, but “Pharmaceuticals, Biotechnology & Life Sciences” (DJSI) are grouped together. To complicate matters further, Biogen’s peers often fall in other Dow Jones industries. The differences for different companies and industries can make benchmarking Biogen to other pharmaceutical and biotechnology companies difficult. Other companies have different products and services or are at a different state of maturity and expansion. For this reason, we focused on self-reported sustainability information, such as CDP, instead of industry generation scoring, for company benchmarking.

Biogen’s commitment to sustainability is formalized in its Sustainability Policy, which incorporates business success, environmental stewardship, and social responsibility as strategic principles for the company’s activities. Some of the best practice actions related to sustainability implemented by Biogen include (CDP, 2017): setting an SBT, developing performance metrics and tracking, becoming an RE100 member, engaging in CDP’s A list for climate and water, and gaining ISO 50001 certification.

Biogen reports its sustainability efforts following the GRI G4 Guidelines “core” option and references the United Nations (UN) Sustainable Development Goals in its annual Corporate Citizenship Report. According to the 2017 Corporate Citizenship Report Progress (Biogen, 2017b), some of Biogen’s achievements in sustainability include:

- 75 percent reduction in operational carbon intensity since 2006
- Carbon-neutral company since 2014
- Zero waste-to-landfill (ZWL)
- 60 percent recovery and recycling rate (reuse, recycle, compost, non-combustion energy recovery)
- 65 percent reduction in potable water intensity
- 100 percent renewable power commitment

VI. Biogen’s SBT
Before setting its SBT, Biogen hired the firm Trucost to evaluate emissions throughout its entire value chain. Table 3 shows sample actions the GHG Protocol recommends that companies could take to reduce emissions in each of the scope 3 categories.
<table>
<thead>
<tr>
<th>Scope 3 Category</th>
<th>Example Actions</th>
</tr>
</thead>
</table>
| 1. Purchased goods and services          | 1. Replace high-GHG-emitting raw materials with low-GHG-emitting raw materials  
2. Implement low-GHG-purchase/purchasing policies  
3. Encourage tier 1 suppliers to engage their suppliers and disclose scope 3 emissions to the customer in order to propagate GHG reporting throughout the supply chain |
| 2. Capital goods                         | 1. Replace high-GHG-emitting capital goods with low-GHG-emitting capital goods |
| 3. Fuel- and energy-related activities (not in scope 1 or 2) | 1. Reduce energy consumption  
2. Change energy source (e.g., shift toward lower-emitting fuel/energy sources)  
3. Generate energy on site using renewable sources |
| 4. Upstream transportation and distribution | 1. Reduce distance between supplier and customer  
2. Optimize efficiency of transportation and distribution  
3. Replace higher emitting transportation modes with lower emitting ones |
| 5. Waste generated in operations         | 1. Reduce waste generated in operations and implement recycling measures  
2. Implement lower-emitting waste treatment methods |
| 6. Business travel                       | 1. Reduce the amount of business travel (e.g., encourage video)  
2. Encourage more efficient modes of travel (e.g., rail instead of plane) |
| 7. Employee commuting                    | 1. Reduce commuting distance and number of days worked per week  
2. Dis-incentivize car commuting and incentivize use of public transit and carpooling  
3. Implement teleworking/telecommuting programs |
| 8. Upstream leased assets                | 1. Increase energy efficiency of operations  
2. Shift toward lower-emitting fuel sources |
| 9. Transportation and distribution of sold products | 1. Reduce distance between supplier and customer  
2. Optimize efficiency of transportation and distribution  
3. Replace higher emitting transportation modes with lower emitting ones |
| 10. Processing of sold products          | 1. Improve efficiency of processing  
2. Redesign products to reduce processing required  
3. Use lower-GHG energy sources |
| 11. Use of sold products                 | 1. Shift away from products that contain or emit GHGs  
2. Decrease the use-phase GHG intensity of product portfolio  
3. Change user instructions to promote efficient product use |
| 12. End-of-life treatment of sold products | 1. Make products recyclable if it leads to net GHG reductions  
2. Implement product packaging measures that lead to net GHG reductions  
3. Implement recycling measures that lead to net GHG reductions |
| 13. Downstream leased assets             | 1. Increase energy efficiency of operations  
2. Shift toward lower-emitting fuel sources |
| 14. Franchises                          | 1. Increase energy efficiency of operations and shift to lower-emitting fuel sources |
| 15. Investments                         | 1. Invest in lower-emitting investments, technologies, and projects |
Appendix 2: Literature and Industry Review

a) Third-Party Knowledge-Sharing and Consensus-Building Programs

- The **Science Based Target Initiative (SBTi)**—created by CDP, the World Resources Institute (WRI), the UN Global Compact, and the World Wildlife Fund (WWF)—manages the SBTs. Biogen worked with the SBTi to set targets in line with the Paris Agreement (SBTi, 2018). It also holds regular webinars and publishes case studies on companies pursuing SBTs.

- **RE100**, a global collaborative initiative of CDP and The Climate Group (that Biogen has already joined), recently published guidance for companies to increase green power in their supply chains (RE100, 2017).

- The EPA’s **Center for Corporate Climate Leadership** encourages and assists organizations in identifying and achieving cost-effective GHG emissions reductions and also drives innovations in reducing supply chain emissions (EPA, 2018).

- The NGO **CERES** maintains a Company Network and Roadmap for Sustainability to promote and assist in corporate leadership in areas like supply chain and logistics (Ceres, 2017).

- The **GHG Protocol** a World Resources Institute (WRI) and World Business Council on Sustainable Development (WBCSD) initiative, maintains resources to help organizations understand, measure, and report emissions, including the Scope 3 Standard (GHG Protocol, 2018).

b) Third-Party Organizations to Refine and Implement a Scope 3 Strategy

- The consultancy **Trucost**, now owned by S&P Global, helps companies like Biogen measure environmental and social impacts across supply chains by combining purchasing data with their proprietary supplier and industry data (Trucost, 2018b).

- The consultancy **Carbon Trust** helps clients like Mahindra Sanyo and Carlsberg set SBTs, provides strategic advice on how to achieve them, and assists with reporting (Carbon Trust, 2017 & 2018). They also offer services to engage suppliers and set procurement standards.

- The sustainability consultant **Quantis** assists clients in developing climate roadmaps and action plans to effectively and efficiently reach their SBTs (Quantis, 2017).

- **Thinkstep** is a consultancy that assists companies in setting their SBTs and then develop and implement strategies to achieve them (Thinkstep, 2018a). Thinkstep has also developed software to calculate companies’ water, carbon, and land-use footprints throughout their own operations and those of their suppliers.

- **Ecofys**, a Navigant Company, works with companies like J&J and Tetra Pak to develop strategies to set and achieve SBTs (Ecofys, 2018).

c) Case Studies from Other Industries

**Alcatel-Lucent** – *scaling up an industry collaboration throughout the information communication technology sector (ICT)*:

The ICT industry has demonstrated a commitment to GHG emissions reductions through industry collaboration. Alcatel-Lucent worked with ICT companies and external experts to create a large-scale solution. The CEO tasked the company’s Bell Labs with assessing how Alcatel-Lucent could tackle climate challenges. Applying the results, Alcatel-Lucent brought in the wider industry including industry leaders and academic, public sector, and NGO experts to reach the goal of improving energy efficiency of communication networks by a factor of 1,000 by 2015 compared to a 2010 baseline (UN Global Compact, et al., 2013). In 2013, the consortium had reached 90
percent of the goal. Alcatel-Lucent took the lead of previous action-based industry collaborations. In 2008, the Global e-Sustainability Initiative (GeSI), The Climate Group, and a partnership of ICT companies assessed the future of the industry (UN Global Compact, et.al, 2013). Their analyses provided a goal for the sector to reduce emissions through energy efficiency measures by 2020 (The Climate Group & GeSI, 2008). The report also outlined policy barriers and incentives, which companies adopted and championed in their policy engagement. Some companies further worked together to release a report articulating the policy action needed to reach the GHG emissions reductions and also described examples of initiatives that could create economic and environmental benefits.

**Apple – direct supplier energy efficiency and renewable energy support:**
Apple launched a supplier Energy Efficiency Program in 2015 to train suppliers to increase efficiencies and reduce carbon emissions (first focusing on the highest energy users) and now requires each of its supplier to set carbon reduction goals (Apple, 2018). Suppliers are given in-depth energy assessments with cost benefit analyses for energy efficiency and green power investments. Through its Supplier Clean Energy Program, Apple will help its suppliers procure over 4 gigawatts (GW) of green power worldwide by 2020. As a part of this program, Apple maintains a Clean Energy Portal, an online platform that offers regional guidance and tools to procure renewable energy, in which over 100 of its suppliers have participated. As of April 2019, 44 of Apple’s suppliers have committed to run their Apple production on 100 percent renewables (Apple, 2019). In China, the company also created a Clean Energy Fund, which aggregates the energy load across ten of its suppliers in China to take advantage of greater purchasing power to procure green power (Fulton, 2018).

**Cisco – employee education and engagement:**
Cisco uses many employee education and engagement activities described in *Supplement 1: Employee Education*, including green teams throughout its various global sites. Green teams help move sustainability goals forward by enabling employees to take ownership of creating and implementing initiatives and encouraging healthy competition between the sites. For example, Cisco has a goal of using electricity generated from renewable sources for at least 85 percent of its global electricity and its Research Triangle Park (RTP) site has been boasting about it trajectory in reaching this goal, which is drumming up healthy competition from other Cisco sites to beat RTP in achieving this target (Personal Communication, Jordan Hart-White, February 8, 2019). Cisco also hosts Earth Aware, a month-long sustainability volunteerism and awareness campaign during which employees take part in seminars, trainings, and volunteer activities. The campaign culminates with SustainX, a large conference that brings in different companies to speak about what sustainability means to them and promotes collaboration.

**Clif Bar – green power consulting services for suppliers:**
Since Clif Bar began tracking supply chain emissions in 2002, it quickly realized that most of its emissions lived within scope 3. To be able to guide its suppliers to do the same, Clif Bar began purchasing offsets equal to 100 percent of its emissions in 2003 and procured green power for each new facility it constructed (EPA, 2016). In 2014, Clif Bar launched the 50/50 by 2020 program for 50 suppliers to transition to 50 percent or more green power by 2020 (Clif Bar, 2017). Realizing that most of its suppliers would require assistance, Clif Bar began paying for independent energy experts to help suppliers assess their options to install on-site systems or procure other forms of
renewable electricity. More than 90 percent of Clif Bar’s suppliers that have taken advantage of these consulting services have procured green power. Furthermore, in March 2019, Clif Bar created a multimillion-dollar AgFund to help its organic farmer suppliers become more climate resilient, which includes helping them host wind turbines on their properties (GreenBiz, 2019). Many of its suppliers now share best practices at Clif Bar’s annual supplier summit and are formally recognized by the company.

**Levi Strauss & Co. – supplier energy efficiency and renewable energy advisory services:**
In 2018, Levi’s set an SBT to reduce supplier emissions (scope 3 category 1) by 40 percent by 2025 on an absolute basis (Levi Strauss, 2018). To achieve this lofty goal, the company has formed two key partnerships: The Clean by Design Program with the Natural Resources Defense Council (Murray, 2016) and the Partnership for Cleaner Textiles (PaCT) with the International Finance Corporation (IFC) of the Word Bank (PaCT, 2018). Through the Clean by Design Program, a group of experts created a best practice manual for 12 participating textile mills, resulting in millions of dollars of annual energy savings. Additionally, through PaCT, suppliers receive access to advisory services (25% of the costs are paid by the supplier, 25% by Levi’s, and 50% by IFC) and low-cost financing for water, energy efficiency, and renewable energy projects. In the first year of the program, participating suppliers each reduced emissions by an average of 20 percent. Suppliers that perform well on Levi’s supplier code of conduct also have access to free renewable energy assessments and competitively-priced financing for renewable energy projects if they decide to pursue them.

**Nike – working with its suppliers to reduce impacts:**
Through its Environment Minimum Programs, Nike works with suppliers to understand their impact areas, and develop and implement new practices to improve their performance, including energy usage and carbon emissions (Nike, 2017). The company shares data collection and reporting tools with its suppliers and holds training programs to help them minimize their environmental footprints. Nike’s procurement team makes sustainability an expectation and views energy savings as an efficiency issue, which could affect future business with the company if expectations are not met (C. Greenwood, personal communication, December 14, 2018). Nike also works with Washington State University to develop capabilities, energy toolsets, and best practices to help suppliers become more energy efficient.

**Sustainable Apparel Coalition (SAC) – using combined buying power to influence suppliers:**
The SAC is the apparel, footwear, and textile industry’s self-described leading alliance for sustainable production (SAC, 2018). The SAC was formed because the apparel industry is carbon intensive and each individual company often only has a small portion of each supplier’s total business (like the pharmaceutical industry). By banding together as an industry, SAC members, with a combined annual revenue of over $500 billion (similar to U.S. pharmaceutical sales) can both pool their resources and assert greater leverage over common suppliers. One of the SAC’s most valuable tools is the Higg Index, which is a suite of tools that allows companies throughout the apparel coalition to accurately assess a supplier company’s, product’s, or material’s sustainability performance in order for companies to make informed decisions.
Together for Sustainability (TfS) – common supplier evaluations and data-sharing: 
TfS is a broad chemical industry sustainability collaboration made up of 22 multinational chemical companies (TfS, 2018). The collaboration has developed and implemented a program to assess, audit, and improve the global chemical supply chain (EY & UN Global Compact, 2016). The more than 10,000 supplier evaluations that have been carried out using Ecovadis, in addition to the 1,200 independent audits, is available to all member organizations. The TfS website also allows for the sharing of best practices among members and suppliers and allows suppliers to compare their efforts to other suppliers.

Unilever – incorporating sustainability into manager training: 
Unilever’s top 500 managers go through an intensive leadership development process. As part of the process, the most senior executives generate and present a “Purpose Into Impact” project. These projects draw on the company’s sense of personal purpose to deliver societal and business impact. The executives must choose one of Unilever’s most material sustainability challenges, such as water scarcity or sustainable sourcing, and work in groups to develop solutions. The solutions are then presented back to the top leaders in the business. In addition to senior executives, Unilever has also integrated sustainability into existing training for other managers. For instance, all new brand managers spend a week on a sustainability marketing challenge (Bhattacharya & Polman, 2016).

Walmart – a comprehensive, industry-leading supplier emissions reduction program: 
Working with the external groups WWF, EDF, CDP, BSR, and TSC, Project Gigaton was created in 2017 to avoid a gigaton (a billion tons) of greenhouse gas emissions throughout its value chain by 2030 (Walmart, 2018a). Project Gigaton is the scope 3 component of Walmart’s SBT. Suppliers who want to join have to first set an emissions reduction goal, then sign up on Walmart’s online Sustainability Hub and report their emissions reductions each year. As of April 2019, over 1,000 suppliers had signed on and those participating receive public recognition and have access to a variety of tools and resources on the Hub. While Walmart’s energy and sustainability staff can assist suppliers in reducing their emissions, Walmart will not offer longer-term contracts to suppliers just because they pursue sustainability. Walmart believes cost savings from reducing energy use alone should provide enough incentive for suppliers (K. Canoy, personal communication, October 5, 2018). Sustainability is just one of many considerations Walmart’s procurement team uses, but the company hopes that by having the conversation with suppliers and by showing the value of its own sustainability efforts, suppliers will make improvements. Project Gigaton’s scope 3 data collection process is led by TSC, which works with suppliers to improve their carbon emissions (TSC, 2017). TSC also maintains Walmart’s Sustainability Index, which tracks suppliers’ efforts to improve product sustainability performance across over 100 categories (Walmart, 2018b).

---

d) Industry Case Studies

Abbott – improving product packaging: 
Abbott was guided by the four R’s: reduce – optimize packaging design to reduce material use; renew – source packaging from renewable materials; recycle – improve the use of recycled content and expand the use of recyclable packaging; reuse – design packaging to allow reuse opportunities. They redesigned multipack carriers for nutritional bottles, which improves consumer convenience and reduces the weight of plastic carriers by more than 50 percent. This has eliminated more than
700,000 pounds of packaging on an annual basis. Since 2010, Abbott has reduced the amount of waste sent to landfill by 42 percent (CDP, 2017).

**Bayer – sustainability audits and third-party organizations:**
In addition to assessing approximately 2,000 suppliers using Ecovadis, Bayer conducted supplier audits around the globe. Internal auditors completed almost 200 audits of suppliers focusing on EHS criteria. External auditors such as TfS and PSCI conducted shared sustainability audits supplier audits and reached out to suppliers via supplier events. During the audits and supplier engagement, Bayer identified 1.3 percent that had a “critical” result and these companies were asked to correct these measures. Almost a year later, 40 percent of the re-assessed suppliers improved the critical area (CDP, 2017).

**Daiichi Sankyo – gathering thorough information on supplier emissions:**
Daiichi Sankyo asks its suppliers and partners (third-party logistics providers, etc.) to understand the Daiichi Sankyo group Environmental Management policy and CSR Procurement Policy. The company engaged 95 percent of total spend, or 150 companies. Daiichi Sankyo holds meetings with them routinely to share the information about GHG emissions and engage the implementation of Daiichi Sankyo’s policy and action plan. It also collects information about GHG emissions reductions, reductions in procurement risk, cost reductions, and status to reach goals. Daiichi Sankyo aims for 90 percent of their key suppliers (by purchase value) to establish GHG reduction targets by 2020 (CDP, 2017).

**GSK – engaging suppliers through online dashboards:**
GSK collaborates with suppliers online via its “GSK Supplier Exchange.” The Exchange is an online forum for sharing ideas about things like improving energy efficiency. Suppliers have access to this information to reduce the impact of their operations. GSK tracks the number of suppliers engaged on the Exchange as a metric for success. Around 350 suppliers are engaged via the GSK Supplier exchange. GSK is using the information from the Exchange to identify suppliers and prioritize energy reduction events on-site for suppliers. According to GSK, each of these workshops typically identifies CO2e emissions reduction opportunities of 5,000 tons CO2e (CDP, 2017).

**GSK – aligning actions to climate policy:**
GSK has made enormous efforts to ensure alignment between its public position on climate change and its company actions. In 2013, the GSK’s Corporate Responsibility Committee asked the company’s Audit and Assurance Group “to review internal processes and risk to company reputation surrounding public commitments, including those relating to climate change” (UN Global Compact, et.al, 2013). As a result, GSK developed the Supplier Exchange. Around 350 suppliers are engaged via the GSK Supplier Exchange online forum for collaboration to share practical ideas about improving energy efficiency, reducing water use and reducing waste. Suppliers have used this insight to make improvements to their operations (CDP, 2017).

**Novartis – engaging employees in sustainability initiatives:**
Novartis uses many employee education and engagement activities described in Supplement 1: Employee Education. Novartis formally recognizes employees in its awards programs. Novartis rewards associates who develop energy saving, renewable energy, or environmental projects such
as water footprint, sustainable packaging, or waste and emissions reductions. In addition, the company fosters innovation among employees; all employees can submit innovative projects or ideas to improve energy efficiency and reduce GHG emissions to the Novartis Health, Safety, Environment, and Business Continuity (HSE&BC) Excellence Award scheme. The winners are judged by an internal panel of experts. The winning projects are funded and implemented (CDP, 2017).

**Novo Nordisk** – *supporting renewable energy in the supply chain:*
Novo Nordisk engaged directly with eight suppliers in 2016. In this effort the company encouraged suppliers to invest in and purchase renewable energy. Two suppliers had a three-day supplier visit by two energy experts, helping them to identify energy efficiency projects. The suppliers were selected based on their specific needs and maturity. One supplier was offered support for an energy efficient design of their new facility. Novo Nordisk shared their documents and guidance based on industry and experience (CDP, 2017).

**Novo Nordisk** – *educate company on SBT:*
Novo Nordisk uses its “Blueprint for Change” for major issues affecting its future. It uses this tool to create coherent strategies and help in “measuring realized benefits for both society and the organization and sharing this information” with stakeholders (UN Global Compact, et al., 2013). Novo Nordisk seeks to match its “Blueprint” on climate change with actions, so has engaged with external partners such as WWF to do so. This includes mainstreaming sustainability goals throughout the company, working with suppliers that have emissions reductions goals, and adhering to the timeline it has set for reaching its SBTs. It also created partnerships to promote clean energy resources. For instance, to promote clean energy incentives, it strategically partnered with Chinese officials to increase focus on renewable energy around the company’s production site in Tianjin, China. In 2013, Novo Nordisk signed a Memorandum of Understanding (MOU) with Tianjin Economic-Technological Development Area to achieve this goal (UN Global Compact, et al., 2013).

e) **Industry Resources**

*Industry Database*
In addition to the case studies, the efforts and goals of suppliers and competitors were put into an industry database Excel file. The data that populates the spreadsheet are from CDP 2017 responses that are self-reported from the companies. Biogen can use this database to create instant, printable profiles when making decisions regarding applications of recommendations. An example showing Biogen’s, AstraZeneca’s, and Omnicare’s profiles are shown in Figure 11.
### Biogen

<table>
<thead>
<tr>
<th>Company</th>
<th>Type</th>
<th>SBT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogen</td>
<td>Biotechnology</td>
<td>Scope 1, 2, 3 by 35% 2013-2030</td>
</tr>
</tbody>
</table>

#### Emissions Reduction Goals

<table>
<thead>
<tr>
<th>Scope 1, 2, 3 by 35% 2013-2030</th>
</tr>
</thead>
</table>

#### Emissions Reduction Efforts

Optimize insulated packaging for products requiring refrigeration. By engaging with 50 of our top impacting suppliers, 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 reducing overall value chain emissions by 14 percent through the use of actual carbon emission data from vendors as compared to estimates made by the EEIO model.

#### Engagement

**Supplier Engagement on Climate Change** - In 2016, Biogen engaged with its top 50 suppliers from a carbon emission and spend perspective, which collectively represented about 75 percent of our 2016 supply chain carbon emissions.

### AstraZeneca

<table>
<thead>
<tr>
<th>Company</th>
<th>Type</th>
<th>SBT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>Pharmaceutical Biotechnology</td>
<td>Scope 1: 20%, Scope 2: 95%, Scope 3: 25% (per million USD of sales) from 2015-2025</td>
</tr>
</tbody>
</table>

#### Emissions Reduction Goals

<table>
<thead>
<tr>
<th>Scope 1: 20%, Scope 2: 95%, Scope 3: 25% (per million USD of sales) from 2015-2025</th>
</tr>
</thead>
</table>

#### Emissions Reduction Efforts

Investing in GHG efficiency improvements through a dedicated natural resources fund of approximately $25M per year managed by the Natural Resources Reduction Governance Group (NRRGG), launched in 2015. The NRRGG includes representatives from key stakeholder groups across the organisation: Global Safety, Health and Environment (SHE), Global Engineering, Global Maintenance, Finance, and Procurement. Projects submit applications to the fund and go through a vetting process that scores them according to lifetime natural resource saving per USD invested. We are deepening our engagement with suppliers to encourage the setting of appropriate GHG and renewable energy targets and through annual data collection we will measure the success of supplier activity. Prioritisation is maintained through inclusion in our carbon commitments alongside Scope 1 and 2 sources, and quarterly monitoring of performance enables measurement of success.

#### Engagement

5% of total spend, 40 suppliers actively engaged; We have been engaging with key suppliers on energy and resource use since 2012, and this year we disclosed four years of data. Our engagement targets our key first tier outsourced suppliers of Active Pharmaceutical Ingredient (API) and Formulation & Packing (F&P) services for which we collect primary data on energy use covering 90% of spend in those subcategories (a portion of Category 1 of Scope 3 footprint). In 2015 - the latest year that complete data is available, these 40 suppliers accounted for 96,000 tonnes CO2 (2% of 2015 Category 1 emissions).
<table>
<thead>
<tr>
<th>Company:</th>
<th>OMNICARE INC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relation</td>
<td>Supplier</td>
</tr>
<tr>
<td>Type</td>
<td>Couriers and messengers</td>
</tr>
<tr>
<td>SBT?</td>
<td>Target set</td>
</tr>
</tbody>
</table>

**Emissions Reduction Goals**

- 22% of Scope 1, 2 and downstream scope 3 by 2018

**Emissions Reduction Efforts**

- In 2016 we partnered with Johnson & Johnson Consumer Inc. (J&J) to raise awareness of our customers related to recycling of personal care products to reduce the overall energy use and carbon footprint associated with the manufacturing of plastic and paper materials. J&J and CVS Health were also signatories to the Chemical Footprint Project in its inaugural year, demonstrating the companies' joint commitment to chemical transparency and management of chemicals in products.

**Engagement**

- CVS Health also commits that 70% of its suppliers by emissions will set science-based emissions reduction targets on their scope 1 and 2 emissions by 2023.

*Figure 11 Examples from the Industry Database spreadsheet showing Biogen’s, AstraZeneca’s, and Omnicare’s profiles*
Competitor Benchmarking

Table 4 provides a summary of what Biogen’s competitors are doing to reduce GHG emissions. This information is a condensed version of what is available in the database. Biogen should use this information when benchmarking itself against competitors.

<table>
<thead>
<tr>
<th>Competitor</th>
<th>SBT as if 2018</th>
<th>CDP C3 Absolute Emissions Reduction Goal as of 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogen</td>
<td>Scope 1, 2, 3 by 35 percent 2013-2030</td>
<td>Ongoing commitment to Carbon Neutrality; Supplier Engagement on Climate Change - In 2016, Biogen engaged (gathered more emissions information) with its top 50 suppliers from a carbon emission and spend perspective, which collectively represented about 75 percent of Biogen’s 2016 supply chain carbon emissions; Optimize insulated packaging for products requiring refrigeration</td>
</tr>
<tr>
<td>Abbott</td>
<td>No</td>
<td>Scope 1 and 2, 12 percent reduction 2010-2016</td>
</tr>
<tr>
<td>AbbVie</td>
<td>No</td>
<td>Scope 1 and 2, 25 percent 2015-2025</td>
</tr>
<tr>
<td>Amgen</td>
<td>No</td>
<td>Scope 1 and 2, 10 percent 2012-2020 (facility carbon), Scope 2 20 percent 2012-2020 (fleet carbon)</td>
</tr>
<tr>
<td>AstraZeneca</td>
<td>Scope 1: 20 percent, Scope 2: 95 percent, Scope 3: 25 percent (per million USD of sales) from 2015-2025</td>
<td>20 percent Scope 1, 95 percent Scope 2, 20 percent Scope 3 2015-2025</td>
</tr>
<tr>
<td>Baxter</td>
<td>No</td>
<td>Scope 1 and 2, 10 percent reduction 2015-2020</td>
</tr>
<tr>
<td>Bayer</td>
<td>No</td>
<td>Scope 1 and 2, 20 percent 2015-2020</td>
</tr>
<tr>
<td>Bristol-Myers Squibb</td>
<td>No</td>
<td>Scope 1 and 2, 5 percent 2015-2020</td>
</tr>
<tr>
<td>Celgene</td>
<td>No</td>
<td>Scope 1 and 2, 20 percent 2015-2020</td>
</tr>
<tr>
<td>Daiichi Sankyo</td>
<td>Operations 27 percent 2015-2030, 90 percent of key suppliers by purchase value will institute GHG reduction targets by fiscal year 2020</td>
<td>Scope 1 and 2&amp; percent 2015-2030</td>
</tr>
<tr>
<td>Genentech Inc (Roche Holding AG)</td>
<td>No</td>
<td>Scope 1 and 2 15 percent 2015-2025, 95 percent reduction in business travel 2005-2050</td>
</tr>
<tr>
<td>Gilead</td>
<td>No</td>
<td>Scope 1, 2, and 3, 25 percent 2010-2020 and 100 percent 2010-2050</td>
</tr>
<tr>
<td>GSK</td>
<td>Committed</td>
<td>Scope 1 and 2, 20 percent 2010-2020, 80 percent 2010-2050</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>Not yet approved</td>
<td>Scope 1 and 2, 20 percent 2010-2020</td>
</tr>
<tr>
<td>Lundbeck A/S</td>
<td>Scope 1, 2 by 45 percent 2010-2020</td>
<td>Annual 4 percent absolute reduction target for Scope 1 and 2 emissions, Scope 1 and 2, 45 percent 2010-2020</td>
</tr>
<tr>
<td>Merck</td>
<td>Committed</td>
<td>Scope 1 and 2, 40 percent 2015-2025</td>
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<tr>
<td>Novartis</td>
<td>Committed</td>
<td>Scope 1 and 2, 30 percent 2010-2020</td>
</tr>
<tr>
<td>Novo Nordisk</td>
<td>Committed</td>
<td>Scope 1 and 2, 58 percent 2014-2040</td>
</tr>
<tr>
<td>Pfizer</td>
<td>Operations 20 percent 2012-2020; 100 percent of key suppliers will manage environmental impacts, including GHG emissions, 90 percent will institute GHG reduction targets by 2020</td>
<td>Scope 1 and 2, 20 percent 2012-2020; 60-80 percent reduction 2000-2050</td>
</tr>
<tr>
<td>Shire</td>
<td>Committed</td>
<td>Scope 1, 3 percent 2015-2016; Scope 2, 3 percent 2015-2026</td>
</tr>
<tr>
<td>Takeda</td>
<td>Committed</td>
<td>Scope 1 and 2, 25 percent 2005-2020</td>
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<tr>
<td>Vertex</td>
<td>No</td>
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Competitor Supplier Engagement Tools

Table 5 shows which survey tools Biogen’s competitors are using to gather sustainability information from their suppliers. The majority are using their own surveys, but this can create survey fatigue from suppliers that have a lot of customers. For this reason, we recommend a program that standardizes surveys, such as CDP Supply Chain, EcoVadis, EcoDesk, and TFS.

<table>
<thead>
<tr>
<th>Competitor</th>
<th>CDP Supply Chain</th>
<th>Ecovadis</th>
<th>Ecodesk</th>
<th>TFS</th>
<th>Individual Survey</th>
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<tbody>
<tr>
<td>Abbott</td>
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<td>AbbVie</td>
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<td>Amgen</td>
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<td>AstraZeneca</td>
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<td>Baxter</td>
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<td>Bayer</td>
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<td>Bristol-Myers Squibb</td>
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<td>Celgene</td>
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<td>Daiichi Sankyo</td>
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<td>GSK</td>
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<td>Johnson &amp; Johnson</td>
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<td>Lundbeck A/S</td>
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<td>Merck</td>
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<td>Novartis</td>
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<tr>
<td>Novo Nordisk</td>
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<td>Pfizer</td>
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<td>Takeda</td>
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<td>Vertex</td>
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*Only where explicitly mentioned in CDP, we did not read through individual resources to see what tools were utilized

f) A Further Look at PSCI

Biogen is a member of PSCI, the Pharmaceutical Supply Chain Initiative. The purpose of PSCI is to bring together the pharmaceutical industry “to define, implement, and champion responsible supply chain practices” (PSCI, n.d.). PSCI’s core focus areas are:

- fair and safe work conditions and practices,
- responsible business practices, and
- environmental sustainability and efficient use of resources (PSCI, n.d.).

Among the benefits of membership is the ability to influence the priorities of the pharmaceutical industry. PSCI members can collectively share knowledge and expertise to drive complex, global change in the industry more effectively than one business can alone (PSCI, 2018). To enact this
vision, PSCI created the Pharmaceutical Industry Principles for Responsible Supply Chain Management, which members are expected to incorporate into their supply agreements. The Principles draw from the United Nations Global Compact (PSCI, 2018).

Under the principle of environment, PSCI focuses on three management systems elements: environmental authorizations, waste and emissions, and spills and releases. These environmental management systems protect the health of workers, communities, and the integrity of ecosystems (PSCI, 2011). The elements do not directly mention climate change and GHG emissions. The most closely related elements are environmental authorizations, which include air emissions, and waste and emissions. According to the PSCI environment principle, suppliers must comply with all applicable environmental regulations and have environment, health, and safety systems in place (PSCI, 2011).

In order to make sure that suppliers are undertaking these actions, participating companies can audit their suppliers using the PSCI supplier collaboration audit program. PSCI has created guidance tools tailored to the pharmaceutical industry for assessing performance and risk. By having a common tool, suppliers are able to share their audits with multiple members via a web-based platform. In addition to saving time, money, and resources, the shared audit tool increases transparency of the supply chain, enables members to view trends and patterns in the industry, and also promotes greater unity in the industry because members work with a common set of guidelines, which is consistently messaged to suppliers. Specific to emissions, the audit includes a section for suppliers to include their GHG emissions reduction and measurement plan (PSCI, 2018a). At the end of 2017, PSCI members could access 152 supplier audit reports (PSCI, 2018). PSCI has also developed a capacity building program to support suppliers in meeting PSCI standards. Suppliers are able to access webinars and resources in PSCI’s resource library and also attend supplier conferences hosted by PSCI (PSCI, n.d.).

Because Biogen is already a member of PSCI, it has a connection with 33 other businesses in the industry including large and influential companies like AstraZeneca, Pfizer, and Johnson & Johnson. In instances when Biogen alone does not have enough leverage to influence suppliers to change their practices, the company can use this industry association and work towards meeting its SBT. Biogen can look to other companies both within and outside of the pharmaceutical industry who have used their membership in industry groups to advance environmental goals.
Appendix 3: Biogen’s Supplier Analysis

As part of the analysis of Biogen’s suppliers, we include Table 6 showing the number of suppliers in each of the categories established by Trucost for 2017 (2018a).

Table 6: Number of suppliers by category in 2017, listed by largest to smallest category

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management scientific and technical consulting services</td>
</tr>
<tr>
<td>Scientific research and development services</td>
</tr>
<tr>
<td>Legal services</td>
</tr>
<tr>
<td>Medical and diagnostic labs and outpatient and other ambulatory care services</td>
</tr>
<tr>
<td>Nonresidential maintenance and repair</td>
</tr>
<tr>
<td>Other educational services</td>
</tr>
<tr>
<td>Pharmaceutical preparation manufacturing</td>
</tr>
<tr>
<td>Architectural engineering and related services</td>
</tr>
<tr>
<td>Analytical laboratory instrument manufacturing</td>
</tr>
<tr>
<td>Couriers and messengers</td>
</tr>
<tr>
<td>Business support services</td>
</tr>
<tr>
<td>Custom computer programming services</td>
</tr>
<tr>
<td>Miscellaneous Nondurable Goods Wholesalers</td>
</tr>
<tr>
<td>Software publishers</td>
</tr>
<tr>
<td>Accounting tax preparation bookkeeping and payroll services</td>
</tr>
<tr>
<td>Biological product (except diagnostic) manufacturing</td>
</tr>
<tr>
<td>Advertising and related services</td>
</tr>
<tr>
<td>Printing</td>
</tr>
<tr>
<td>Computer systems design services</td>
</tr>
<tr>
<td>Electromedical and electrotherapeutic apparatus manufacturing</td>
</tr>
<tr>
<td>Employment services</td>
</tr>
<tr>
<td>Data processing hosting and related services</td>
</tr>
<tr>
<td>Plastics material and resin manufacturing</td>
</tr>
<tr>
<td>Packaging machinery manufacturing</td>
</tr>
<tr>
<td>Electronic and precision equipment repair and maintenance</td>
</tr>
<tr>
<td>Computer terminals and other computer peripheral equipment manufacturing</td>
</tr>
<tr>
<td>Monetary authorities and depository credit intermediation</td>
</tr>
<tr>
<td>Surgical and medical instrument manufacturing</td>
</tr>
<tr>
<td>Commercial and industrial machinery and equipment repair and maintenance</td>
</tr>
<tr>
<td>Telecommunications</td>
</tr>
<tr>
<td>Food services and drinking places</td>
</tr>
<tr>
<td>Office supplies (except paper) manufacturing</td>
</tr>
<tr>
<td>Coated and laminated paper packaging paper and plastics film manufacturing</td>
</tr>
<tr>
<td>Other basic organic chemical manufacturing</td>
</tr>
<tr>
<td>Pump and pumping equipment manufacturing</td>
</tr>
<tr>
<td>Insurance agencies brokerages and related activities</td>
</tr>
</tbody>
</table>
Table 7 and Table 8 present the suppliers with biggest Scope 3 emissions for years 2015 and 2016, which indicates the yearly changes in the top 10 suppliers based on GHG emissions.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Client Sector</th>
<th>GHG Contribution</th>
<th>Expenditure contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier 1</td>
<td>Plastics material and resin manufacturing</td>
<td>12%</td>
<td>3%</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>Other basic organic chemical manufacturing</td>
<td>9%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>Scientific research and development services</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>Supplier 4</td>
<td>Architectural engineering and related services</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Supplier 5</td>
<td>Other plastics product manufacturing</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 6</td>
<td>Management scientific and technical consulting services</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 7</td>
<td>Pharmaceutical preparation manufacturing</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 8</td>
<td>Surgical and medical instrument manufacturing</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 9</td>
<td>Scientific research and development services</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 10</td>
<td>Nonresidential maintenance and repair</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Table 8 2015 top 10 suppliers by total scope 3 emissions, listed by largest to smallest total GHG emissions

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Client Sector</th>
<th>GHG Contribution</th>
<th>Expenditure contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier 1</td>
<td>Other basic organic chemical manufacturing</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>Scientific research and development services</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>Plastics material and resin manufacturing</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Supplier 4</td>
<td>Pharmaceutical preparation manufacturing</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 5</td>
<td>Management, scientific, and technical consulting services</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>Supplier 6</td>
<td>Surgical and medical instrument manufacturing</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 7</td>
<td>Scientific research and development services</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 8</td>
<td>Pharmaceutical preparation manufacturing</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Supplier 9</td>
<td>Other industrial machinery manufacturing</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Supplier 10</td>
<td>Scientific research and development services</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Table 9 shows Biogen’s GMP suppliers and their contribution to GHG scope 3 for the last three years.

Table 9 GMP supplier’s scope 3 GHG contribution

<table>
<thead>
<tr>
<th>Supplier</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier 1</td>
<td>0.8%</td>
<td>0.7%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>0.7%</td>
<td>8.5%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>5.9%</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Supplier 4</td>
<td>0.2%</td>
<td>5.0%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Supplier 5</td>
<td>11.5%</td>
<td>12.1%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Supplier 6</td>
<td>0.6%</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Supplier 7</td>
<td>0.8%</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Supplier 8</td>
<td>0.6%</td>
<td>1.5%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Supplier 9</td>
<td>1.6%</td>
<td>1.4%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Total</td>
<td>22.8%</td>
<td>29.2%</td>
<td>20.0%</td>
</tr>
</tbody>
</table>
Table 10 presents the actions taken by the top 25 suppliers related to sustainability and GHG accountability. RE denotes companies that are taking on renewable energy projects and EE denotes companies taking on energy efficiency projects. These are “what” companies are accomplishing. The next columns represent “how.” Do the companies collect sustainability information from suppliers and customers? Do they have sustainability information and selection criteria in their code of conduct? Do they set aside money for financing sustainability projects? Do they perform audits for suppliers to make sure sustainability initiatives are being carried out? Do they set lower ROIs for selecting projects with sustainability initiatives? Do the companies have dashboards for themselves or suppliers to track sustainability progress? Finally, the last column denotes if the company has set their own SBT. All of this information is included in the industry database and can be viewed in the company profiles.

Table 10 Supplier sustainability analysis.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>RE</th>
<th>EE</th>
<th>Collect Sustainability Information</th>
<th>Sustainability in Selection Criteria or Code of Conduct</th>
<th>Financing</th>
<th>Audits</th>
<th>ROI</th>
<th>Dashboard</th>
<th>SBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier 1</td>
<td>X</td>
<td></td>
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<td></td>
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<td>Supplier 2</td>
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<td>Supplier 3</td>
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<td>Supplier 4</td>
<td>X</td>
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<td>Supplier 5</td>
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<td>Supplier 6</td>
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<td>Supplier 7</td>
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<td>Supplier 12</td>
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<td>Supplier 16</td>
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<td>Supplier 18</td>
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<td>Supplier 20</td>
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<td>Supplier 21</td>
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<td>Supplier 25</td>
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<td>Supplier 26</td>
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<td>Supplier 29</td>
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<td>Supplier 30</td>
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<td>Supplier 31</td>
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<tr>
<td>Supplier 32</td>
<td>X</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Supplier 33</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Appendix 4: Recommendations and Supplements

Figure 12 shows our recommendations overlaid with the logos of Biogen’s competitors that have already adopted any of the nine recommendations. Companies in the sector are already doing a good job of engaging suppliers, but, compared to other industries, have a ways to go with regards to taking internal and industry collaboration measures to address supply chain emissions.

To support Biogen in implementing recommendations and catching up with peers, we generated supplementary materials. Each supplementary material is introduced with its associated recommendation.

a) Supplement 1: Employee Education

In the last decade, a growing trend in corporate sustainability has been employees becoming a key stakeholder group for sustainability programs and reports (EY, 2011). Integrating employee education and engagement into companies’ broad sustainability strategies is becoming more commonplace. Biogen should take steps to educate employees on its aggressive SBT goals and create sustainability champions among employees.

A. Educate

1. Monthly lunch and learn: The purpose of these monthly lunch and learns is to teach employees about sustainability initiatives that are occurring at the company- or industry- level or general trends in business sustainability and how they can get involved. Once a month, the sustainability team should host a lunch where it presents Biogen’s sustainability initiatives, current business sustainability topics such as reporting, or shows a short movie on the topic of
sustainability. The sessions can also be activity-based such as hosting a green trivia or bingo with prizes. Each session should include a discussion so employees can ask questions, offer insights, or provide comments. Biogen should take advantage of the scheduled lunch and learns through the Carolina-Star certification process (N.C. Department of Labor, n.d.) and incorporate sustainability learning material.

The first lunch and learn should be dedicated to Biogen’s long-term sustainability objectives and how they fit into the company’s success. Employees should be informed about Biogen’s SBT goal and the steps the sustainability team is taking to achieve these goals. Employees should also understand how different departments can contribute to reaching these goals whether it is through reduced energy use, transportation mode-switching, or collecting data from suppliers. Employees should leave with a physical take-away such as a one-page document outlining Biogen’s long-term sustainability objectives and points of contact. (See Figure 13 for an example one-pager).

2. **Earth Day activities:** Earth Day makes April a good month to raise awareness regarding sustainability. Biogen can host a day-long, week-long, or month-long sustainability celebration. Ideas for events include:

   - Offer multiple sustainability workshops, presentations, and activities.
   - Host a fair that brings in organizations to engage and educate employees on relevant environmental topics.
   - Publicly recognize employees who have contributed to Biogen’s sustainability goals. (See B.3: Employee recognition).
   - Set a company-wide competition for sites to reduce their energy consumption. Include a prize to heat up the competition. (See B.2: Healthy competition).

3. **Signage:** Posting signs is an effective way of bringing attention to sustainability goals. Biogen can post signs encouraging employees to take the stairs rather than elevator, switch off lights in conference rooms after use, or use reusable bottles for drinks (see Figure 14 for three example posters for reducing energy use in the office). In addition, the sustainability team should display sustainability goals, progress, tips, and other information on e-boards/monitors.

4. **Incorporate sustainability into employee and manager training:** Employees and managers should receive sustainability training as part of the HR on-boarding process. For employees, learning about sustainability during the on-boarding process will increase awareness and knowledge about Biogen’s sustainability goals and initiatives, while also signaling the importance of these goals within the company. For managers, these trainings will enable them to integrate sustainability into their business decisions as they will gain specialized knowledge and expertise. Moreover, employees who work with knowledgeable managers will believe that it is possible to reach sustainability goals throughout the company. Ideally, Biogen should provide a monetary reward to managers who advance sustainability initiatives.
B. Engage

1. **Create a green team:** Employees will buy-into Biogen’s sustainability objectives if they are given the opportunity to create some sustainability initiatives. Biogen should recruit employees across different divisions and departments for a company green team. The green team can generate ideas for initiatives and decide which ones to implement.

2. **Healthy competition:** Biogen’s sustainability team should encourage competition among employees to enhance participation in sustainability initiatives and also spark innovation. Using reduced energy consumption as an example, Biogen could set up the following types of competitions:
   - Everyone wins: If company-wide, Biogen reduces energy use by 25 percent, Biogen will host a company picnic for all employees.
   - Site competition: The site that reduces their energy use the most will win $1,000 to contribute to the charity of its choice.
   - Intrinsic motivation: Reduce your energy use over the course of 24 hours.

3. **Employee recognition:** Biogen should publicly recognize employees who come up with creative ideas or contribute to sustainability goals. Biogen can also recognize departments or divisions that are contributing to these objectives. Biogen should also celebrate its sustainability achievements or awards like leadership in the DJSI. Employees should feel they have played a part in achieving goals and recognition.

4. **Funding for sustainability projects:** Biogen should set aside funds for education and engagement initiatives:
   - Education: Biogen should create a small training budget for conferences, seminars, online trainings. Employees who receive these funds should share what they learned at the monthly lunch and learns.
   - Engagement: Employees should be encouraged to co-create sustainable practices. Employees who develop good ideas for sustainability initiatives should be able to access funding and support from Biogen.
**Biogen's Science Based Target**

### Goals and Progress

**By 2020:**
- Reduce GHG intensity of operations by 80 percent
- Reduce emissions across the supply chain by 35 percent

**So far we have:**
- Achieved carbon neutrality (2014)
- Reduced 72 percent of GHG intensity in operations (2015)

### Current Initiatives

- Demonstrate support of Paris Agreement temperature target:
  - Joined the We Mean Business coalition
  - Signed the American Business Act on Climate Pledge

- Reduce carbon footprint:
  - Joined RE100 Initiative to source 100 percent of electricity from renewable energy sources

### Awards and Recognition

- Dow Jones Sustainable World Index in 2018 – Biotech industry leader
- RobecoSAM Silver Class and Industry Mover (RobecoSAM, 2018)
- 100 Best Corporate Citizens for 2017 by CR Magazine
- One of 136 leading businesses committed to 100 percent renewable power via RE100
- The Sustainability Yearbook – RobecoSAM Bronze Class (2017)
- #15 in the U.S. on Newsweek’s 2017 Green Rankings
- One of the Top 100 green power users in the Environmental Protection Agency’s Green Power Partnership

### Points of Contact

Interested in learning more about Biogen’s climate strategy or sustainability goals and initiatives. Here are your points of contact:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandy Stolte</td>
<td>Manager, EHS</td>
</tr>
<tr>
<td>Matthew Yamaihin</td>
<td>Environmental Consultant</td>
</tr>
</tbody>
</table>

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*Figure 13 Example of one-pager to distribute at lunch and learn.*
Figure 14 Example of signage for employee education
b) Supplement 2: Starting Point for Suppliers

Once Biogen starts engaging suppliers to reduce scope 3 emissions, some suppliers might require additional guidance on how to face this new challenge. In order to provide them with more information, some communications tools could be developed. Figure 15 presents an example introductory document to GHG reduction mechanisms for suppliers who are in early stages of taking action against climate change. Additional documents explaining what SBTs are, accounting strategies, or even sharing case studies could further help suppliers reduce their GHG emissions.
GENERAL SOURCES

- https://www.walmart sustainabilityhub.com/

ENERGY

- U.S. EPA’s ENERGY STAR Program: https://www.energystar.gov/

WASTE

- U.S. EPA’s Resources for Waste Reduction and Recycling: https://www.epa.gov/recycle
- EPA’s WasteWise program: https://www.epa.gov/smm/wastewise
- Don’t “Waste” Your Chance To Do Your Share—How To Reduce Your Climate Footprint

TRANSPORTATION

- EPA’s SmartWay Transport Partnership: https://www.epa.gov/smartway

MATERIALS

- EPA’s Design for the Environment Program: https://www.epa.gov/saferchoice
- Sustainable Purchasing Leadership Council: https://www.sustainablepurchasing.org/
- EPA’s Green Chemistry site: https://www.epa.gov/greenchemistry
- EPA’s Life Cycle Assessment Web site: https://www.epa.gov/saferchoice/design-environment-life-cycle-assessments

Figure 15 Communication tool and suggested GHG reduction strategies and informational sources for Biogen’s suppliers
c) Supplement 3: Supplier Dashboard

We recommend Biogen work with an industry collaboration group to make a dashboard that gathers supplier data, predicts emission trajectories, and provides suppliers with resources to reduce environmental impact. We created the dashboard shown in Figure 16 by combining ones made by Novartis, Glaxo, and Walmart. Novartis made an interactive dashboard that enables users to visualize Scope 3 emission data and to detect hotspots caused by specific Novartis activities by using an advanced predictive hybrid-method that can calculate carbon emissions using primary data from both CDP and from the web (EDF Climate Corps, 2018). GSK’s Supplier Exchange connects GSK employees, experts, and companies in the supply chain to share and implement sustainability solutions. The Exchange platform is hosted by 2degrees, a highly-recognized engagement and collaboration forum for steering sustainable supply chain improvements (2 Degrees Network, 2018). Walmart’s Sustainability Index includes resources such as training, webinars, and FAQs that suppliers can access to reduce their emissions (Walmart Sustainability Index, 2019). Walmart’s index was created in partnership with EDF. EDF has also created its own resource called the Supply Chain Solutions Center. It serves as a public location for guidance on addressing a myriad of sustainability issues for companies across all industries (EDF, 2018).

![Sample Supplier Dashboard](image)

*Figure 16 Sample Supplier Dashboard*
Appendix 5: The Business Case for Tackling Supply Chain Sustainability

Table 11 shows the top 15 investors in Biogen as of December 2018.

Table 11: Biogen's top investors (Nasdaq, 2019)

<table>
<thead>
<tr>
<th>Owner Name</th>
<th>Date</th>
<th>Shares Held</th>
<th>Value (in $1,000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackrock Inc.</td>
<td>12/31/2018</td>
<td>16,568,963</td>
<td>5,515,311</td>
</tr>
<tr>
<td>Vanguard Group Inc</td>
<td>12/31/2018</td>
<td>15,170,607</td>
<td>5,049,840</td>
</tr>
<tr>
<td>Primecap Management Co/Ca/</td>
<td>12/31/2018</td>
<td>14,716,217</td>
<td>4,898,587</td>
</tr>
<tr>
<td>State Street Corp</td>
<td>12/31/2018</td>
<td>8,781,192</td>
<td>2,922,995</td>
</tr>
<tr>
<td>Clearbridge Investments, Llc</td>
<td>12/31/2018</td>
<td>8,729,845</td>
<td>2,905,904</td>
</tr>
<tr>
<td>Wellington Management Group Llp</td>
<td>12/31/2018</td>
<td>5,400,991</td>
<td>1,797,828</td>
</tr>
<tr>
<td>Capital World Investors</td>
<td>12/31/2018</td>
<td>4,015,567</td>
<td>1,336,662</td>
</tr>
<tr>
<td>Fmr Llc</td>
<td>12/31/2018</td>
<td>3,671,066</td>
<td>1,221,988</td>
</tr>
<tr>
<td>Aqr Capital Management Llc</td>
<td>12/31/2018</td>
<td>3,156,081</td>
<td>1,050,565</td>
</tr>
<tr>
<td>Invesco Ltd.</td>
<td>12/31/2018</td>
<td>3,126,480</td>
<td>1,040,711</td>
</tr>
<tr>
<td>Northern Trust Corp</td>
<td>12/31/2018</td>
<td>2,907,306</td>
<td>967,755</td>
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<tr>
<td>Alliancebernstein L.P.</td>
<td>12/31/2018</td>
<td>2,831,228</td>
<td>942,431</td>
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<tr>
<td>Geode Capital Management, Llc</td>
<td>12/31/2018</td>
<td>2,713,577</td>
<td>903,268</td>
</tr>
<tr>
<td>JPMorgan Chase &amp; Co</td>
<td>12/31/2018</td>
<td>2,667,835</td>
<td>888,042</td>
</tr>
<tr>
<td>Bank Of New York Mellon Corp</td>
<td>12/31/2018</td>
<td>2,236,167</td>
<td>744,353</td>
</tr>
</tbody>
</table>
References


PSCI. (n.d.). Retrieved from https://pscinitiative.org/home


UN Global Compact, the secretariat of the UN Framework Convention on Climate Change, UN Environment Programme, the World Resources Institute (WRI), CDP, WWF, Ceres and The Climate Group. (2013). Guide For Responsible Corporate Engagement In Climate Policy: A Caring For Climate Report. [PDF document].


