MAZZETTI

LEAP/STEP

Lucile Packard Children's Hospital Stanford

Carbon Neutrality Strategy
Phase 1 Report:

2019 -2020 GREENHOUSE GAS INVENTORY

Lucile Packard Children's Hospital
Stanford Children's Health
Main Campus

January 18, 2022

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Lucile Packard Children's Hospital

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EXECUTIVE SUMMARY

Stanford University has pledged to achieve carbon neutrality by 2040 with the goal being applied to Stanford Children's Health's existing, ongoing, and future capital projects. Stanford Children's Health requested a roadmap to guide their campus to carbon neutrality. Mazzetti and LeapStep were engaged to provide a methodical approach consisting of (3) phases to establish a comprehensive strategic plan to support achievement of your carbon neutrality goals:

- Phase 0 - Discovery Workshop
- Phase 1 - Baseline Development
- Phase 2 - Options Analysis & Strategic Planning

In Phase 0, we established a shared vision: *To heal the natural systems that support human wellness as we urgently demonstrate the possibilities of carbon-free healthcare through the development of an LPCH decarbonization plan*. In Phase 1, the approach to this inventory focused on establishing a clear understanding of Stanford Children's Health's current baseline conditions, within the established boundaries of the study. Data was collected on a wide variety of emissions sources and is compiled herein.

Next steps will include evaluating compatible system strategies and developing an actionable and dynamic strategic implementation plan to support decision making for senior leadership. The resulting roadmap will be reflective of Stanford Children's Health's unique characteristics, opportunities, and challenges.

Our delivery methodology was structured as a series of tasks supported by data gathering, interactive work sessions, and interviews, resulting in this Phase 1 report. This work required the support of numerous stakeholders within LPCH, and we are grateful for their time, effort, creativity, and contributions.

METHODOLOGY

The following Greenhouse Gas (GHG) inventory was prepared for Stanford Children's Health by Mazzetti and LeapStep, following the GHG Protocol Corporate Accounting and Reporting Standard. It includes scope 1 (direct emissions from owned or controlled sources), 2 (indirect emissions from the generation of purchased energy), and 3 (all other indirect emissions that occur upstream and downstream in the value chain) for a portion of LPCH's operations.

Boundary of Inventory

For this inventory, LPCH has limited the scope to the main campus property. To comply with the GHG Protocol, a full entity-wide inventory is recommended for future year inventories, as well as revision to this inventory with a baseline year of 2019.

Facilities Included in Inventory

Lucile Packard Children's Hospital – Main (New), 725 Welch Road
Lucile Packard Children's Hospital – West, 725 Welch Road

Consolidation Approach

Equity Share Financial Control ☑ Operational Control*

*Operational control is defined as the authority to introduce and implement operating policies. Under the Operational Control Consolidation Approach, a complete inventory accounts for 100% of emissions from operations under the organization's control, including owned and leased assets. As a result, this constitutes a partial inventory due to its limitation to the facilities listed above.

Reporting Period Covered by this Inventory:

This inventory spans 01/01/2019 to 12/31/2020. Fiscal year data was annualized to align with calendar year data.

Operational Boundaries

Scope 3 emissions sources included in this inventory are: Employee Commute, Business Travel, Solid Waste, Wastewater, Patient Transport, Capital goods, Purchased Goods and Services.

Scope 3 emissions sources excluded from this inventory are: Fuel- and energy-related activities (not included in scope 1 or 2), Upstream transportation and distribution, Upstream leased assets, Processing and use of sold products, End-of-life treatment of sold products, Downstream leased assets, Franchises, Investments.

Data Collected

The following data types were collected and analyzed to complete this inventory:

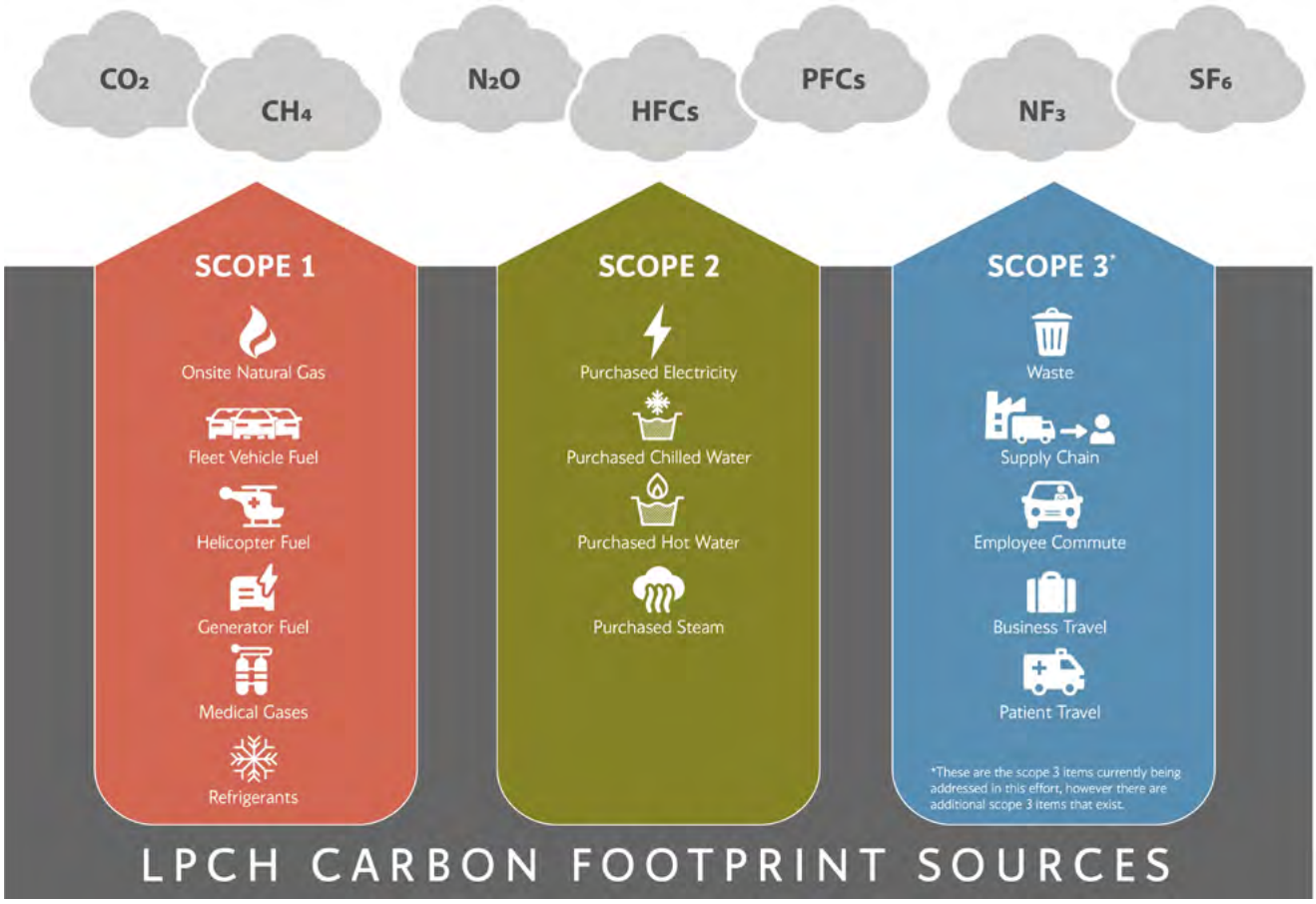
- Building type, size, and age
- Utilities: Utility providers (electricity and gas) and utility bills (annual) for all buildings
  - » Electricity
  - » Natural gas
  - » Chilled water
  - » Heating water
  - » Steam: Steam (West building external) and Steam internal (BMS output Main building)
- Fleet vehicles: Fuel purchase records (annual) for all owned vehicles to include cars, , and any other fossil fuel burning mobile equipment
- Helicopters (contracted): flight volume and fuel burn rate
- Diesel generators: Fuel purchase records (annual) for emergency diesel generators
- Anesthetic gases: Anesthetic gas purchase records (annual) and recovery records
- Performance data:
  - » Energy usage by source
  - » Energy costs/rates
  - » Energy studies
  - » All available recent (3 years) energy assessment reports•
- Energy projects: Summary of all current or planned energy upgrade projects for existing buildings
- Patient Travel: Anonymized patient in-person encounter data with zip codes
- Employee Travel: Annual transportation survey results, anonymized employee zip codes, and hybrid or remote work patterns
- Procurement: Purchasing expenditures by type, including capital
- Waste: Waste volumes by type, treatment method, hauling distance and frequency
- Wastewater: Wastewater volume by treatment method
- Business Travel: Dollars spent in various transportation modes

Standards Applied

This GHG inventory was compiled following the GHG Protocol Corporate Accounting and Reporting Standard, revised edition, published by the World Resource Institute in 2015.

Emission Scopes

Emissions are categorized into three scopes. Scope 1 emissions are direct emissions from stationary sources such as natural gas boilers, mobile sources such as fleet vehicles, and fugitive, unintentional, emissions like refrigerant loss and anesthetic gas use. Scope 2 is reserved for purchased energy such as electricity or steam generated from another source. Scope 3 are indirect emissions that are both upstream and downstream from the reporting entity. Examples of Scope 3 emissions are employee commuting and the disposal of waste products. Scope 3 emissions are another entity's Scope 1 or 2 emissions that support the reporting entity's operations.



Global Warming Potential (GWP)

GWP values from the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5) are used when calculating mtCO2e.

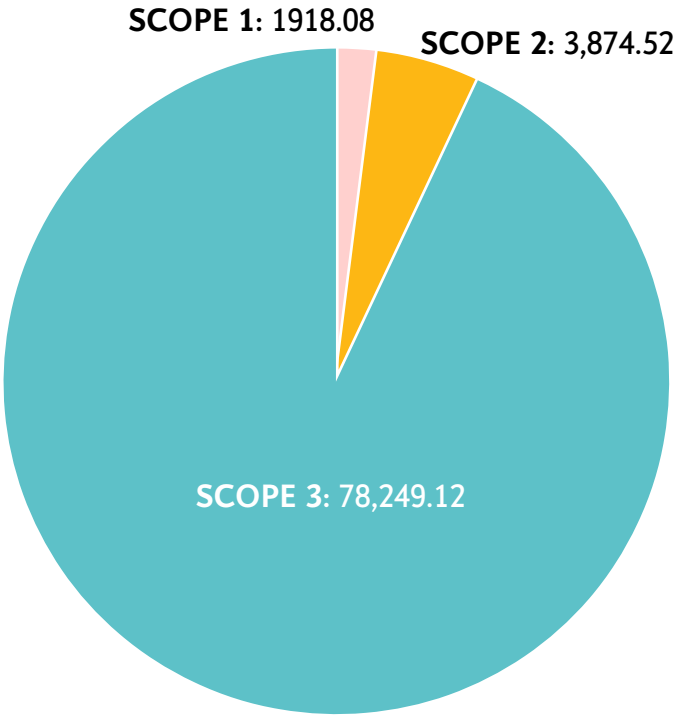
Greenhouse Gas	GWP
CO_2	1
CH_4	28
N_2O	265
HFC's	1,300 - 4,000

EMISSIONS SUMMARY

2019 Emissions Summary

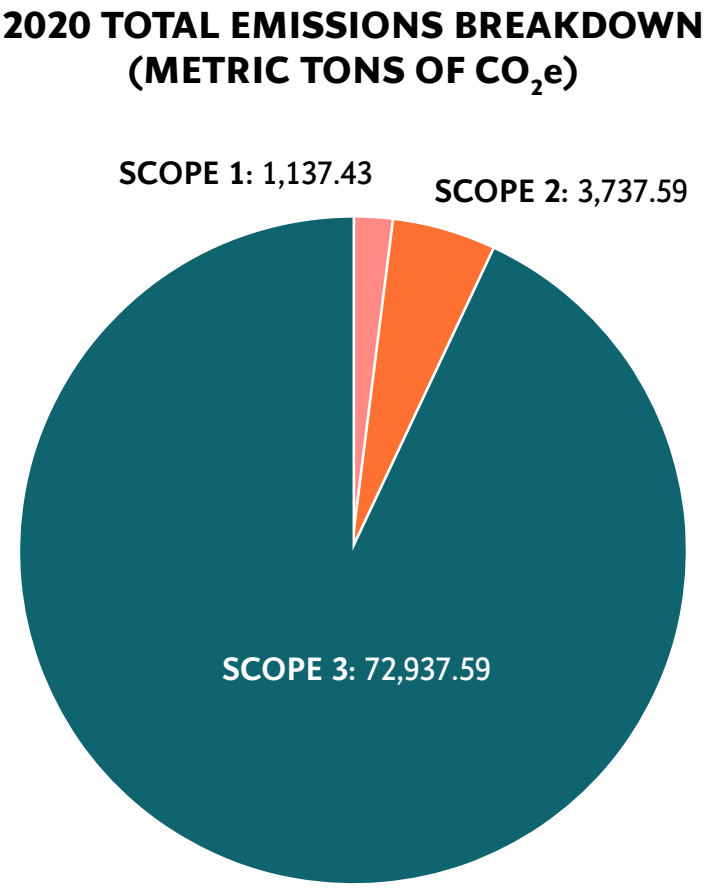
EMISSIONS	TOTAL ($mtCO_2e$)	CO_2 (mt)	CH_4 (mt)	N_2O (mt)	HFCs (mt)	PFCs (mt)	SF_6 (mt)
SCOPE 1	1,918.08	1,315.98	0.19	1.97	74.34	0.00	0.00
SCOPE 2	3,874.52	3,845.85	0.37	0.07	0.00	0.00	0.00
SCOPE 3	78,249.12						

2019 TOTAL EMISSIONS BREAKDOWN (METRIC TONS OF CO_2e)

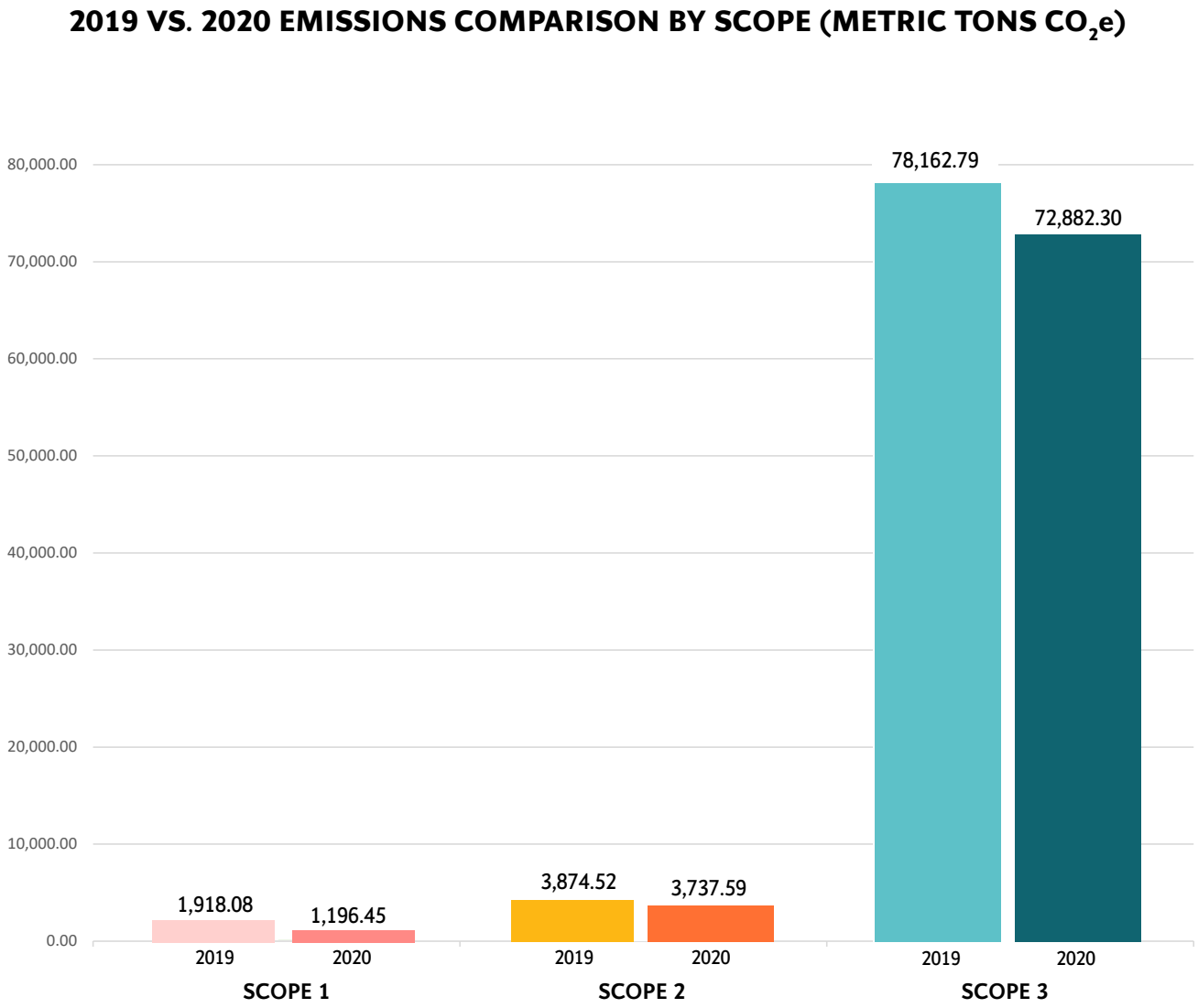


2020 Emissions Summary

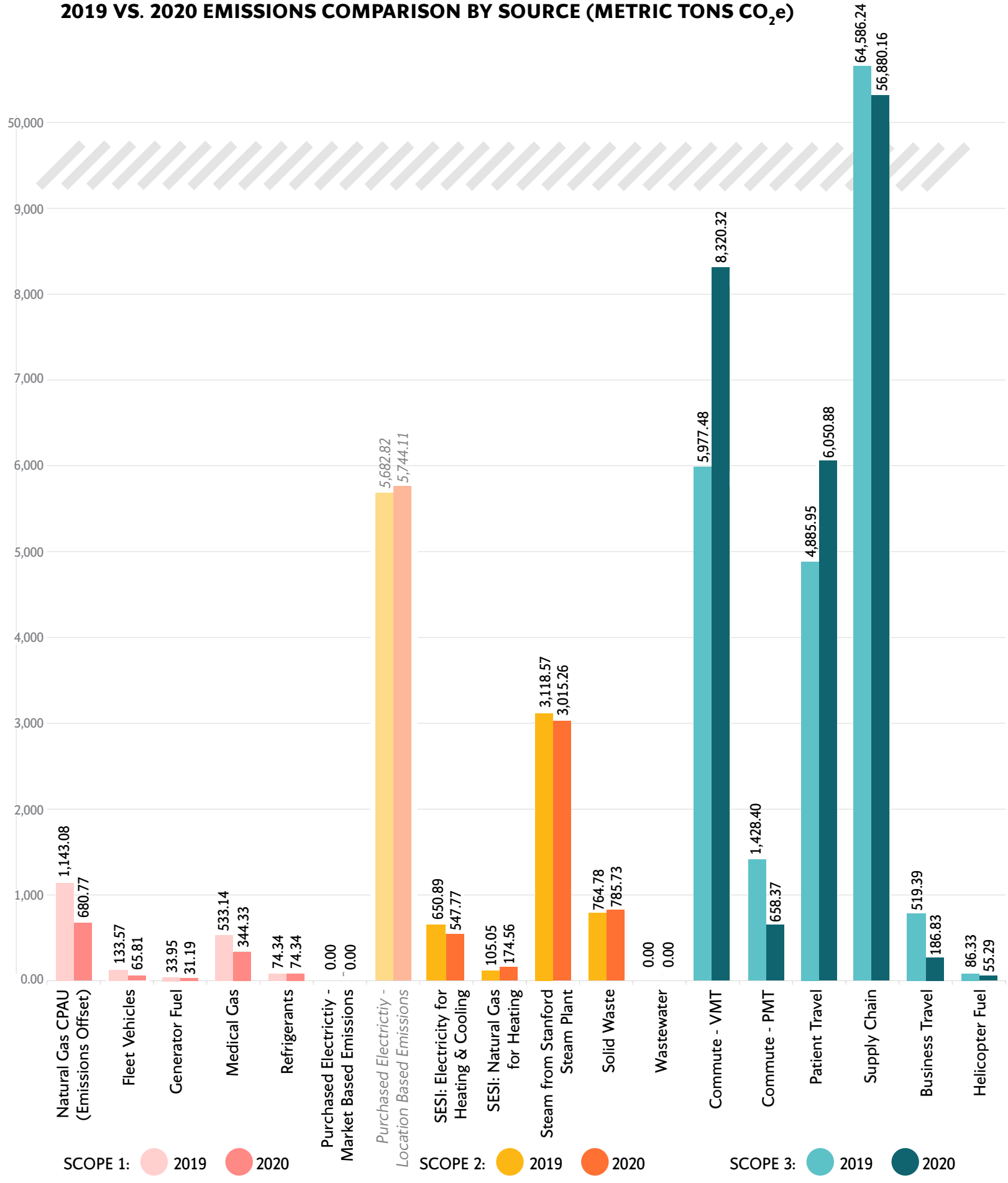
EMISSIONS	TOTAL ($mtCO_2e$)	CO_2 (mt)	CH_4 (mt)	N_2O (mt)	HFCs (mt)	PFCs (mt)	SF_6 (mt)
SCOPE 1	1,137.43	762.65	0.10	1.12	74.34	0.00	0.00
SCOPE 2	3,737.59	3,709.56	0.37	0.07	0.00	0.00	0.00
SCOPE 3	72,937.59						



YEAR OVER YEAR COMPARISON



2019 VS. 2020 EMISSIONS COMPARISON BY SOURCE (METRIC TONS CO_2e)



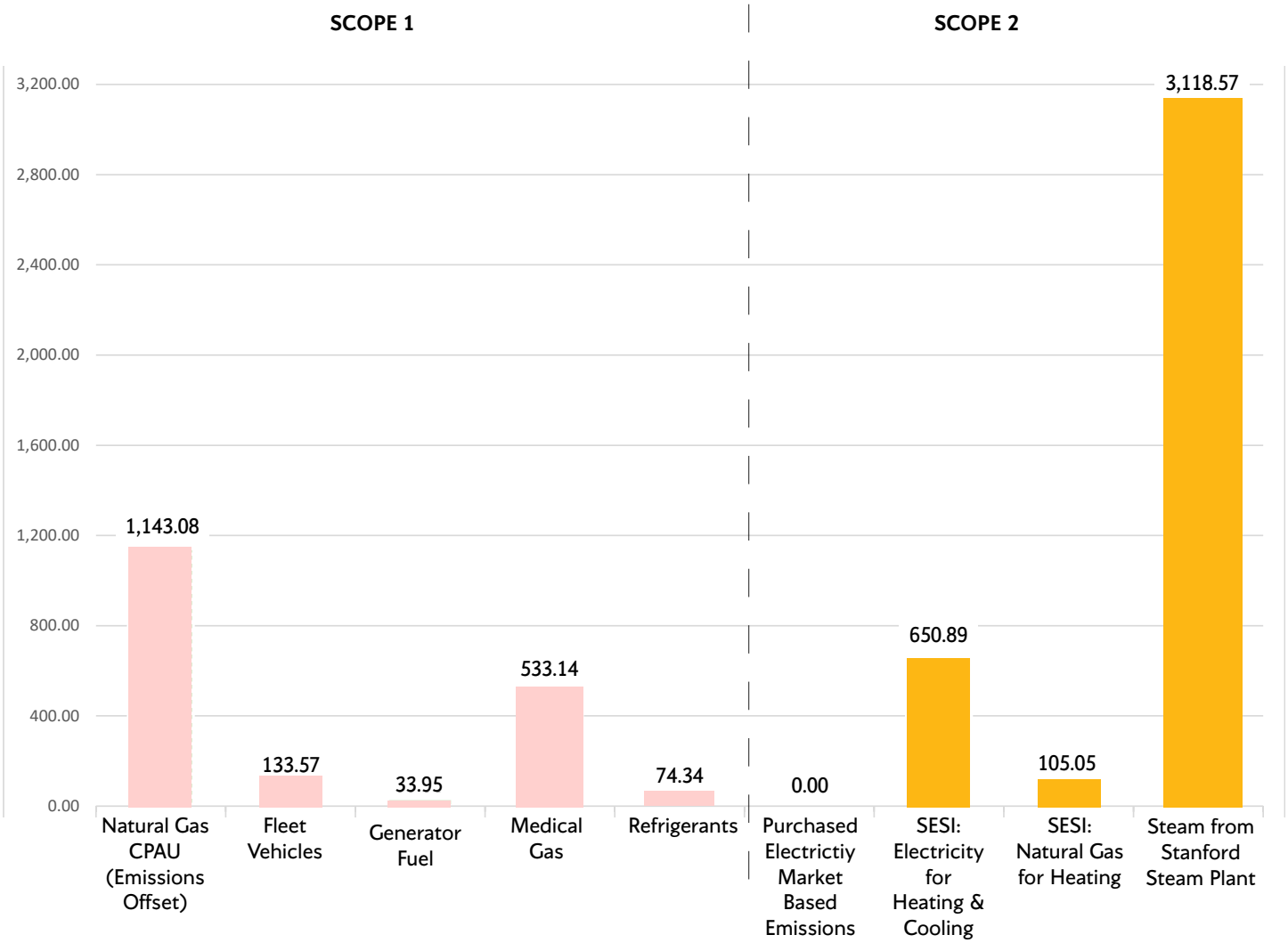
EMISSIONS DETAIL

2019 EMISSIONS DETAIL

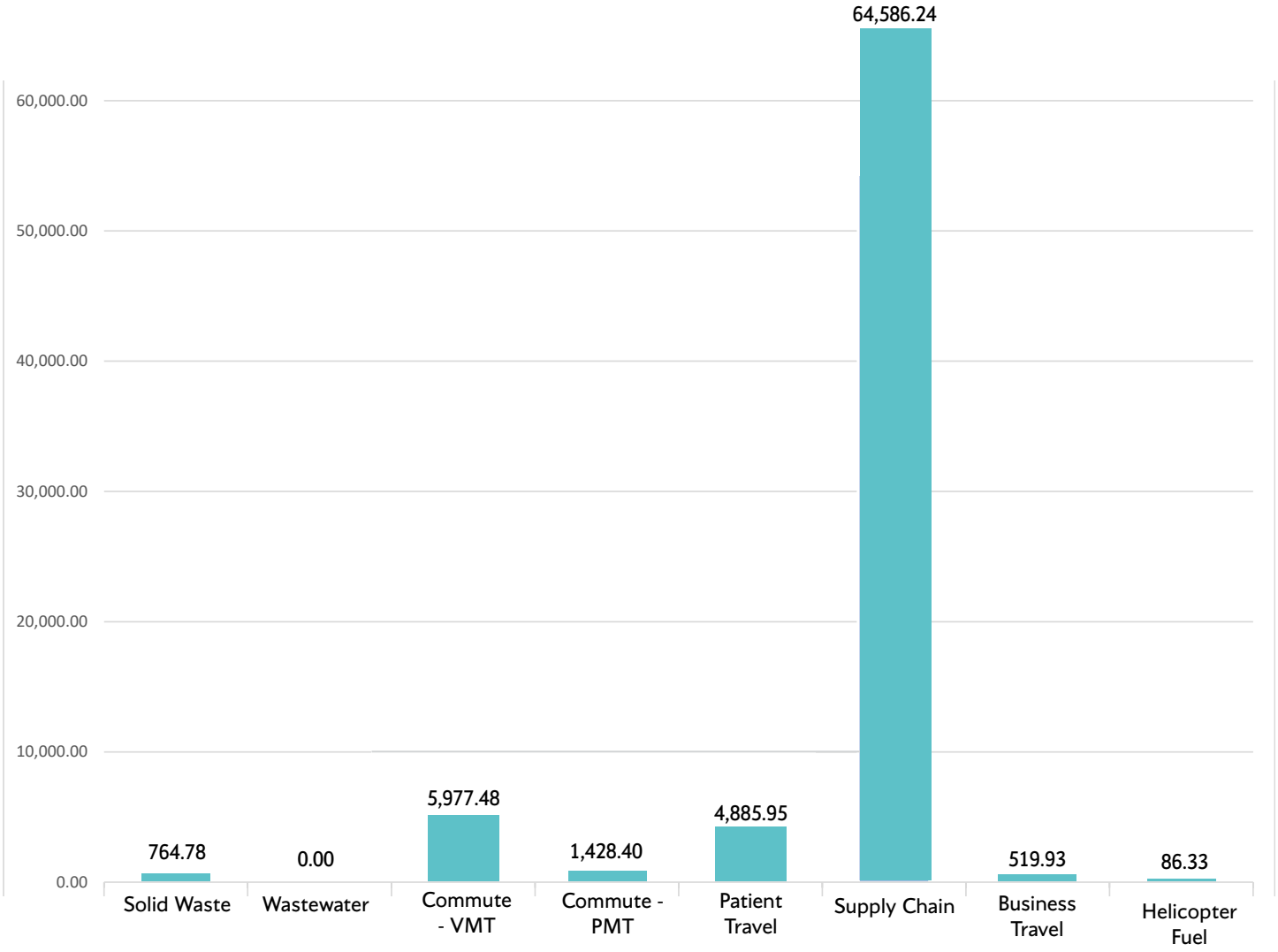
EMISSIONS	**TOTAL ($mtCO_2e$)**	CO_2 (mt)	CH_4 (mt)	N_2O (mt)	HFCs (mt)	PFCs (mt)	SF_6 (mt)
SCOPE 1:	1,918.08	1,315.98	0.19	1.97	74.34	0.00	0.00
On-site Natural Gas	1,143.08	1,134.60	0.10	0.02	0.00	0.00	0.00
Fleet Vehicles	133.57	78.83	0.09	0.20	0.00	0.00	0.00
Generator Fuel	33.95	33.52	0.001	0.002	0.00	0.00	0.00
Medical Gas	533.14	69.03	0.00	1.75	0.00	0.00	0.00
Refrigerants	74.34	0.00	0.00	0.00	74.34	0.00	0.00
SCOPE 2:	3,874.52	3,845.85	0.37	0.07	0.00	0.00	0.00
Purchased Electricity - Market Based Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00
*Purchased Electricity - Location Based Emissions**	*5,682.82*	*5,658.05*	*0.41*	*0.05*	*0.00*	*0.00*	*0.00*
SESI: Electricity for Heating and Cooling	650.89	645.67	0.09	0.01	0.00	0.00	0.00
SESI: Natural Gas for Heating	105.05	104.74	0.01	0.0002	0.00	0.00	0.00
Steam from Stanford Steam Plant	3,118.57	3,095.43	0.27	0.0583	0.00	0.00	0.00
SCOPE 3:	78,249.12						
Solid Waste	764.78						
Wastewater	0.00						
Employee Commute - Vehicle Miles Traveled	5,977.48						
Employee Commute - Passenger Miles	1,428.40						
Patient Transport	4,885.95						
Business Travel - All Modes	519.93						
Supply Chain	64,586.24						
Helicopter Fuel	86.33						

*The GHG Corporate Protocol requires reporting of both location and market-based emissions. Purchased Electricity – Location Based Emissions shows the estimated emissions for purchased electricity based on the listed emissions factor for the EPA's CAMX eGrid subregion which averages the electricity emissions factors for most of the state of California. Purchased Electricity - Market Based Emissions use emission factors from the specific utility providing the power to SHC. These are shown as zero due to CPAU's 100% renewable power generation.

2019 SCOPE 1 & 2 EMISSIONS BREAKDOWN (METRIC TONS CO_2e)

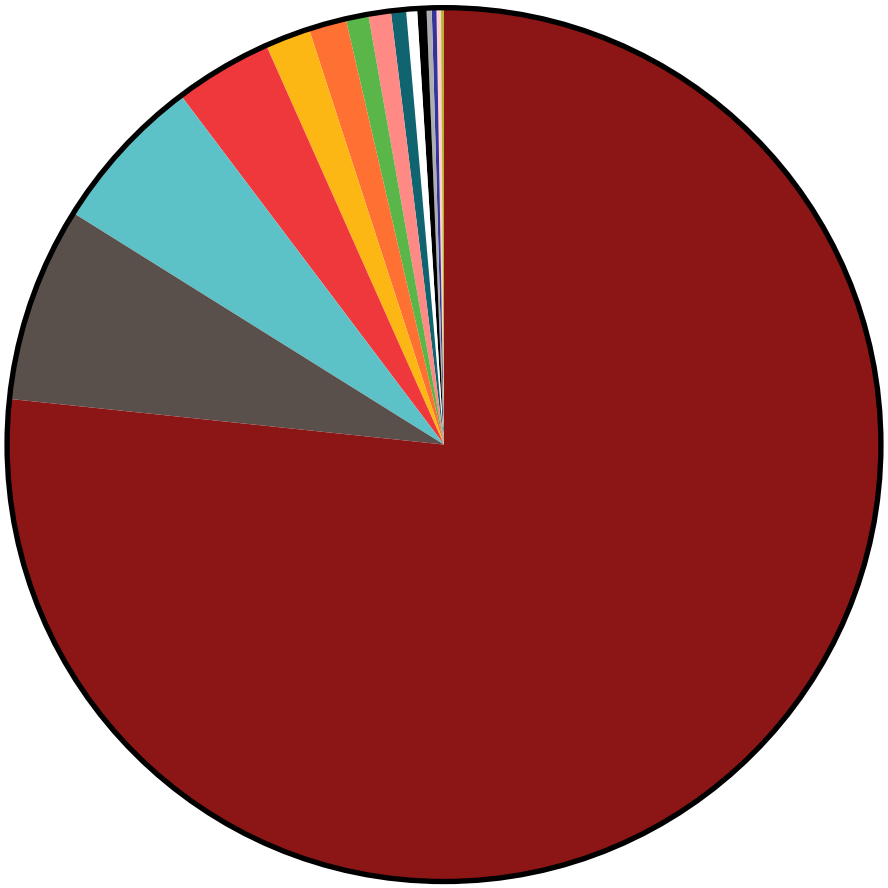


2019 SCOPE 3 EMISSIONS BREAKDOWN (METRIC TONS CO_2e)



The following table lists emissions sources from highest percentage of total emissions to lowest. This list should be used to prioritize action, tackling larger emissions sources first.

EMISSIONS	2019 % OF TOTAL EMISSIONS
Scope 3: Supply Chain	76.85%
Scope 3: Employee Commute – Vehicle Miles Traveled	7.11%
Scope 3: Patient Travel	5.81%
Scope 2: Steam from Stanford Steam Plant	3.71%
Scope 3: Employee Commute - All Other Modes	1.70%
Scope 1: On-site Natural Gas	1.36%
Scope 3: Solid Waste	0.91%
Scope 2: SESI: Electricity for Heating and Cooling	0.77%
Scope 1: Medical Gas	0.63%
Scope 3: Business Travel - All Modes	0.62%
Scope 1: Fleet Vehicles	0.16%
Scope 2: SESI: Natural Gas for Heating	0.13%
Scope 3: Helicopter Fuel	0.10%
Scope 1: Refrigerants	0.09%
Scope 1: Generator Fuel	0.04%
Scope 2: Purchased Electricity - Market Based Emissions	0.00%
Scope 3: Wastewater	0.00%

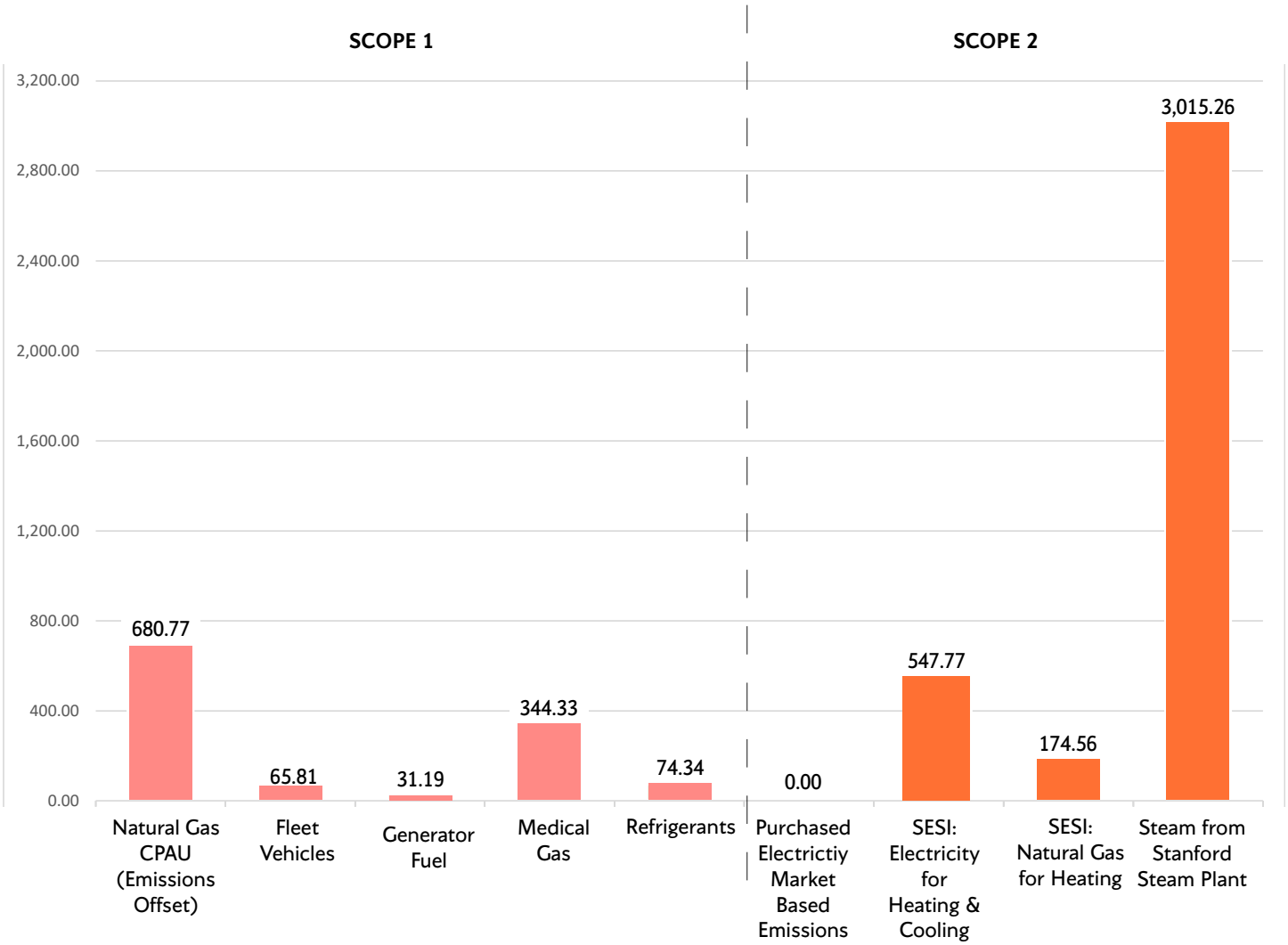


2020 Emissions Detail

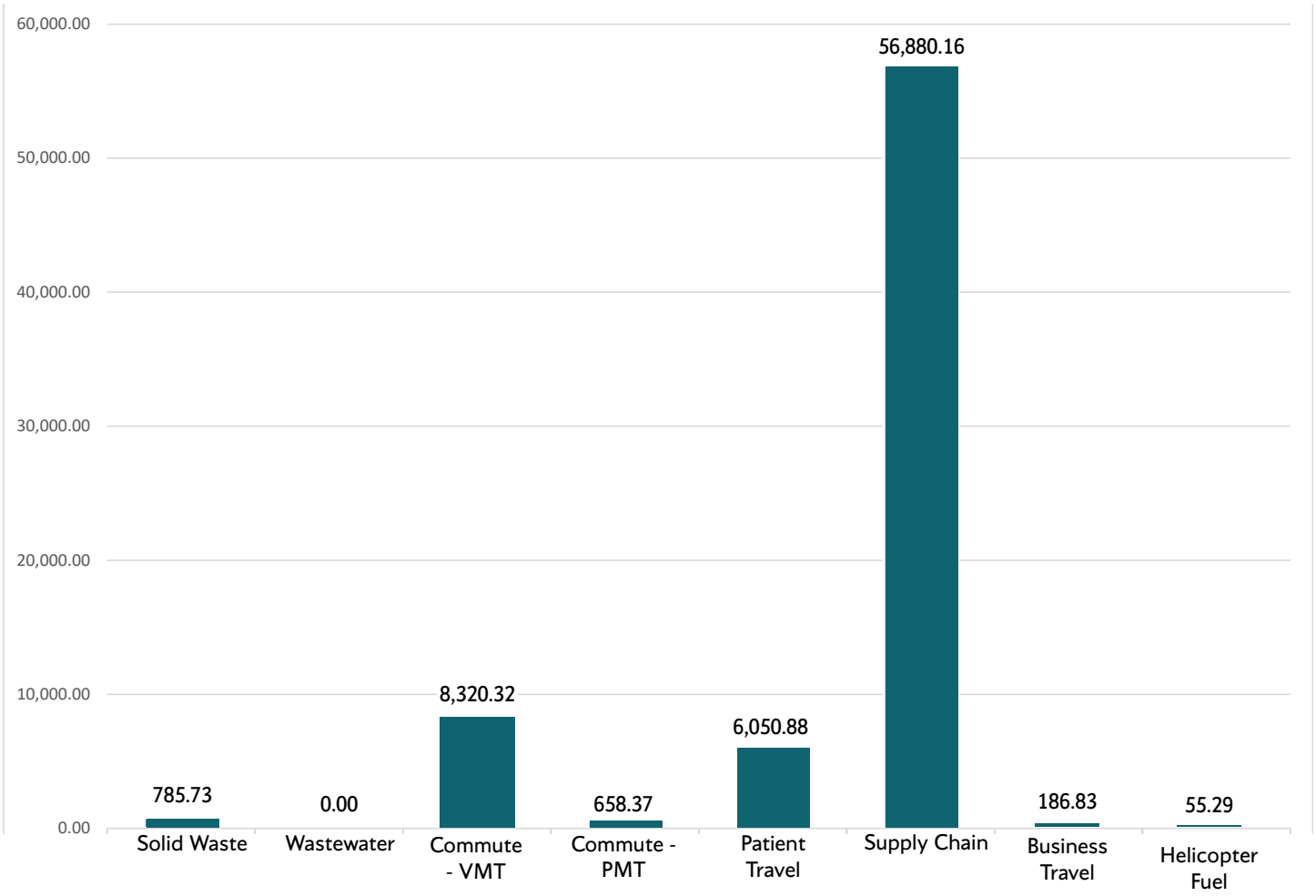
EMISSIONS	**TOTAL ($mtCO_2e$)**	CO_2 (mt)	CH_4 (mt)	N_2O (mt)	HFCs (mt)	PFCs (mt)	SF_6 (mt)
Scope 1:	1,137.43	762.65	0.10	1.12	74.34	0.00	0.00
On-site Natural Gas	680.77	675.72	0.06	0.01	0.00	0.00	0.00
Fleet Vehicles	65.81	39.18	0.04	0.10	0.00	0.00	0.00
Generator Fuel	31.19	30.80	0.001	0.001	0.00	0.00	0.00
Medical Gas	285.31	16.95	0.00	1.01	0.00	0.00	0.00
Refrigerants	74.34	0.00	0.00	0.00	74.34	0.00	0.00
Scope 2:	3,737.59	3,709.56	0.37	0.07	0.00	0.00	0.00
Purchased Electricity - Market Based Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00
*Purchased Electricity - Location Based Emissions**	*5,744.11*	*5,719.08*	*0.42*	*0.05*	*0.00*	*0.00*	*0.00*
SESI: Electricity for Heating and Cooling	547.77	542.64	0.09	0.01	0.00	0.00	0.00
SESI: Natural Gas for Heating	174.56	174.04	0.02	0.0003	0.00	0.00	0.00
Steam from Stanford Steam Plant	3,015.26	2,992.89	0.27	0.0564	0.00	0.00	0.00
Scope 3:	72,937.59						
Solid Waste	785.73						
Wastewater	0.00						
Employee Commute - Vehicle Miles Traveled	8,320.32						
Employee Commute - Passenger Miles	658.37						
Patient Transport - All Modes	6,050.88						
Business Travel -All Modes	186.83						
Supply Chain	56,880.16						
Helicopter Fuel	55.29						

*The GHG Corporate Protocol requires reporting of both location and market-based emissions. Purchased Electricity – Location Based Emissions shows the estimated emissions for purchased electricity based on the listed emissions factor for the EPA's CAMX eGrid subregion which averages the electricity emissions factors for most of the state of California. Purchased Electricity - Market Based Emissions use emission factors from the specific utility providing the power to SHC. These are shown as zero due to CPAU's 100% renewable power generation.

2020 SCOPE 1 & 2 EMISSIONS BREAKDOWN (METRIC TONS CO_2e)

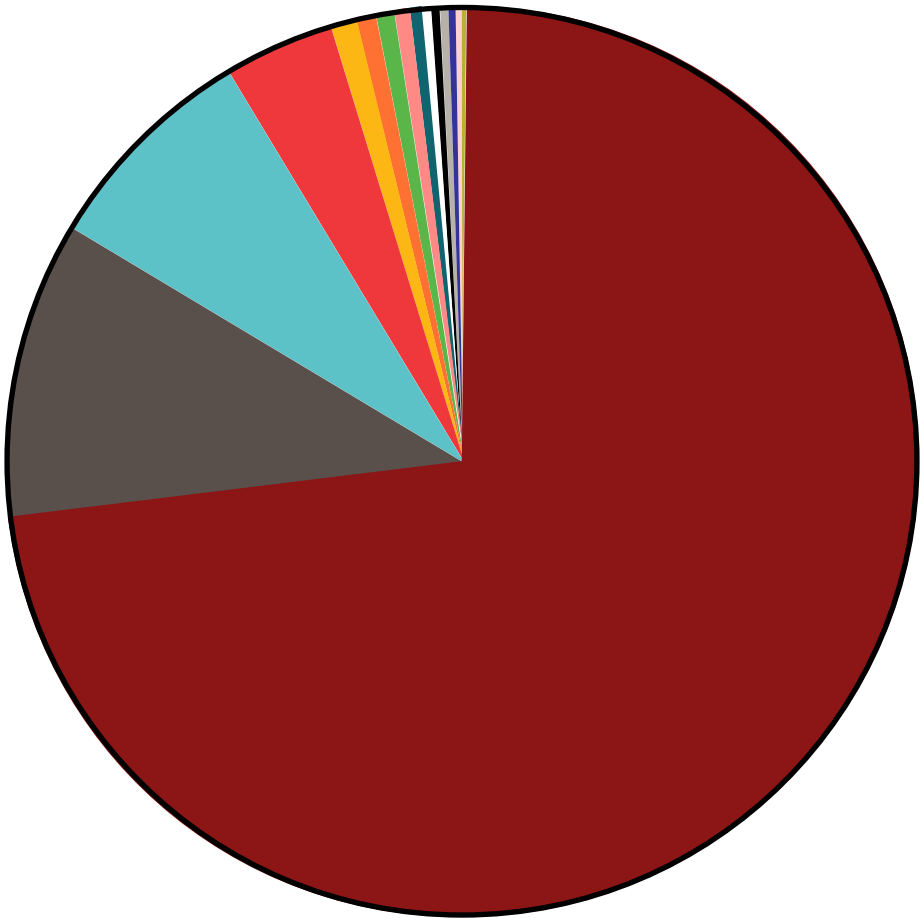


2020 SCOPE 3 EMISSIONS BREAKDOWN (METRIC TONS CO_2e)



The following table lists emissions sources from highest percentage of total emissions to lowest. This list should be used to prioritize action, tackling larger emissions sources first.

EMISSIONS	2020 % OF TOTAL EMISSIONS
Scope 3: Supply Chain	73.10%
Scope 3: Employee Commute – Vehicle Miles Traveled	10.69%
Scope 3: Patient Travel	7.78%
Scope 2: Steam from Stanford Steam Plant	3.88%
Scope 3: Solid Waste	1.01%
Scope 1: On-site Natural Gas	0.87%
Scope 3: Employee Commute - All Other Modes	0.85%
Scope 2: SESI: Electricity for Heating and Cooling	0.70%
Scope 1: Medical Gas	0.37%
Scope 3: Business Travel - All Modes	0.24%
Scope 2: SESI: Natural Gas for Heating	0.22%
Scope 1: Refrigerants	0.10%
Scope 1: Fleet Vehicles	0.08%
Scope 3: Helicopter Fuel	0.07%
Scope 1: Generator Fuel	0.04%
Scope 2: Purchased Electricity - Market Based Emissions	0.00%
Scope 3: Wastewater	0.00%



METHODOLOGY DETAIL

Scope 1

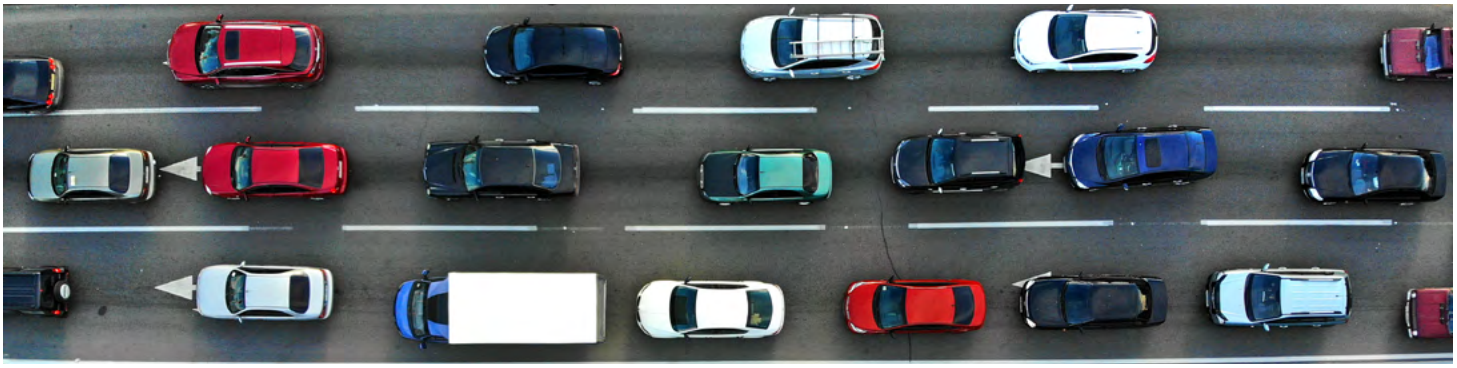
Scope 1 Emission Sources	Description of the types, sources, and quality of data used to calculate emissions	Description of the methodologies, allocation methods, and assumptions used to calculate emissions
 On-site Natural Gas	Natural gas data was pulled from Key Green Solutions. LPCH West sources natural gas from CPAU (City of Palo Alto Utilities).	Natural gas emissions factors came from the Climate Registry 2021 Default Emissions Factor Document. However, CPAU offsets all of their supplied natural gas with carbon offsets and offers their customers the ability to claim zero CO2e emissions for all of their usage.
 Fleet Vehicles	Fleet vehicle data included in this report only includes the fleet vehicles owned by LPCH. It is understood that LPCH also uses fleet vehicles owned by SHC but those are entirely being included in SHC's GHG Inventory and will not need to be accounted for in this report. The fleet vehicle collected for LPCH includes fuel usage totals for diesel and unleaded vehicles.	Fleet vehicle emissions for LPCH were calculated using unleaded and diesel fuel emissions factors. Those emissions factors are found in EPA's 2021 Emissions Factors for GHG Inventories Report.
 Generator Fuel	Diesel fuel data was provided by EH&S department. For shared SHC/ LPCH generators, the steam allocation percentage was applied to the diesel fuel used.	The diesel fuel emission factors came from the EPA GHG emission factors hub.
 Medical Gas	Medical nitrous oxide and carbon dioxide data was provided by the LPCH Manager of Distribution & Logistics, Supply Chain in the form of purchasing reports. Desfurane, sevofurane, and isofurane data was pulled from LPCH purchasing reports from Surgical Supply Chain. Only deliveries to LPCH were included. Data is included for all buildings in the survey. Data to provide separate use for medical gas in LPCH West vs LPCH Main is being researched further.	Weights per product were used to calculate total weight for nitrous oxide. 100-year Global Warming Potentials for desflurane, sevoflurane, and isoflurane came from: Assessing the Impact on Global Climate from General Anesthetic Gases. LPCH Main does employ a WAGD medical gas capture system but specific data for that system is still being researched for accounting purposes. It was assumed that 90% of the emitted medical gases (95% of the total) in LPCH Main were captured by the WAGD system.
 Refrigerants	Refrigerant data was provided by the LPCH Engineering and Maintenaince staff via 2019 and 2020 purchase records. However, we discovered that the 2019 record files that were stored on a USB drive were corrupt and we opted to use 2020 values for both years instead.	The GHG Protocol Approach 2: Lifecycle Stage Approach was used to calculate emissions. From the equipment owner and operator's standpoint, refrigerants are being used to re-charge equipment and it is assumed that the value of refrigerants being added is equal to that that is being lost through leakage. According to GHG Protocol, CFCs and HCFCs may be omitted since they are being phased out by the Montreal Protocol. It is our recommendation that a better processs should be put in place to track and collect refrigerant data. Follow the GHG Protocol's online calculator tool for list of required data.

Scope 2

Scope 2 Emission Sources	Description of the types, sources, and quality of data used to calculate emissions	Description of the methodologies, allocation methods, and assumptions used to calculate emissions
Purchased Electricity - Market Based Emissions	Electricity data was pulled from Key Green Solutions. Electricity for LPCH Main and West is sourced from CPAU (City of Palo Alto Utilities).	Annual market-based emissions factors are provided from the utility, CPAU. However, CPAU provides all of their supplied electricity using 100% renewable sources and offers their customers the ability to claim zero CO2e emissions for all of their usage. Although the natural gas emissions for CPAU have offsets, LPCH is electing not to count those offsets in our calculations
Purchased Electricity - Location Based Emissions	Electricity data was pulled from Key Green Solutions. Electricity for LPCH Main and West is sourced from CPAU (City of Palo Alto Utilities).	The annual location-based emissions factor can be found using EPA's eGrid Explorer tool on their website. The emissions factor is based on the CAMX region
SESI: Electricity for Heating and Cooling	LPCH Main receives chilled water and heating hot water and LPCH West receives chilled water from the Stanford University's (SU) SESI plant. Stanford University provided a breakdown for LPCH buildings in terms of electricity consumption for chilled water and heating hot water. However, it was discovered that SU's database of energy consumption for LPCH buildings was different than that of LPCH's database. SU did not have access to Key Green Solutions. It is recommended that LPCH and SU verify energy consumption data is aligned and coordinate on a building breakdown for source energy use.	Stanford University's Office of Sustainability & Energy calculated emissions from the SESI plant and provided a breakdown for all LPCH buildings. It is our recommendation to work with SU to create a report showing electricity usage per building for each LPCH building for future GHG inventories.
SESI: Natural Gas for Heating	Stanford University provided a breakdown for LPCH buildings in terms of natural gas consumption for heating hot water. At LPCH Main, the heating hot water produces building heating and domestic hot water	Stanford University's Office of Sustainability & Energy calculated emissions from the SESI plant and provided a breakdown for all LPCH buildings. It is our recommendation to work with SU to create a report showing natural gas usage per building for each LPCH building for future GHG inventories.
Steam from Stanford Steam Plant	Energy data for the steam plant and a steam consumption breakdown per building was pulled from Key Green Solutions. Steam is provided to LPCH West from SHC's steam plant located at 901 Quarry. At LPCH West, the steam produces heating hot water for building heating, domestic hot water, and direct steam for humidification.	The emissions for the steam plant were calculated using electricity (CPAU) and natural gas (PG&E) that is supplied to the steam plant. The steam plant serves Stanford Health Care, LPCH West, and School of Medicine. A breakdown percentage based on the steam meters was used to determine the energy and emissions for each facility. Based on that breakdown, LPCH is responsible for a 25.8% share in 2019 and a 16.3% share in 2020.

Scope 3

Scope 3 Emission Sources	Description of the types, sources, and quality of data used to calculate emissions	Description of the methodologies, allocation methods, and assumptions used to calculate emissions
Solid Waste	Waste tonnage data is from Key Green Solutions. A 21% allocation for LPCH landfill, medical waste, and recycling is applied in Key Green Solutions (79% to SHC). Hauling distances and frequencies came from the "SHC Waste Index" spreadsheet.	Emission factors came from the EPA GHG emission factors hub (hub last modified April 1, 2021; emission factors located in table 9). As these factors include transportation with an average hauling distance of 20 miles, transportation emissions were added for any waste stream in excess of that average, using LPCH's hauling data. This is detailed in the "Additional Annual Mileage" and "Notes" columns of the GHG spreadsheet for each waste stream. In cases where the EPA hub lacked emission factors for a particular waste type or disposal method, assumptions were made and noted in the "Notes" column. This methodology is a departure from the one used in previous reports to the City of Palo Alto.
Wastewater	Wastewater data is from Key Green Solutions and estimated at 95% of total water consumption.	The same assumptions and methodologies from the 2019 report to the City of Palo Alto were used here. According to CEC estimates, the amount of energy needed to treat and dispose of one million gallons (MG) of wastewater is approximately 1,911 kWh2. The CPAU emission factor used was zero, as noted above.
Employee Commute - Vehicle Miles Traveled (VMT)	Annual commuter survey results were provided by Transportation Services and employee headcount was provided by Space Analytics & Strategic Initiatives. VMT was calculated from responses of: drive alone, vanpool, and carpool. We recommend separating these to set single occupancy vehicle reduction targets. Driving distances were calculated using the NBER Zip Code Distance Database. Responses with invalid zip codes or distances greater than 100 miles were excluded.	VMT was scaled based on the percentage of survey responses and the LPCH main campus population working 20 hours per week or more. For 2020, the data was scaled based on the percentage of employees working onsite under the hybrid model. Assumptions include: 48 work weeks per year, 2 trips per day, 2 persons per carpool, and 5 persons per vanpool. The Passenger Car (fuel unknown) emission factors were used from the EPA GHG emission factors hub (hub last modified: April 1, 2021; emission factors located in Table 10).



Employee Commute - Passenger Miles Traveled (PMT)	Annual commuter survey results were provided by Transportation Services and employee headcount was provided by Space Analytics & Strategic Initiatives. PMT was calculated from all other transportation mode responses (e.g. Caltrain, biking, etc.). Distances were calculated using the NBER Zip Code Distance Database. Responses with invalid zip codes or distances greater than 100 miles were excluded. The "Other" category represents ~6% of all miles; we recommend incorporating these responses into survey options in the future.	The same scaling factors and assumptions described above were used to calculate PMT. The emission factors for each transportation mode were used from the EPA GHG emission factors hub (hub last modified: April 1, 2021; emission factors located in Table 10). The Marguerite shuttle emission factor was zero, as the fleet serving SHC is all electric and on CPAU power. Remote work emissions were assumed to have an emission factor of zero. The passenger vehicle emission factor was used as a default for unknown transportation modes.
Patient Travel	Patient travel data was provided by IS Analytics & Reporting, including home zip code and number of visits in-person and via telehealth. Distances were calculated using a database of zip code coordinates (latitude and longitude). Distances were estimated for null or invalid entries based on per patient mileage. There-and-back travel was assumed for each entry.	The distance-based method was used to estimate emissions, using Air Travel (Medium Haul) and Passenger Car (fuel unknown) emission factors from the EPA GHG emission factors hub (hub last modified: April 1, 2021; emission factors located in Table 10). As transportation modes were not available for in-person visits, trips of 250 miles or less were assumed to be vehicular travel, while distances over 250 miles were assumed to be air travel.
Business Travel	Business travel data was provided by Accounts Payable, in the form of dollars spent in each transportation mode. If mileage can be collected in the future, this will provide for more accurate emissions estimates.	The spend-based method was used to estimate emissions, using secondary EEIO (environmentally extended input–output) factors from the EPA Supply Chain GHG Emission Factors for US Industries and Commodities. Transportation modes were aligned with the best available emission factors (e.g. "Rail" emissions factors were used for train/subway spending).
Supply Chain	Spend data was provided for major departments with significant procurement roles, specifically: PD&C, Pharmacy, IT, Nutrition Services, and Supply Chain. Data was parsed for LPCH-related expenses only. Internal transfers of funds, notably PD&C fees applied to capital projects, were excluded. Supply Chain and Pharmaceutical data were provided for fiscal years; if possible, we recommend collecting all data in either calendar year or fiscal year for consistency.	The spend-based method was used to estimate emissions, using secondary EEIO factors from the EPA Supply Chain GHG Emission Factors for US Industries and Commodities. Types of purchases were aligned with the best available emission factors (e.g. "Computer and Electronic Products" emissions factors were used for IT spending).
Helicopter Fuel	Helicopter fuel data came from Stanford Life Flight. Gallons of fuel were estimated based on total flight hours and a fuel burn rate of 80 gal/hr. Flights associated with LPCH were estimated by accounting for the flight volume of PIC/NICU/OB patients going to LPCH.	The helicopter fuel (helicopter A fuel) emission factors came from the Climate Registry 2021 Default Emission Factor Document.

CONCLUSION

In 2020, Lucile Packard Children's Hosptial emitted 77,812 Metric Tons of CO_2e from Scope 1, 2 and 3 emissions. Overall, this is a 7% decrease from 2019; however, the reductions were primarily derived from only Scope 1 and 2 emissions. With respect to Scope 3, emissions from waste, employee commuting, and patient travel actually increased from 2019. It is important to note the 2020 emissions were fundamentally informed by the unique conditions resulting from the COVID-19 pandemic that impacted the operations of all health systems including LPCH.

Across both reference years 2019 and 2020 the emission sources with the largest carbon footprint were Scope 3 related supply chain and employee commuting which aligns with national data trends for health systems. It is important to prioritize these areas for reduction as they can offer the greatest impact and overall reductions. LPCH can influence scope 3 emissions through strategic engagement with vendors, waste haulers, staff, patients, and the community at large. Specific ideas and recommendations for carbon reductions will follow this GHG inventory report and the brainstorming sessions. However, it is important to note that LPCH has less ability to control, and ultimately reduce these emissions as compared to Scope 1 and 2. Conversely, although Scope 1 and 2 emissions are significantly less than scope 3, LPCH has the ability to control them more directly and carbon reduction opportunities exist across both scopes and emission sources.

Supply Chain: Currently, the healthcare supplier sector has not been challenged to disclose carbon emissions, making it difficult for procurement staff to evaluate choices. Without disclosure at a large scale, the spend-based method is the most accurate measure available. With large scale disclosure, more granular inventories can track improvement over time more effectively. As vendors work to reduce their scope 1 and 2 emissions, LPCH can benefit from a reduction in their scope 3 emissions.

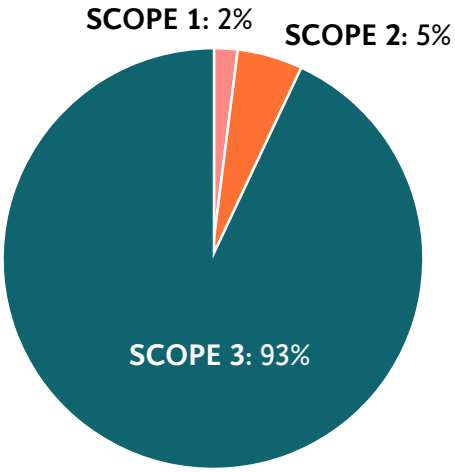
Employee Commute: Total commuter miles increased by 12%, in alignment with an 8% growth in FTE and a reduction in carpooling and vanpooling during the pandemic. Pandemic-related remote work volume was minor for the main campus workforce, with only 6% of employees working partially remote, and only 1% of employees working 80%-100% remote. There was a significant increase in single occupancy vehicle commuting, from 59% in 2019 to 82% in 2020. Focused effort on safe return to transit and ride sharing options will be necessary to see an improvement in these emissions. We recommend tracking electric vehicle driving in future inventories.

The aggregation and analysis of the overall emissions data has also revealed the need for improvements in tracking of Scope 2 and Scope 3 data; specifically supply chain, employee commute, business travel, patient travel, and SESI data to obtain more accurate or consistent results.

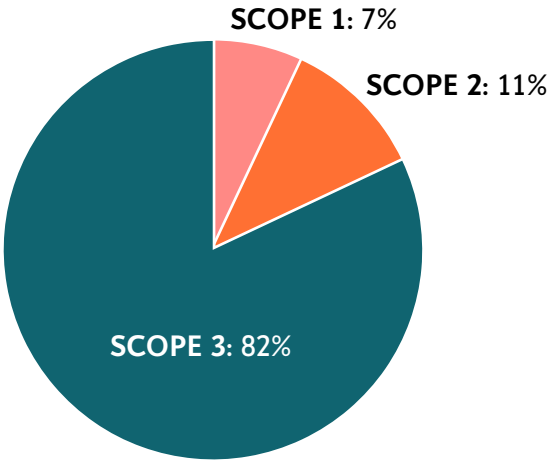
Additional emission sources were included in this inventory which are not part of the scope of the inventories prepared for the City of Palo Alto (scope / boundaries for the Palo Alto inventory are driven by requirements of the SUMC Renewal Project Environmental Impact Report). Specific additional emission sources included are supply chain, business travel, patient transport, refrigerants, additional waste types, additional medical gases, and additional employee commute transportation modes. Future GHG inventories may include other scope 3 emission sources excluded from this 2019-2020 inventory.

While some scope 3 emission sources were excluded from this inventory, the overall breakdown of scope 1, 2, and 3 emissions generally aligns with the US healthcare sector breakdown as seen in the pie chart below. At LPCH, scopes 1 and 2 represent an even smaller share, in part due to zero-emission energy sources.

LPCH 2020 EMISSIONS BREAKDOWN



AVERAGE US HEALTHCARE EMISSIONS BREAKDOWN



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