Southcoast Health System Inc.

Health and Human Services Environmental Pledge Report

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NOVEMBER 14, 2023

Southcoast® Health

About Southcoast Health System Inc:

Southcoast Health System was incorporated as a not for profit entity in 1996 through the merger of Charlton Memorial Hospital in Fall River, St. Luke's Hospital in New Bedford, and Tobey Hospital in Wareham. All three hospitals are located in Southeastern Massachusetts. Today, Southcoast Health is one of the largest employers in the region with over 7,500 employees.

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.

On June 3, 2022, Southcoast Health signed the Healthcare Sector pledge form consistent with Executive Order 14507. The following report demonstrates Southcoast Hospitals Group's compliance to the 2023 requirements of the HHS pledge.

With gratitude,

Nicole Rosa, LEED AP BD&C, CHC

Director, Real Estate Design, Development & Sustainability

Southcoast Health HHS Pledge Report 2023

0. Signing the Pledge:

On June 3, 2022, Southcoast Health signed the Health Sector Climate Pledge from the White House and HHS (Health and Human Services) (Appendix A). Southcoast pledged to produce a climate resilience plan anticipating the needs of groups that experience disproportionate risk of climate related harm, and to reduce greenhouse gas (GHG) organizational emissions 50% by 2030 (from a baseline no earlier than 2008) and achieve net zero emissions by 2050.

1. Designating an executive-level lead:

In early 2023, the Southcoast Health System CEO, Dr. Rayford Kruger, designated Philip Oliveira, Vice President of Supply Chain Strategy & Logistics, as the executive-level lead to support the sustainability team as they worked to achieve the goals set within the HHS pledge.

The Sustainability task force was formed under the leadership of Nicole Rosa, Director, Real Estate Design, Development & Sustainability. The task force includes members from Facilities, Marketing and Communications, Support Services, and Government affairs. The Environmental Specialist position was created, and Yunhan Yang joined Nicole Rosa's department in February 2023.

Click here for more information.

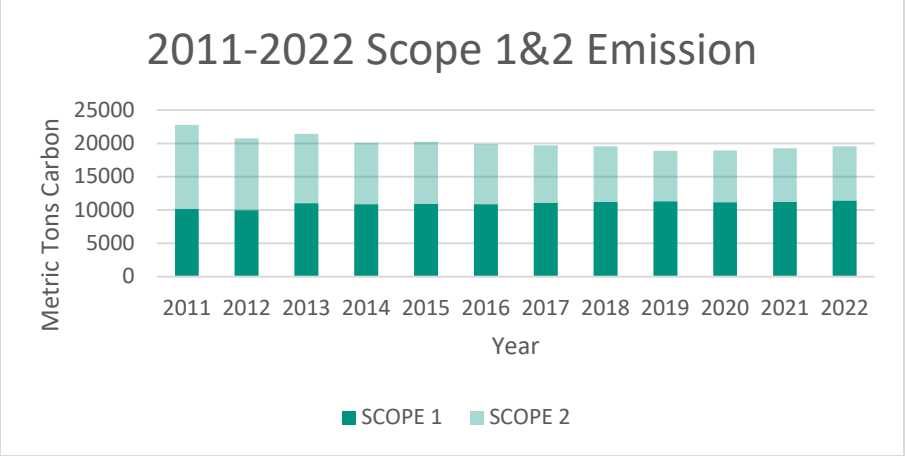
2. Setting baseline for organizational (scope 1&2) emissions:

The analysis of data to establish the baseline for Scope 1 and 2 GHG emissions began in February 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 Group from utility companies. Collecting both internal and external data and utilizing publicly available conversion factors outlined in Appendix B, Southcoast Health successfully established the annual trend of carbon emissions, illustrated in Figure 1 below.

Figure 1. Carbon Emission Annual Trend

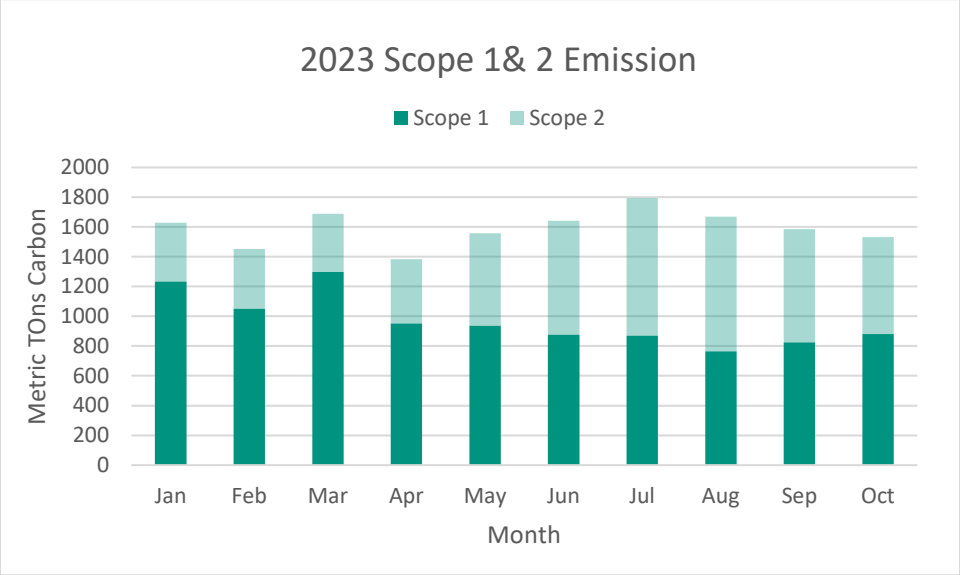


After reviewing all available data regarding Southcoast Hospital GHG emissions, Southcoast established the baseline year of 2011. The highest level of documented GHG emissions at the hospitals in 2011 was equal to 22,761 tons CO2e. To achieve a 50% reduction below the 2011 baseline, Southcoast needs to lower annual Scope 1 & 2 total GHG emissions by 11,380+ tons CO2e.

In 2022, Southcoast Health emitted 19,548 tons CO2e, reflecting a 14% reduction from the 2011 baseline. Southcoast is reviewing opportunities to continue to reduce GHG emissions by an additional 8,168 tons CO2e to achieve the 2030 pledge. We will publish our baseline data before the end of 2023 and publicly account for progress toward the 2030 goal on an annual basis.

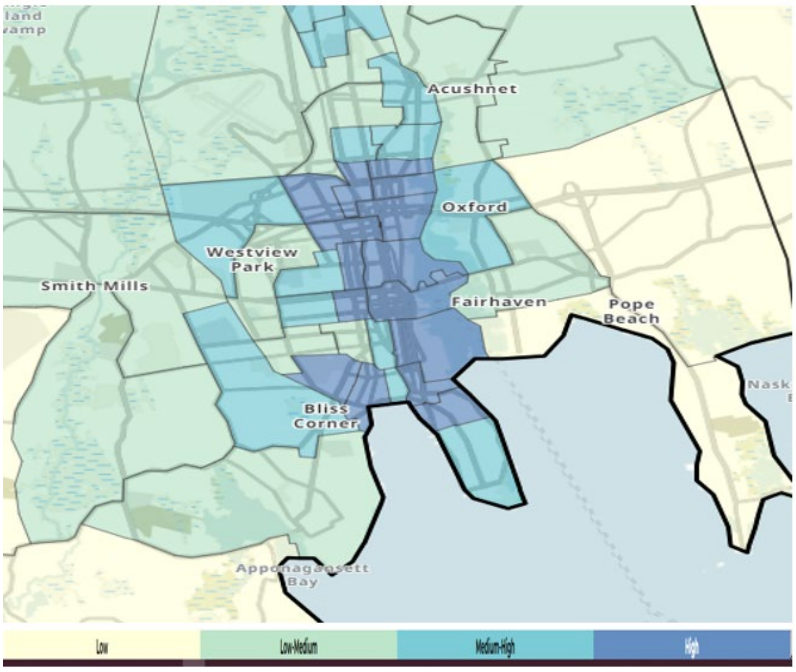
Starting in 2023, Southcoast Health initiated the collection of monthly carbon emissions data as depicted in Figure 2.

Figure 2. Carbon Emission Monthly Trend 2023



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, New Bedford, Massachusetts.



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 conducted on-site visits to precisely map the positions by street. Prior to each major disaster, we plan to integrate this street-level data with our internal information systems to de-identify at risk locations and determine the medical resources 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).

Resilience of our Hospitals:

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. 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).

4. Beginning Scope 3 (supply chain) emissions inventory:

   The Southcoast Health System Supply Chain Strategy & Logistics team has 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. Our plan for the year 2024 involves conducting an initial assessment to thoroughly review each category and determine which ones to include in our scope 3 emissions inventory. Subsequently, we will proceed with the inventory of scope 3 emissions.

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

Yunhan Yang
Environmental Sustainability Specialist

Nicole Rosa
Director, Real Estate Design, Development & Sustainability

Southcoast Health

(Appendix A)

Pledge Form for Healthcare Sector Stakeholder Event

Climate change represents a major threat to human health in the coming century with particularly acute impacts for people that have been marginalized around the world and across the United States.[1] Stakeholders in the U.S. health care system – including hospitals, health systems, payers, suppliers and pharmaceutical companies - must lead the response to this crisis through their example and through preparedness to meet the catastrophic and chronic challenges to come. We must rapidly develop approaches to care that meet the climate health needs of disproportionately affected patients and families, and we must just as rapidly reduce our contributions to the greenhouse gas emissions that are threatening life on the planet.

As such, our organization makes the following commitments on behalf of the health and well- being of people today and future generations. We voluntarily pledge to:

1. *At minimum*, reduce organizational emissions by 50% by 2030 (from a baseline no earlier than 2008) and achieve net-zero by 2050, publicly accounting for progress on this goal every year.
    a) Share publicly our strategies for reducing on-site emissions (where relevant addressing sources related to on-site energy usage, waste anesthetic gases, vehicle fleets and refrigerants).
2. Designate an executive-level lead for our work on reducing emissions by 2023 and conduct an inventory of Scope 3 (supply chain) emissions by the end of 2024.
3. Develop and release a climate resilience plan for continuous operations by the end of 2023, anticipating the needs of groups in our community that experience disproportionate risk of climate-related harm.

These commitments are largely consistent with the commitments of federal government health systems as outlined in Executive Order 14057 and we will gladly join in a public-private collaboration to share learning in pursuit of these goals.

(Space to share additional commitments, activities and achievements follows on the next page.)

Organization name: Southcoast Health

Date: 06/03/2022

Organizational contact name: Philip Oliveira

Organizational contact email address: oliveiraph@southcoast.org

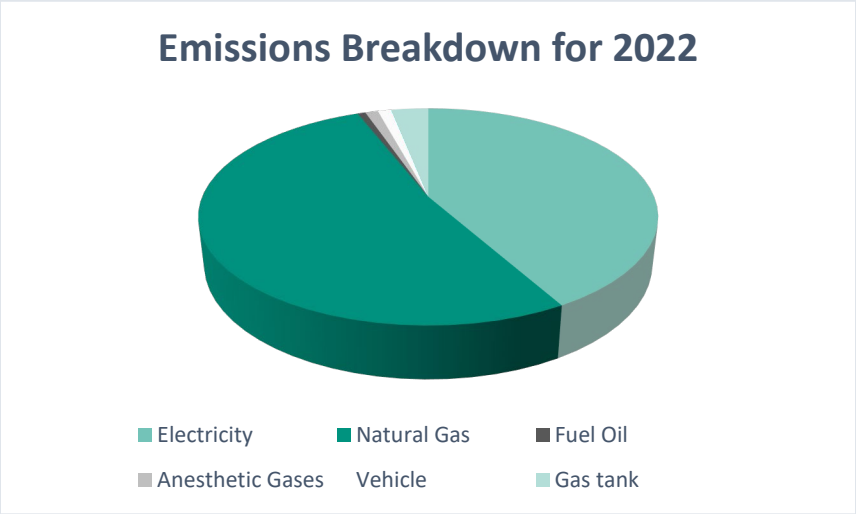
Atwoli, L, Banqui A, Benfield T, et al. (2021). Call for emergency action to limit global temperature increases, restore biodiversity, and protect health. Lancet, 398(10304):939-41.

(Appendix B)

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 2022. 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, in reality, higher than our HHS pledge report.

Figure 1. Breakdown of Carbon Emissions for 2022



Emission Source	Emission in ton	Percentage
Electricity	8163.310816	42%
Natural Gas	10215.5156	52%
Fuel Oil	129.5357904	1%
Anesthetic Gases	208.3038696	1%
Vehicle	223.8274059	1%
Gas tank	607.1015942	3%

0. 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 use natural gas for boiler, cooking and sterilization.
   Similar to 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. On 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, in order to avoid double counting, we need to minus courier veh9,14,15 from the left side

Calcuation:
($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, in order 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 on June 2023, our company owned vehicle emit 17.23 ton of CO2.

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.

6. Gas tank Carbon Emissions (Scope 1)
   We procure our gas tanks from the supplier Airgas, comprising two types: CO2 gas tanks for dry ice production and N2O gas tanks primarily used in the anesthetic process alongside fluranes. Similar to 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 as of 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 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 the 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 drill 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 Procedures