Southcoast Health System Inc.

Health and Human Services Environmental Pledge Report

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JULY 1, 2024

About Southcoast Health System Inc:
Southcoast Health System was incorporated as a non-profit entity in 1996 through the merger of Tobey hospital in Wareham, St. Luke's hospital in New Bedford, and Charlton Memorial hospital in Fall River. All three hospitals are in Southeastern Massachusetts. Southcoast Health is the largest employer in the area with 7,500+ employees.

The Southcoast Hospitals Group, an entity within Southcoast Health System Inc, has (3) hospitals and (787) licensed beds to serve 724,000 clients within the 33 communities in our Primary service area. Our three emergency centers treat over 155,000 patients and our Maternity team delivers more than 3,000 newborns each year.

The following report demonstrates Southcoast Hospitals Group's compliance with the 2023 requirements of the HHS pledge.

With Gratitude,

Nicole Rosa
Director of Supply Chain Logistics, Project Management, & Sustainability
HHS Task force lead

Southcoast Health HHS Pledge Report 2023

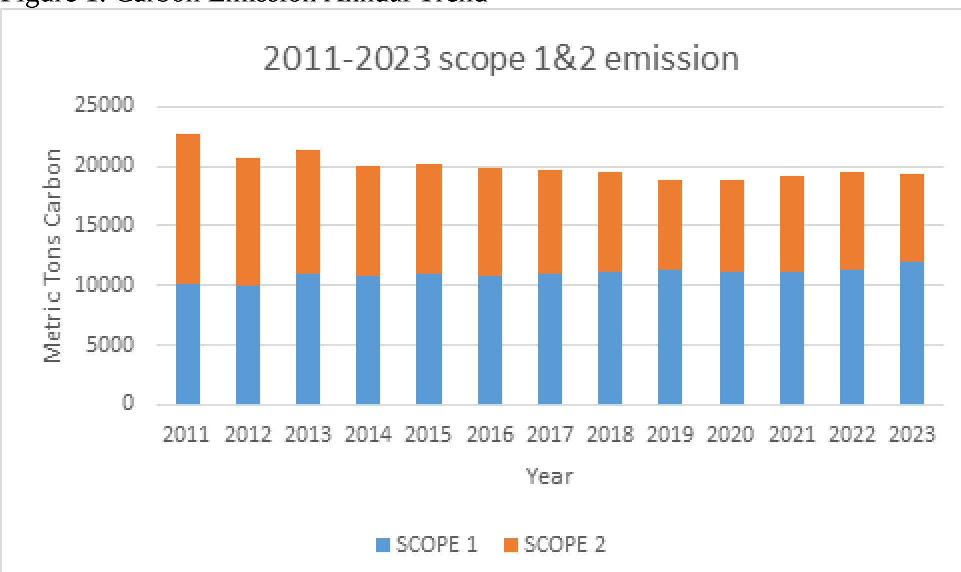
1. Continuously monitoring organizational (scope 1&2) emissions:

The analysis of data to establish the baseline for Scope 1 and 2 GHG emissions began in Feb 2023.

Scope 1 GHG emissions are direct emissions from sources owned or controlled by Southcoast Hospitals, such as burning natural gas on-site for boilers/food service, diesel used to run back-up generators, anesthetic gases emitted during surgery, refrigerant leakage, and gasoline consumed by company-owned vehicles.

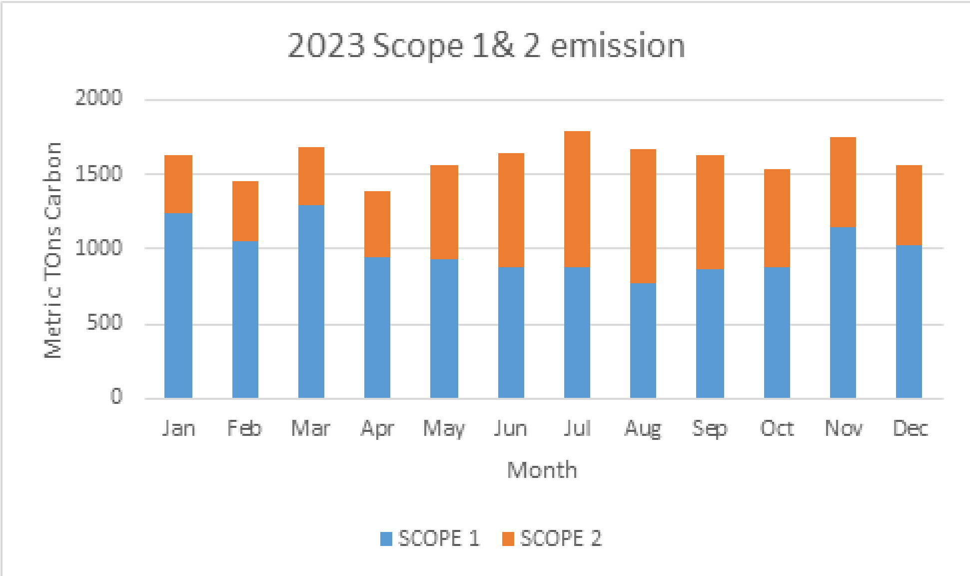
Scope 2 GHG emissions include indirect emissions from the generation of electricity purchased by Southcoast Hospitals from utility companies. By collecting both internal and external data and utilizing publicly available conversion factors (outlined in Appendix A), Southcoast Health has successfully established the annual trend of carbon emissions, illustrated in Figure 1 below.

Figure 1. Carbon Emission Annual Trend



Last year, Southcoast established the baseline year of 2011. 2011 was the highest level of documented GHG emissions at the hospitals equal to 22,761 tons CO2e. To achieve a 50% reduction below baseline (2011), the target set is to lower annual Scope 1 & 2 total GHG emissions by 11,380+ tons CO2e. In 2023, Southcoast Health emitted 19,304 tons CO2e, reflecting a 15% reduction from the 2011 baseline. Southcoast is reviewing opportunities to continue to reduce GHG emissions by an additional 7,924 tons CO2e to achieve the 2030 pledge. We are publishing our data and will publicly account for progress on this goal every year. Southcoast Health initiated the collection of monthly carbon emissions data, starting in 2023 as depicted in Figure 2.

Figure 2. Carbon Emission Monthly Trend 2023



2. Setting up Scope 3 (supply chain) emissions inventory Baseline:

Scope 3 encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them, but by those that are indirectly responsible for up and down its value chain. The Southcoast Health System Supply Chain Strategy & Logistics team had reached out to several major medical supply partners that service the hospitals to request information regarding our scope 3 emissions, category 1: Emissions from purchased good and services. Other categories within scope 3 emissions encompass those related to the purchase of capital goods, sourcing of fuel and energy, upstream and downstream transportation, employee business travel and commuting, leased assets both upstream and downstream, process and use of sold products, waste generated in operation and from sold products, as well as emissions from franchises and investments.

In alignment with the GHG Protocol requirements for Scope 3 emissions, Southcoast Health conducted an initial assessment of all 15 categories to determine their relevance and the availability of corresponding data. Following this assessment, Southcoast Health selected 4 categories (as shown in Chart 1) for a detailed emissions evaluation (Detailed methods in Appendix B) for the calendar year 2022. The total CY22 Scope 3 emissions were 105,236 metric tons.

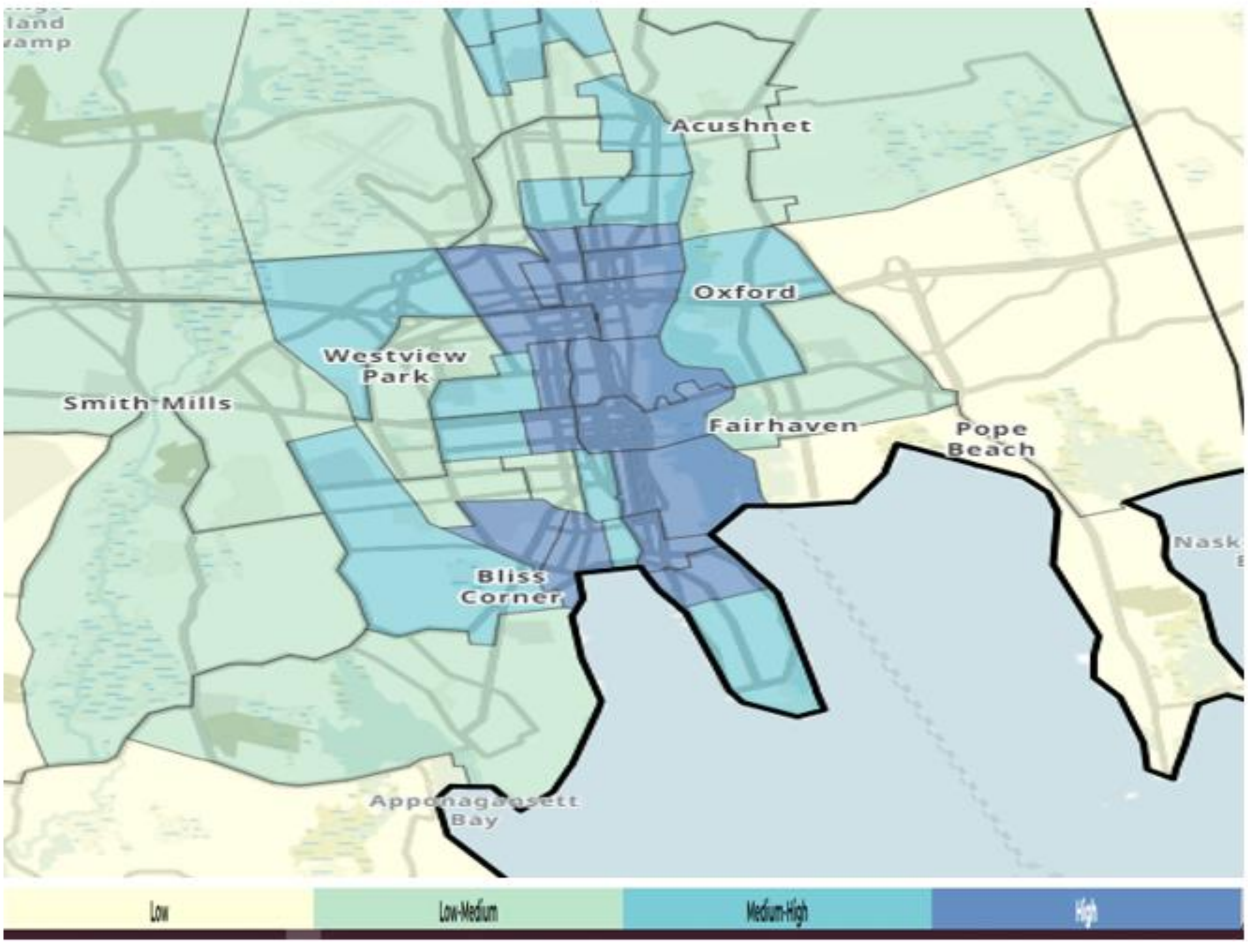
Southcoast Health is planning to collaborate with vendors to reduce supply chain carbon emissions and create a positive community impact. Additionally, Southcoast Health intends to expand its efforts by adding more categories as more data becomes available.

Chart 1. Scope 3 emissions for CY22 (GHG emissions in metric tons)

Category 1-- Purchased Goods and Services	99,129
Category 3-- Fuel- and Energy- Related Activities	3,945
Category 4-- Upstream Transportation and Distribution	1,195
Category 5—Waste Generated in Operation	967
Total	105,236

3. Climate resilience plan for continuous operations and anticipating the needs of groups in their community that experience disproportionate risk of climate-related harm:

Image 1. Example of CDC SVI index around Saint Luke's Hospital



Through a comparison of the CDC SVI (Social Vulnerability Index) and FEMA RAPT (Resilience Analysis and Planning Tool) — illustrated in Image 1 — we have pinpointed the most vulnerable populations surrounding all three hospitals in the face of various climate disasters. Given that our primary climate risks involve flooding and hurricanes, we are currently concentrating our efforts on these specific locations. Subsequently, we conduct on-site visits to precisely map their positions on different streets. Prior to each major disaster, we plan to integrate this street-level data with our internal IT system to de-identify at risk locations and determine the medical resources likely to be needed the most. This strategic approach enables us to proactively order and prepare the necessary resources within the hospitals (Detailed in Appendix C).

Our hospitals are designed with redundant systems to withstand extreme weather events, ensuring their resiliency and functionality for a minimum of 96 hours during such occurrences. Our facilities are resilient to strong winds, with redundant sources for electricity, natural gas, and water supply. Additionally, we maintain enough emergency drinking water and dried food supplies in each hospital. To enhance preparedness, our facility teams are trained for heat wave scenarios, and we conduct extreme weather drills in each hospital at least twice a year. (Detailed in Appendix D).

Conclusion:
Southcoast Health is proud of our accomplishments since signing the pledge. We have completed our 2023 requirements and are moving into 2024 with a solid foundation to achieve our goals.

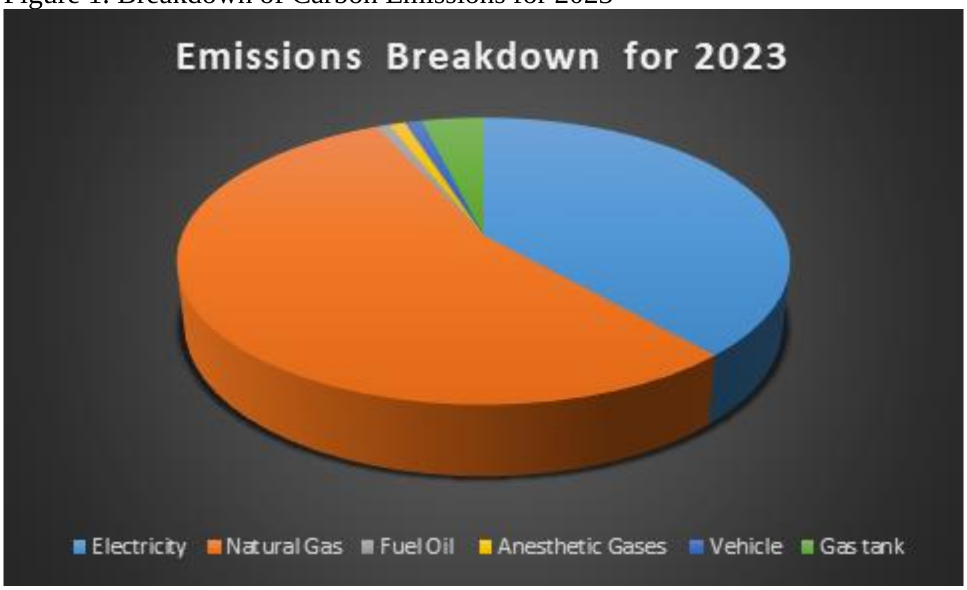
Yunhan Yang
Environmental Sustainability Specialist

Appendix A

This appendix serves as a reference detailing the methodology for collecting our raw data for scope 1 and 2 emissions and the subsequent conversion into carbon dioxide equivalents.

Figure 1 provides a comprehensive breakdown of carbon emissions in 2023. While Electricity is our scope 2 emission, everything else are our scope 1 emissions. It's important to note that for our baseline year of 2011, we initially gathered data for electricity usage and natural gas, progressively incorporating additional categories in subsequent years. Consequently, the emissions for our baseline year are higher than our HHS pledge report.

Figure 1. Breakdown of Carbon Emissions for 2023



Emission Source	Emission in ton	Percentage
Electricity	7406.1868	38%
Natural Gas	10541.9599	55%
Fuel Oil	158.6299	1%
Anesthetic Gases	195.4560	1%
Vehicle	209.6364	1%
Gas tank	744.5073	4%
Refrigerant log	47.7685	0%

1. Terms and Definitions

GWP: Global Warming Potential is the ability of any type of gas to trap extra heat in the atmosphere over time (100 years) relative to carbon dioxide (CO2). Take Methane as an example, with a GWP of 28. This implies that one pound of Methane has the equivalent heat-trapping ability as 28 pounds of Carbon Dioxide. Most of the GWP comes from IPCC 5TH edition, chapter 8. (AR5)
(https://www.ipcc.ch/report/ar5/wg1/)

Emission Factors: for a given unit (J, Kwh, ton, gallons) of energy source (Electricity, diesel, natural gas), how much CO2 equivalent does it emit.

The distinction between GWP and Emission factors lies in their focus: GWP typically measures a specific gas type, whereas Emission factors generally measure a specific fuel type. Most emission factors comes from GHG Protocol: Cross Sector Tools.
(https://ghgprotocol.org/calculation-tools-and-guidance)

The source of historical emissions factor for our electricity and natural gas use is Energy Star. Specifically, our region is NEWE.
(https://www.energystar.gov/buildings/tools-and-resources/historical_greenhouse_gas_factors_2000_2022)

1. Electricity Carbon Emissions (Scope 2)

We obtain electricity data directly from our utility bills provided by the utility provider. Additionally, we record this usage in the Energy Star Portfolio Manager and extract the information from there. To calculate the total electricity consumption for a given facility, we sum up all electricity bills for that specific location and apply the emission factor from Energy Star relevant to the corresponding year.

Example: We extract year ending at December, 2022 from Energy Star Portfolio Manager for SLH (Image 1). We added all 3 meters up and found that emission factors for the year of 2022 is 70.8515 kg CO2eq/ MMBtu.

Image 1. Energy Star energy usage example

Year Ending Date	101 Page Main - 1634-303-0017 (kBtu)	101 Page Parking - 1223-444-0019 (kBtu)	101 Page Starbuck Lot - 1223-4485-0018 (kBtu)
12/31/2022	46407516.39	8372.61	13234.27

Calculation:
(46407516.39 kBtu +8372.61 kBtu +13234.27 kBtu) / (1000 kBtu/ MMBtu) *(70.8515 kg CO2eq/ MMBtu) / (1000kg/ ton) = 3289.57 ton.
Meaning that for the entire year of 2022, SLH electricity indirect emission is 3289.57 ton of CO2e.

2. Natural Gas Carbon Emissions (Scope 1)

Our facility uses natural gas for boiler, cooking and sterilization.
Like electricity data, we also get our natural gas data directly from our utility bills provided by the utility provider. For data on Natural gas from previous years, our facility team archived it in their documentation, and we utilize this information to compute emission factors. We aggregate all usage within the same facility for the calculation. Subsequently, we obtain emission factors also from Energy Star.

Example: On January, 2023, our 2 natural gas bills for TOH indicate we use 3287+27 MMBtu of natural gas. We found that the emission factor for the natural gas is 53.1148 kg CO2e/ MMBtu (the emission factors for natural gas does not fluctuate on an annual base) (see image 2).

Image 2. Emission factors for Natural Gas Combustion from Energy Star US emissions Factors

US Emissions Factors (kg CO2eq/MBtu)

Fuel Type	Subregion	2022
Direct GHG Emissions		
Natural Gas		53.1148

Calculation:
(3287 MMBtu+ 27 MMBtu) * (53.1148 kg CO2e/ MMBtu)/ (1000kg/ ton) = 176.022 ton
In essence, in January 2023, TOH emitted 176.022 tons of CO2e through on-site combustion of natural gas.

3. Company Owned Vehicles Emissions (Scope 1)

Our facility owns vehicles are used for maintenance, daily operations, security, and carrier services. We compile the dollar amounts from both carrier service records and accounts payable for fuel card usage in other vehicles. These figures are aggregated on a monthly basis, considering that three carrier service vehicles use a fuel card while the rest utilize a charging service from a local gas station. To prevent double counting, we subtract the fuel card usage of these three vehicles. Subsequently, we determine the monthly average regular gas price for Massachusetts from the EIA website (https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPMR_PTE_SMA_DPG&f=M) to calculate the amount of fuel used per month (in gallons). The emissions are then calculated using the GHG Cross-Section Tool and AR5.

Example:

a. In June 2023, we collect monthly fuel $ cost from both account payable (Image 3 left, note that the blank is the amount we already paid for fuel card, so the total cost of vehicle is Grand Total + blank) and Carrier service (Image 3 right). We also collect from EIA website that in that month the average price for regular gasoline is $3.501 / Gallon. Again, to avoid double counting, we need to minus courier veh9,14,15 from the left side.

Calculation:
($137.85+$3991.83-$331.9-$442.28-$288.76+$3737.87) / ($3.501 / Gallon) = 1943.6 Gallon

Image 3. Example for raw data for company owned vehicle on June 2023 (left from AP and right from carrier service)

Row Labels	Sum of Billed Amount
CATERING CHEVVAN	32.07
CMH SECURITY	89.52
COURIER VEH14	288.76
COURIER VEH15	442.28
COURIER VEH9	331.9
FAC 08GMC	788.6
FAC 11CANYON	24.4
FAC 11CANYON1GT	44.66
FAC 11TOY	395.6
FAC 12FORDF250	40
FAC CAMARA	334.78
FAC GIFFORD	418.89
FAC LAVOIE	360.01
FAC LEBLANC	65.83
SLH SECURITY	276.59
TOH SECURITY	195.79
(blank)	-3991.83
Grand Total	**137.85**

Monthly Totals			
$487.38	$388.26	$358.01	$366.28
March 2023	April 2023	May 2023	June 2023
$4,636.75	$3,741.17	$3,585.92	$3,737.87

b. Above equations shows on June 2023, we use 1943.6 Gallon of Regular Fuel, to transfer the usage to Carbon Emissions, we collect emission factors from GHG Cross-Sector- Tools (Image 4). The Image shows for 1 gallon of gasoline combustion, there will be 8.81 kg CO2 emission, 0.33075 g of CH4 emission and 0.17775 g of N2O emission. Because there are CH4 and N2O emissions, we also use AR5 GWP Values (28 for CH4 & 265 for N2O)

Image 4: emission factors for gasoline combustion from GHG Cross-Sector- Tools

Table 12. CO2 Emission Factors by Fuel

Fuel	Region	CO2	CO2 - Biomass Fuel	CO2 Unit - Numerator	CO2 Unit - Denominator
Gasoline/Petrol	US	8.81		Kilogram	US Gallon

Table 13. CH4 and N2O Emission Factors by Fuel

Transport and Fuel	Region	CH4	CH4 Unit - Numerator	CH4 Unit - Denominator	N2O	N2O Unit - Num	N2O Unit - Denominator
Passenger Car - Gasoline - Year 2005-present	US	0.33075	Gram	US Gallon	0.17775	Gram	US Gallon

Calculation:
1943.6 Gallon * ((8.81kg CO2+ 0.00033075 kg CH4 * 28 CO2/ CH4+ 0.00017775 kg N2O * 265 CO2/ N2O)/ Gallon) / (1000kg/ ton) = 17.23 ton
So in June 2023, our company owned vehicle emit 17.23 ton of CO2.

Southcoast Progress:
By continuously tracking trends over the past three years, we observed a reduction in carbon emissions related to this category by more than 18%, decreasing from 147 tons in 2020 to 121 tons in 2023. (Figure 2)

Figure 2. Vehicle related carbon emission trend for 2020-2023

4. Fuel Oil (for equipment) Carbon Emissions (Scope 1)

Our facility employs No. 2 Fuel Oil as an emergency backup fuel source, serving as an alternative for boiler when natural gas been cut and energy source for emergency generators when electricity down, although they are stored separately. We procure the fuel when tank levels are low, and we monitor the quantity purchased from each supplier as the foundation for calculating carbon emissions. We obtain emission factors from GHG Cross- Sector Tools.

Example and Calculation: Same as Vehicle Emissions Part b

5. Anesthetic Gas Carbon Emissions (Scope 1)

Anesthetic gas plays a crucial role in surgeries, but it comes with significantly high Global Warming Potentials (GWPs): 491 for isoflurane, 1790 for desflurane, and 216 for sevoflurane (from AR5). Notably, desflurane is ten times worse than sevoflurane, prompting a concerted effort to minimize its usage in recent years. Despite this reduction, complete elimination remains challenging due to specific surgical conditions. Each month, our anesthetic gas supplier, McKesson, provides a shipping record. Using this information, along with the GWP and density data, we calculate carbon emissions on a monthly basis.

Example: On January 2023, McKesson sent us a monthly report, after summarized the data, we had the following info: for CMH, we purchased 84 bottles of 250 ml sevoflurane and 1 set of 100ml*6 of isoflurane (Image 5). The density for isoflurane is 1.496 g/ml and for sevoflurane is 1.505 g/ml.

Image 5: Jan.2023 CMH anesthetic gas purchase history

2023	1	sevoflurane (250ml)	00074445604	
		sevoflurane (250ml)	66794001525	84
		desflurane (240ml*6)	10019064134	
		isoflurane (100ml*6)	10019036040	1
		sevoflurane (250ml*6)	10019065164	
		isoflurane (100ml)	66794001710	

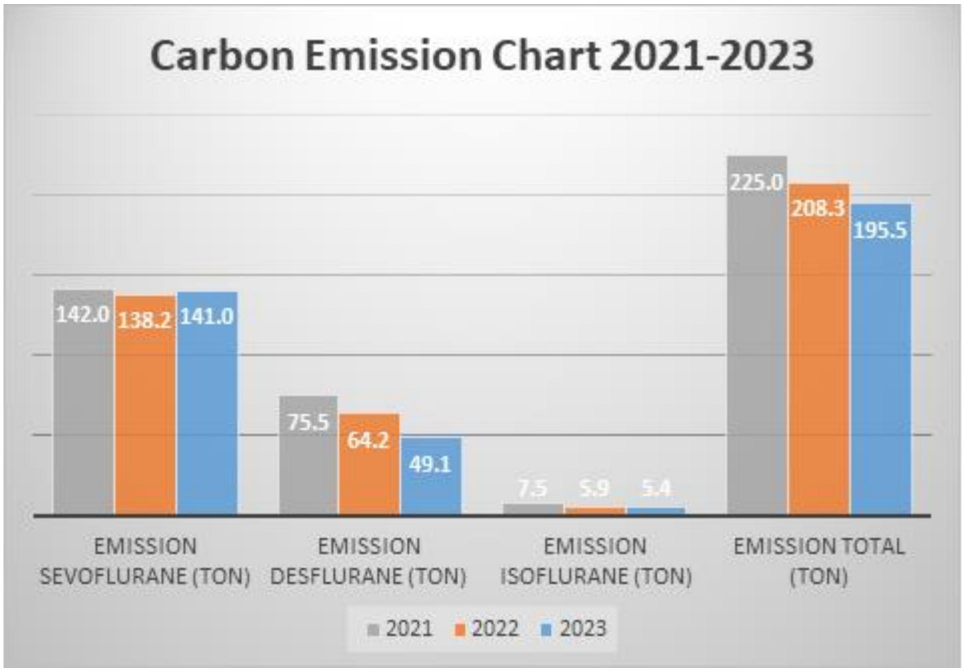
	isoflurane	desflurane	sevoflurane
density(g/ml)	1.496	1.465	1.505
gwp	491	1790	216

Calculation:
84 Sevo*250ml*(1.505g/ml)*(216CO2/Sevo)/ (1,000,000g/ton) + 1 Iso * 100ml * 6 * (1.496g/ml) * (491 CO2/ ISO)/ (1,000,000 g/ ton) = 7.27 ton
For Jan.2023, CMH emit 7.27 ton CO2e from Anesthetic gases usage.

Southcoast Progress:

By continuously tracking trends over the past three years, we observed a reduction in carbon emissions related to this category by more than 10%. Notably, for the most environmentally harmful Desflurane, we reduced its use and associated carbon emissions by over 30% (see Figure 3).

Figure 3. Emission relates to flurane for 2021-2023



6. Gas tank Carbon Emissions (Scope 1)

We procure our gas tanks from the supplier Airgas, comprising two types: CO_2 gas tanks for dry ice production and N_2O gas tanks primarily used in the anesthetic process alongside flurane. Like the calculation process for anesthetic gas carbon emissions, Airgas provides us with a monthly purchase invoice to facilitate the tracking of carbon emissions associated with these gas tanks.

Example and Calculation: Same as anesthetic gas calculation without density conversion as the data is already in weight-based measurements.

7. Refrigerant Leakage Carbon Emissions (Scope 1)

Within our facility, refrigerants are present in both refrigerators and air conditioning units, and the leakage from these equipment poses significant harm to the environment. To quantify the carbon emissions linked to refrigerant leakage, we've established a shared online documentation accessible to facility managers across all three hospitals. Whenever a refrigerant refill occurs, we record the amount refilled, assuming it equals the amount lost to the atmosphere. This information, combined with the Global Warming Potential (GWP) for each refrigerant (https://ww2.arb.ca.gov/resources/documents/high-gwp-refrigerants), is then utilized in our calculations.

Example and Calculation: Same as anesthetic gas calculation without density conversion as the data is already in weight-based measurements.

8. Metered-Dose Inhaler (MDI) Carbon Emissions (Scope 1)

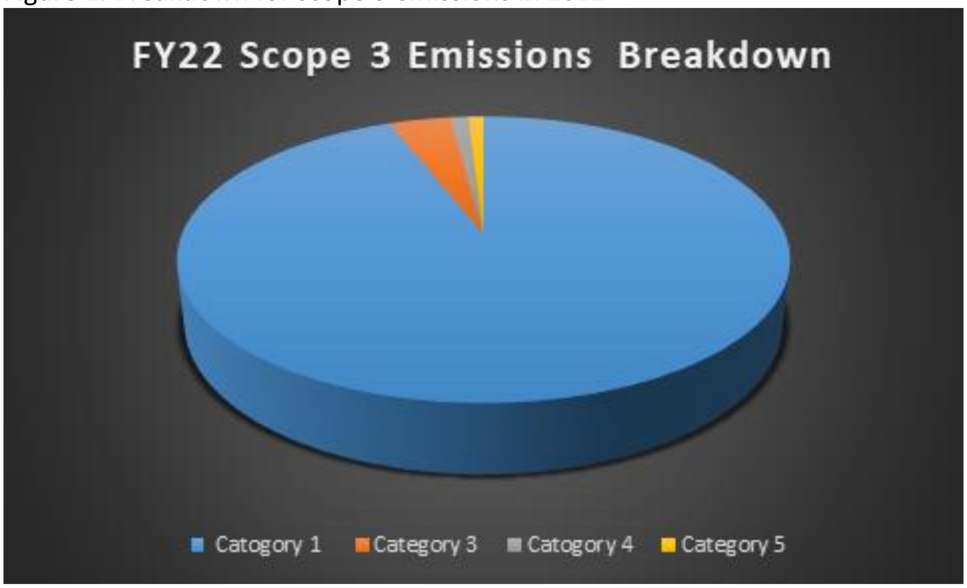
Metered Dose Inhalers (MDIs) play a crucial role in asthma treatment. The propellants in MDIs often contain anesthetic gases, contributing to global warming when used. Despite our inquiries to various manufacturers regarding the specific amounts of anesthetic gases in each MDI, none have been willing to disclose this information yet. We do, however, have purchase data available, so once manufacturers are open to revealing the details, we'll be able to calculate the carbon emissions associated with MDIs.

Appendix B

This appendix serves as a reference detailing the methodology for collecting our raw data for scope 3 emissions and the subsequent conversion into carbon dioxide equivalents.

Figure 1 provides breakdown for scope 3 emissions in 2022. As the first year of conducting scope 3 emissions, Southcoast Health collected 4 categories that most relevant to us and have data available. We could potentially add more scope 3 categories in future years, including Business Travel, Employee Commuting and Upstream leased assets.

Figure 1. Breakdown for scope 3 emissions in 2022



Category 1-- Purchased Goods and Services	99,129 Metric tons
Category 3-- Fuel- and Energy- Related Activities	3,945 Metric tons
Category 4-- Upstream Transportation and Distribution	1,195 Metric tons
Category 5—Waste Generated in Operation	967 Metric tons
Total	105,236 Metric tons

Terms and Definitions:

GWP: Global Warming Potential is the ability of any type of gas to trap extra heat in the atmosphere over time (100 years) relative to carbon dioxide (CO2). Take Methane as an example, with a GWP of 28. This implies that one pound of Methane has the equivalent heat-trapping ability as 28 pounds of Carbon Dioxide. Most of the GWP comes from IPCC 5TH edition, chapter 8. (AR5)
(https://www.ipcc.ch/report/ar5/wg1/)

Emission Factors: for a given unit (J, Kwh, ton, gallons or $ amount) of energy source (Electricity, diesel, natural gas), how much CO2 equivalent does it emit.

Primary and Secondary Data: Primary data consists of information provided by suppliers or other value chain partners, related to specific activities within the reporting company's value chain. This data may include primary activity data or emissions data calculated by suppliers based on their specific activities. Secondary data encompasses industry-average data (e.g., from published databases, government statistics, literature studies, and industry associations), financial data, proxy data, and other generic information. We always looking for primary data first when collecting scope 3 Emissions.

Proxy Data: Proxy data can be extrapolated, scaled up, or customized to better represent a given activity. For instance, if we collect data on 80% of our purchased goods' Scope 3 carbon emissions, we could assume the remaining 20% have the same emission factor to fill the gap.

Category 1-- Purchased Goods and Services

This category includes all upstream emissions from purchased goods (tangible products) and services (intangible products). For purchased goods, this encompasses all emissions related to the sourcing of raw materials, transportation from sourcing sites to factories, and production processes (cradle-to-gate). For purchased services, this includes all emissions related to the production of products that support the services provided.

Southcoast Health gathered 2022 spending breakdown by different suppliers. Then we reached out to three of our largest suppliers to obtain product-specific emission factors (cradle-to-gate emission factors for specific products). However, after discussions, we realized they do not have product-specific data available now. Therefore, we used the following 1A and 1B methodologies to gather our category 1 emissions data for our largest 45 suppliers (which consist 75% of our annual spending)

1A- Suppliers that have publicly available scope 1, 2&3 emissions.

The methodology proposed aims to allocate carbon emissions to buyers in proportion to their spending on a supplier. This approach ensures that every buyer is accountable for the same amount of carbon emissions per dollar spent.

As sustainability becomes increasingly critical, many companies now report their Scope 1, 2, and 3 emissions in their sustainability reports. We reviewed the websites of our top 45 suppliers to identify those that disclose their carbon emissions, particularly those related to our upstream emissions (market-based Scope 1 and 2, and Categories 1, 4, and 5 of Scope 3 emissions).

For suppliers that provide relevant emissions data, we aggregate their reported emissions and refer to their financial reports to obtain their total revenue. By dividing the total emissions by the total revenue, we calculate the carbon emissions factor (typically measured in kg CO_2 per dollar or ton CO_2 per million dollar). We then multiply this emissions factor by our annual spending with each specific supplier to determine the amount of carbon emissions for which we are responsible.

Example: For 2022, our largest supplier was McKesson, with an expenditure of approximately $87.5 million. Their impact report provides the following emissions data (Table 1. McKesson Carbon Emission):

Table1. McKesson Carbon Emission

GHG emissions in metric tons	FY23
Scope 1	79,292
Scope 2 (market-based)	141,303
Scope 3, Category 1	31,310,812
Scope 3, Category 4	546,464
Scope 3, Category 5	10,878
Total	32,088,749

We also found that McKesson's FY 2023 financial report indicates an annual revenue of $276,711 million. Using this data, we follow these steps to calculate our Southcoast Allocation of carbon emissions.

Calculation:
Emission factors= total emissions/ total revenue = 32,088,749 ton/ $276,711 million = 116 ton CO_2/ million $.
Southcoast Health responsible emission= Emission factor * Annual spending= 116 ton CO_2/ million $ * 87.5 million $ =10147ton CO_2.

1B- Suppliers does not have publicly available scope 1, 2&3 emissions.

Since some of our suppliers do not disclose their carbon emissions, we use secondary data to fill the gap. This time, we chose the widely used US Environmentally Extended Input-Output (EEIO) data. Specifically, within the US EEIO data, we picked the "supply chain emission factors for US industries and commodities," which align with the category 1 (cradle-to-gate) emission factor definition. This data combines environmental and economic information to determine the per dollar carbon emissions for specific industries or commodities.

Given that our spending breakdown identifies the industries we purchase products and services from, but not the specific commodities, we used the most recent "detailed industry data."

The supply chain industry emission factors are classified by NAICS 6-digit industry codes. First, we identify our suppliers' 6-digit industry codes and then locate the corresponding supply chain emission factors. These emission factors indicate the average emissions per dollar for a specific industry, regardless of the company. We then multiply the emission factor by the amount spent with each supplier to calculate the carbon emissions we are responsible for. The final step is to adjust the emissions for inflation using the Consumer Price Index (CPI), since the dollar value diminishes with inflation, and accordingly, the carbon emissions corresponding to the dollar value also decrease.

We apply this EEIO methodology to some of our goods suppliers and all our services suppliers.

For a more detailed explanation of why we chose USEEIO supplier emission factors, refer to the following video link by the author of USEEIO data.
(https://www.youtube.com/watch?v=pJ8gvZPdcgc&t=1029s)

Example:

For CY 2022, our largest service supplier was Automatic Data Processing (ADP), with expenditures of approximately $108 million. Since ADP does not report their carbon emissions, we used industry-specific emission factors to estimate their emissions. We identified ADP's NAICS code as 518200 (see Image 1). To find the corresponding supply chain emission factors, we used the most recent year available, 2016, from detailed industry data (see Image 2). This data includes not only carbon dioxide but also methane, nitrous oxide, and other greenhouse gases (GHGs).

To calculate carbon emission equivalents (CO2e), we applied emission factors of 28 for methane and 265 for nitrous oxide, like scope 1 emissions. We then multiplied the CO2e by our annual spending to determine the annual emissions.

Since the 2016 detailed commodity data was based on 2018 dollar values, we needed to adjust for inflation because the same amount of dollars spent in 2022 has less purchasing power than in 2018, meaning fewer goods were purchased for the same amount. We used the Consumer Price Index (CPI), where the CPI value for December 2018 was 251 and for December 2022 was 297. We used the ratio of these CPI values to adjust the carbon emissions we are responsible for.

Calculation:

For industry 518200 (which include 518210), the carbon equivalent emission factor per dollar = carbon dioxide emission factor + methane emission factor + Nitrous oxide emission factors + other GHGs emission factor = 0.152kg +0.001kg * 28 kg co2e/ kg methane + 0 kg co2e/ kg Nitrous oxide + 0.008 kg= 0.188kg/$.

We spent 108 million dollars, so total emission we responsible for was:
108$ * 10^6 * 0.188 kg/$ * 1ton/ 1000kg = 20304 ton CO2e

Finally, we adjust inflation: 20304 ton CO2e *251/297= 17159 ton co2e.

Summary: We combined all carbon emission data for our top 45 supplier using 1A and 1B methods, resulting 74149 ton. As these 45 suppliers represent 74.79 % of our total CY 22 spending, scaled up to 100% assuming the remaining supplier have the same emission factors.

Calculation: 74149-ton CO2e / 74.79%= 99129 ton CO2e.

Image 1. ADP NAICS code

Unique Site ID: 00-191-5172	
Company Name: Automatic Data Processing Inc	**Tradestyle:** ADP
Top Contact: Restricted	**Title:** Restricted
Street Address: 1 ADP Blvd Ste 1 # 1, Roseland NJ 07068	
Phone: Restricted	
URL: www.adp.com	
Total Emps: 56,000	**Emps On Site:** 1,500
Sales Volume: $15,005,400,000	
Public/Private: Public	**Year Started:** 1949
Lat:	**Long:**
NAICS 1: 518210	Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services
NAICS 2:	
SIC 1: 73749902	Data processing service
SIC 2:	
Number of Locations: 317	
Date of Report: 2022-07-01	

Image 2. Emission Factors for ADP's industry

1254	518200	Data processing, hosting, and related services	carbon dioxid	kg/2018 USD, purchaser price	0.152
1255	518200	Data processing, hosting, and related services	methane	kg/2018 USD, purchaser price	0.001
1256	518200	Data processing, hosting, and related services	nitrous oxide	kg/2018 USD, purchaser price	0
1257	518200	Data processing, hosting, and related services	other GHGs	kg CO2e/2018 USD, purchaser pr	0.008
1258	519130	Internet publishing and broadcasting and Web search portals	carbon dioxid	kg/2018 USD, purchaser price	0.12
1259	519130	Internet publishing and broadcasting and Web search portals	methane	kg/2018 USD, purchaser price	0
1260	519130	Internet publishing and broadcasting and Web search portals	nitrous oxide	kg/2018 USD, purchaser price	0
1261	519130	Internet publishing and broadcasting and Web search portals	other GHGs	kg CO2e/2018 USD, purchaser pr	0.003
1262	5191A0	News syndicates, libraries, archives and all other information services	carbon dioxid	kg/2018 USD, purchaser price	0.096
1263	5191A0	News syndicates, libraries, archives and all other information services	methane	kg/2018 USD, purchaser price	0
1264	5191A0	News syndicates, libraries, archives and all other information services	nitrous oxide	kg/2018 USD, purchaser price	0

... 2013_Detail_Commodity | 2012_Detail_Commodity | 2011_Detail_Commodity | 2010_Detail_Commodity | **2016_Detail_Industry** | 2015_Detail_Industry

Category 3-- Fuel- and Energy- Related Activities

This category includes all emissions related to fuel and energy, excluding the combustion part of the energy, which is already included in our Scope 1 and Scope 2 emissions. Specifically, for Southcoast, our Category 3 emissions pertain to upstream carbon emissions related to electricity and natural gas. This includes the extraction, production, and transportation (which also called WTT, or well – to - tank) of fuels. For electricity, there is an additional Transmission and Distribution (T&D) loss.

We do not include natural gas T&D loss because it is already accounted for in our Scope 1 emissions. This is evidenced by our natural gas bills, which always include "line loss" when calculating our natural gas consumption basis.

As our utility supplier does not report upstream emission factors, we follow the GHG protocol and use secondary data. A widely used data source is from the UK Government, which can be accessed at the following link: (https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023). This report has all emission factors we need to include upstream emissions.

Example:

The UK report had all emission factors in kWh, so we made some unit conversion for natural gas. Last year, Southcoast consumed a total of 56 million kWh of natural gas and 33 million kWh of electricity.

As US typically use Gross CV, the WTT emission factor for natural gas fall under 0.03 kg CO_2e/ kWh (Image 3).

The T&D lost emission factor for electricity fall under 0.018 kg CO_2e (Image 4) and WTT emission factor for electricity is 0.05 kg CO_2e (Image 5). Note that the WTT emission factor include both electricity we consume on site and electricity lost during T&D.

Calculation:

WTT emission for natural gas= natural gas WTT emission factors * annual consumption = 0.03 kg CO_2e / kWh * 56,000,000 kWh * 1ton/1000kg = 1693 ton CO_2e.

T&D emission factor for electricity= electricity T & D lost emission factors * annual consumption 0.018 kg CO_2e/ kWh * 33,000,000 kWh * 1 ton/ 1000 kg= 595 ton CO_2e

WTT emission for electricity= electricity WTT emission factors * annual consumption = 0.05 kg CO_2e/ kWh * 33,000,000 kWh * 1 ton/ 1000 kg= 1657 ton CO_2e

Total= WTT emission for natural gas+ T&D emission factor for electricity + WTT emission for electricity = 1693 ton + 595 ton +1657 ton = 3495 ton
Note: some numbers are rounded due to simplification.

Image 3. WTT natural gas

Activity	Fuel	Unit	kg CO_2e
Gaseous fuels	Butane	tonnes	344.30947
		litres	0.19765
		kWh (Net CV)	0.02736
		kWh (Gross CV)	0.02524
	CNG	tonnes	530.77887
		litres	0.09289
		kWh (Net CV)	0.04198
		kWh (Gross CV)	0.03789
	LNG	tonnes	912.22817
		litres	0.41277
		kWh (Net CV)	0.07214
		kWh (Gross CV)	0.06512
	LPG	tonnes	349.29282
		litres	0.18551
		kWh (Net CV)	0.02736
		kWh (Gross CV)	0.02548
	Natural gas	tonnes	423.16368
		cubic metres	0.33660
		kWh (Net CV)	0.03347
		kWh (Gross CV)	0.03021

Image 4. T& D lost electricity

Activity	Type	Unit	Year	kg CO_2e	kg CO_2e of CO_2 per unit	kg CO_2e of CH_4 per unit	kg CO_2e of N_2O per unit
T&D- UK electricit y	Electricity: UK	kWh	2023	0.01792	0.01773	0.00008	0.00011

Image 5. WTT electricity

Activity	Country	Unit	Year	kg CO_2e
WTT- UK electricity (generation)	Electricity: UK	kWh	2023	0.0459

Activity	Country	Unit	Year	kg CO_2e
WTT- UK electricity (T&D)	Electricity: UK	kWh	2023	0.00397

Category 4: Upstream Transportation and Distribution

This category pertains to the upstream transportation of the products we purchase, specifically the emissions from the factory gate to the Southcoast gate. This is known as the "Gate-to-Gate" emission factor and corresponds to the "Margins of Supply Chain Emission Factors" within the USEEIO data described in Category 1, Method 1B. We use the same calculation methodology as in Category 1B for this category. Note that there are no upstream transportation emissions for our service suppliers.

Category 5: Waste Generated in Operation

This category measures the emissions generated related to the waste we produce daily. It includes emissions from transportation from our facility to the waste disposal facility, emissions related to sorting, the equipment used at the facility, and the actual disposal process emissions.

We obtained our annual waste pickup tonnage from different vendors (Table 2), which includes six different types of waste streams. Since our waste hauler does not disclose the corresponding emission factors, we need to use secondary data to fill this gap. For this, we selected the US EPA GHG Emission Factors Hub, Table 9.

To properly use this table, we need to know the disposal method for each waste stream and the type of waste we generated. By contacting some of the vendors, we obtained information on the disposal methods. However, for the solid waste stream and universal waste, we used the average disposal method from the “2021 Mass Solid Waste Data” (Image 6). Additionally, since we have not conducted a waste audit yet, we do not know the composition of our waste streams, so we used the "mixed MSW" as our waste material type.

Example:

In this example, we calculate the emissions related to the Municipal Solid Waste (MSW) we generated in CY 2022. We produced 1,728.4 tons of MSW. Since we do not know the exact disposal method, we used the average disposal rate from Figure 6. In 2021, Massachusetts landfilled 490,000 tons (13.8%) of MSW and combusted 3,060,000 tons (86.2%) of MSW. We assumed the same ratio applies to our MSW.

We then used the corresponding EPA emission factors for mixed MSW: 0.58 for landfilled and 0.43 for combusted (Image 7). Note that these units are in ton CO2e per short ton of waste. Therefore, we need to convert our waste generated from tons to short tons using a conversion factor of 1.1 short tons per ton.

Calculation:
Amount we generated went to landfill= MSW total * % of Mass average landfilled waste * short ton conversion factor= 1728 ton * 13.8 % * 1.1 short tons/ ton =262 short ton

Amount we generated went to combustion= MSW total * % of Mass average combusted waste * short ton conversion factor= 1728 ton * 86.2 % * 1.1 short tons/ ton =1638 short ton

Carbon emission relate to MSW went to landfill= weight went to landfill * landfill emission factor= 262 short ton * 0.58 ton CO2e/ short ton = 152 ton CO2e

Carbon emission relate to MSW went to combustion= weight went to combustion * combustion emission factor= 1638 short ton * 0.43 ton CO2e/ short ton= 704 ton CO2e

Total emissions relate to mixed MSW = Carbon emission relate to MSW went to landfill+ Carbon emission relate to MSW went to combustion = 152 ton + 704 ton = 856 tons of CO2e

Table 3 provides a detailed breakdown of carbon emissions for each waste stream. Note that some proxy data has been used for this example, resulting in slight differences.

Table 2. CY 22 waste generated in different waste stream.

Waste Stream Type	Tons of waste generated	Disposal Method
Regulated Medical waste	176.6	Combusted
Municipal Solid Waste	1728.4	Unknown
Recycling: Cardboard & mixed	216.39	Recycled
Hazardous Waste	3.50386	Combusted
Pharma Waste	1.648675	Combusted
Universal Waste	0.431	Unknown
Total	2126.9735	

Image 6. Massachusetts 2021 solid waste data update

Table 3 Solid Waste Disposal 2018-2021 (all data in tons)

			2018	2019	2020	2021
Disposal			**5,660,000**	**5,510,000**	**5,920,000**	**6,220,000**
	Landfill		1,270,000	880,000	660,000	600,000
		MSW	1,190,000	820,000	570,000	490,000
		C&D	0	0	-	-
		Other	70,000	60,000	90,000	110,000
	Combustion		**3,200,000**	**2,990,000**	**3,040,000**	**3,060,000**
		MSW	3,180,000	2,970,000	3,020,000	3,060,000
		Non-MSW	20,000	10,000	20,000	10,000
	Net Exports		**1,190,000**	**1,640,000**	**2,220,000**	**2,570,000**
		Exports	1,820,000	1,970,000	2,470,000	2,920,000
		MSW	750,000	820,000	1,040,000	1,050,000
		Non-MSW	1,070,000	1,140,000	1,430,000	1,870,000
		Imports	630,000	330,000	250,000	360,000
		MSW	610,000	310,000	240,000	300,000
		Non-MSW	20,000	20,000	10,000	50,000

Image 7. Mixed MSW emission factors from EPA hub, table 9

	Metric Tons CO_2e / Short Ton Material					
Material	Recycled[A]	Landfilled[B]	Combusted[C]	Composted[D]	Anaerobically Digested (Dry Digestate with Curing)	Anaerobically Digested (Wet Digestate with Curing)
Mixed Plastics	0.22	0.02	2.34	NA	NA	NA
Mixed Recyclables	0.09	0.75	0.11	NA	NA	NA
Food Waste	NA	0.68	0.05	0.11	NA	NA
Mixed Organics	NA	0.54	0.05	0.13	NA	NA
Mixed MSW	NA	0.58	0.43	NA	NA	NA
Carpet	NA	0.02	1.68	NA	NA	NA

Table 3. Detailed breakdown of category 5 emissions for each waste streams

Waste Stream Type	Tons of CO2e associated with this Waste Stream
Regulated Medical waste	84
Municipal Solid Waste	859
Recycling: Cardboard & mixed	21
Hazardous Waste	2
Pharma Waste	1
Universal Waste	0
Total	967

Appendix C

Preparation for More Vulnerable Community

1. Southcoast Leadership will assess weather conditions to determine their severity and anticipated duration.
2. Collaborate with our internal team to de-identify patients residing in vulnerable communities by cross-referencing their addresses with the list of identified vulnerable communities.
3. Determine the specific medication and supplies required by these de-identified patients on a regular basis. Calculate the necessary quantities based on the severity and expected duration of severe weather events.
4. Procure the identified medications and supplies exclusively for vulnerable communities and ensure proper storage.
5. Distribute the medications to patients when they visit the hospital before, during, and after severe weather events.
6. Following severe weather events, assess the remaining medication and supplies and adjust future orders accordingly to minimize excess inventory.

Appendix D

Climate resilience plan for continuous Hospital operations:

1. Wind Endurance: Our hospitals are designed to withstand winds of at least 75 mph.
2. Power Reliability: We maintain two independent electrical feeds as redundant power sources. In the event of both feeds being disrupted, we have backup generators fueled by diesel stored in tanks, ensuring a minimum of 96 hours of sustained power. Regular weekly testing of generators is a part of our operational protocol.
3. Natural Gas Resilience: If natural gas supply is compromised, our boilers can seamlessly switch to heating oil stored in on-site tanks across all our hospitals. The stored heating oil is sufficient for a minimum of 96 hours.
4. Water Security: Our hospitals are equipped with multiple cross-connected water feeds. In the event of a complete water loss, contingency plans involve the use of large tanker trucks to replenish boiler water and the provision of buckets for toilet flushing. Additionally, we store a minimum of 96 hours' worth of drinking water for patients and dehydrated food in specified areas.
5. Food Sustainability: Each hospital maintains a reserve of dehydrated food, adequate for all patients, with an expiration date set 50 years in the future.
6. Heat Wave Preparedness: Anticipating heat waves exceeding 90 degrees, our HVAC team proactively adjusts the HVAC systems for efficient cooling.
7. Extreme Weather Drills: Annually, our Office of Emergency Management conducts at least two drills in each of our hospitals in collaboration with our hospital partners, addressing various topics related to extreme weather events.
8. Our list of partners: Wareham Fire Department, Wareham Police Department, Wareham Emergency Management Agency, Wareham Health Department. Marion Fire Department, Onset Fire Department, UMass Dartmouth Nursing Program, Brewster Ambulance, & Wareham EMS.

   In the case of severe weather, we follow Annex M & SP-1 for Stand-by, Activation, and Stand-Down Procedure.