

# CITY AND BOROUGH OF SITKA

## Meeting Agenda Sustainability Commission

**Officers:** Chair Aurora Taylor, Vice Chair (*Vacant*), Secretary Erik de Jong

**Members:** Elizabeth Bagley, Gerry Hope, Adam Vail

**Staff Liaison:** Bri Gabel, Sustainability Coordinator

**Assembly Liaison:** Tim Pike

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Monday, January 5, 2026

6:00 PM

Harrigan Centennial Hall

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- I. CALL TO ORDER AND ROLL CALL
- II. ELECTION OF OFFICERS
- III. CONSIDERATION OF THE AGENDA
- IV. CONSIDERATION OF THE MINUTES
- V. PERSONS TO BE HEARD (*not to exceed 3 minutes on topics off the agenda*)
- VI. SPECIAL REPORTS
- VII. UNFINISHED BUSINESS
  - A. Discussion/Direction/Decision on Revision Recommendations to Sitka General Code 2.31:  
Sustainability Commission
- VIII. NEW BUSINESS
  - B. Review and Amend the Bylaws
  - C. Discussion/Direction/Decision on the Sitka Greenhouse Gas Emissions Inventory
  - D. Discussion on Sustainability Commission 2026-2027 Goals
- IX. PERSONS TO BE HEARD (*not to exceed 3 minutes on topics on or off the agenda*)
- X. REPORTS (*Staff, Chair, Assembly, Commissioners*)
- XI. SET NEXT MEETING DATE AND AGENDA
- XII. ADJOURNMENT

# PROCEDURE FOR ELECTION OF OFFICERS

3 Seats to be elected: Chair, Vice Chair, Secretary

## ***If one member is nominated:***

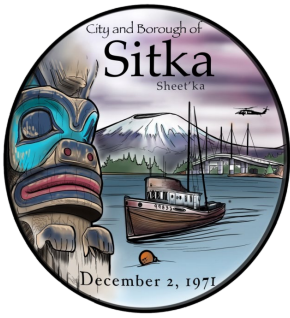
1. Move to nominate: *"I move to nominate \_\_\_\_\_ as the Chair/Vice Chair/Secretary."*
2. Second of above motion
3. Nominee accepts or declines nomination
4. Commission votes "yay" or "nay", motion passes or fails.

## ***If multiple members are nominated:***

1. Move to nominate: *"I move to nominate \_\_\_\_\_ as the Chair/Vice Chair/Secretary."*
2. Second of above nomination
3. Repeat steps **1** and **2** above as many times as necessary
4. Nominees accept or decline nominations
5. Commissioners vote by roll call and vote by name (rather than "yay" or "nay"), member with majority of votes is elected.

## ***Decision to postpone may be made:***


1. For all positions: *"I move to postpone election of officers until the March 4<sup>th</sup> regular meeting."*
2. For a particular position: *"I move to postpone the election of the Chair/Vice Chair/Secretary to the March 4<sup>th</sup> regular meeting."*
3. Second of above motion
4. Commission votes "yay" or "nay", motion passes or fails.



# CITY AND BOROUGH OF SITKA

A COAST GUARD CITY

## MEMORANDUM

**To:** Sustainability Commission Members  
**From:** Bri Gabel, Sustainability Coordinator   
**Date:** December 22, 2025  
**Subject:** **Discussion/Direction/Decision on Revision Recommendations to Sitka General Code 2.31: Sustainability Commission**

### Background

The Commission is composed of seven members appointed by the Assembly and, to the extent deemed advisable by the Assembly and possible from the applicants, include at least one individual with background or training as a sustainability professional and at least one individual of Alaska Native heritage with understanding and appreciation of the historical importance of sustainability on Tlingit Aaní. All voting members of the commission shall be at-large members and representative of a diverse cross-section of the community (SGC 2.31.010).

With the appointment of Commissioner Vail in November, the Commission now has two open seats. Open seats have caused challenges in meeting the quorum requirement of four members to take Commission action as open seats count towards the majority requirement (SCG 2.25.101).

At the November regular meeting, the Commission recommended that SGC 2.31.010 be amended to reduce the Commission's size from seven members to five. With the appointment of Commissioner Vail, if approved, the Commission would be considered full, and its quorum requirement would be three rather than four.

The Commission also discussed recommending the regular meeting frequency, which is currently monthly, but requested that staff seek additional guidance from the Municipal Clerk before making a recommendation.

### Analysis

#### **Types of meetings of municipal boards, commissions, and committees:**

**Regular Meeting:** *Doing business.* A formal, regularly scheduled meeting for official decision making when action can be taken via motions. These meetings follow Robert's Rules of Order and do not have flexibility.

**Work Session:** *Preparing for business.* An informal meeting where discussion, information gathering, strategizing can take place, but no formal action can be taken (no motions allowed). These meetings are more flexible as they do not follow Robert's Rules of Order.

**Special Meetings:** A formal meeting called to address a time sensitive issue outside of the regularly occurring meeting.

The Municipal Clerk clarified that “meetings” as used in the SGC refers to *regular meetings* and that only the number of regular meetings in a year and frequency, if necessary, should be codified. Additional details about how the Commission may choose to meet the requirement specified in code should exist in the Commission’s Bylaws.

In review of the Commission’s previous agendas, items are generally a mix of formal actions such as letter and/or comment approvals and general discussion and/or feedback on long-term projects that would better fall under a work session. Splitting out these two items by amending SGC 2.31.030A to allow more flexibility in the kinds of meetings held would allow the Commission to make progress towards goals and remain responsive to the direction given by the Assembly in SGC. It would likely also reduce overall regular meeting time when decisions need to be made. Based on previous agendas and item types, between 4-6 regular meetings would be sufficient with work sessions in between to maintain momentum.

**Municipal Body Meeting Language:**

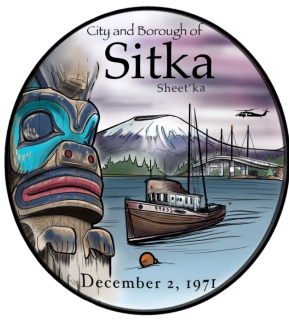
- **Health Needs and Human Services Commission (SGC 2.30.030A):** Meet a minimum of four times per year...
- **Sustainability Commission (2.31.030A):** Meet once per month...
- **Tourism Commission (SGC 2.32.030A):** ...shall convene at least nine monthly meetings each year...
- **Library Commission (SGC 2.35.070A):** ...shall be held...at least once each quarter...
- **Historic Preservation Commission (SGC 2.50. 030A):** ...shall meet a minimum of two times per year...
- **Parks and Recreation Committee (SGC 2.60.050):** ...shall schedule meetings as required, but in no event shall meetings be held less than every quarter.

**Recommendation**

Consider a recommendation to revise SGC 2.31.030A based on the anticipated number of regular meetings and desired frequency. Amend the Bylaws (Item B) to reflect details about alternating between regular meetings and work sessions if desired.

**Next Steps**


The Clerks office will prepare the necessary materials needed to take the Commission’s recommendations to the Assembly for approval. It is anticipated that the first reading will occur in January and go into effect after the second reading.



# CITY AND BOROUGH OF SITKA

A COAST GUARD CITY

## MEMORANDUM

**To:** Sustainability Commission Members  
**From:** Bri Gabel, Sustainability Coordinator   
**Date:** December 22, 2025  
**Subject:** Review and Amend Bylaws

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### **Background**

In the initial meeting of the Sustainability Commission, the Commission adopted bylaws comprised of sections of the Sitka General Code, the establishing ordinance of the Commission, and other parliamentary procedure resources. The purpose of this document was to act as an accessible way to answer questions pertaining to Commission duties, functions, and procedures.

Article VII; Section C, states: The Commission shall annually review the bylaws at the first regular meeting in January.

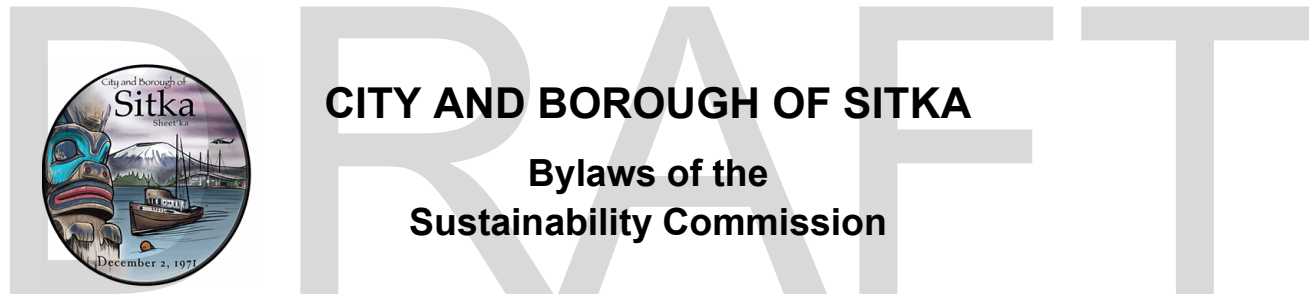
The Commission does not need to amend the bylaws unless they would like to. If a commissioner would like to propose changes, this item allows for that to take place via a motion. Changes made to SGC 2.31 will be reflected in the Bylaws and do not require formal Commission action.

### **Recommendation**

Amend the Bylaws as needed, based on discussion of the Commission. Review the recommended amendments (enclosed) to reflect recommended changes to SGC 2.31 and as advised by the Municipal Clerk to reflect alternating work sessions with regular meetings.

### **Encl**

Sustainability Commission Bylaws with recommended amendments.



# CITY AND BOROUGH OF SITKA

## Bylaws of the Sustainability Commission

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Adopted November 14, 2022

Amended April 1, 2024

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### I. PURPOSE, DUTIES, AND RESPONSIBILITIES

#### A INTRODUCTION

The Sustainability Commission of the City and Borough of Sitka (respectively “Commission” and “City”) is an advisory body established by Ordinance 2022-16S. This document summarizes the scope of the responsibilities of the Commission and specifies the way those responsibilities shall be performed, including its structure, processes, and reporting requirements, as mandated in its establishing ordinance and within Sitka’s General Code (SGC).

#### B PURPOSE

It is the intent of the Sustainability Commission to work towards catalyzing a healthy community now and in the future by proposing solutions to environmental, social, and economic concerns of the City and Borough of Sitka, its partners, and community members (Ord. 2022-16S § 3, 2022.).

#### C DUTIES AND RESPONSIBILITIES

The Commission will act as an advisory body to the Assembly with the purpose of catalyzing and developing municipal and community-focused approaches that support the social, environmental, and economic sustainability of the City. The Commission will accomplish this by working towards the following actions described below (SGC 2.31.060).

- i. Fossil energy use reduction and development of local, renewable energy sources.
- ii. Responsible use of natural resources.
- iii. Diminution of Sitka’s supply-chain fragility.
- iv. Food security enhancement.
- v. Sustainable transportation options that leverage Sitka’s locally generated, renewable energy sources.
- vi. Solid waste consumption, reduction, composting, recycling, and re-use.
- vii. Robust and healthy local ecosystems and natural communities.
- viii. Other matters as the Assembly or Commission may deem beneficial for the City.

### II. ORGANIZATION

#### A MEMBERS

The Commission is composed of seven (7) members appointed by the Assembly and, to the extent deemed advisable by the Assembly and possible from the applicants, include at least one (1) individual with background or training as a sustainability professional and at least one (1) individual of Alaska Native heritage with understanding and appreciation of the historical importance of sustainability on Tlingit Aaní. All voting members of the commission shall be at-large members and representative of a diverse cross-section of the community (SGC 2.31.010).

The Sustainability Coordinator within the Planning and Community Development Department or designee shall be an ex-officio member without a vote (SGC 2.31.010). The Sustainability Coordinator will also serve as the point of contact between Commissioners and City staff through which requests for information can be made.

**B TERM**

The term of a voting member shall be three (3) years or until a successor is appointed. Terms will have staggered expiration dates (SGC 2.31.020).

**C OFFICERS**

The Commission will designate a Chair, a Vice Chair and a Secretary, each of whom shall be elected by the voting members of the Commission and shall serve a term to expire upon election of officers at the first meeting of the following year. The Secretary shall provide minutes of all meetings to the Municipal Clerk (SGC 2.14.040).

In addition to the above officers, the Commission, by a majority vote of its voting members, may designate and elect or appoint such other officers, assistant officers, and agents as it deems necessary at such time, in such manner, and upon and for such terms as it shall prescribe. All officers and agents shall serve at the pleasure of the Commission, whenever in its judgment the best interest of the commission will be served (SGC 2.31.050).

**D RESIGNATION**

Should a member resign from their position prior to expiration of their term, the vacancy on the Commission shall be filled by appointment by the Assembly for any remainder of an unexpired term (SGC 2.31.020).

Should an officer resign from their position prior to expiration of their term, or otherwise is unable or unwilling to perform duties as required of the office, the Commission may elect an officer to serve out the remainder of that term (SGC 2.31.050).

**III. CONDUCT AND PARTICIPATION****A PARLIAMENTARY AUTHORITY**

The conduct of the meetings shall be generally guided by the rules contained in the modern (11<sup>th</sup>) edition of *Robert's Rules of Order*.

**B TELECONFERENCE PARTICIPATION**

While physical presence of the members and the public is the preferred method of participation at the meetings, teleconference participation is allowed (SGC 2.25.050). Any member may participate in any meeting by teleconference. Teleconference participation is solely at the discretion of the member who requests this method of participation if the member is out of town or incapacitated.

The member shall notify the Sustainability Coordinator to arrange for teleconference participation at least twenty-four (24) hours before any regular meeting, and at least twelve (12) hours before any special meeting. If the member is a presiding officer, they shall not preside over the meeting when participating by teleconference.

Teleconference participation at any meeting is limited to four (4) times a year by each member (SGC 2.25.050 (f)).

**C VOTING**

Abstention from voting is not allowed (Sitka Charter 2.10, Alaska Statutes 29.29.169(d)) except in cases where a commissioner may have a conflict of interest as defined in the City Charter 1.04.080.

Four (4) affirmative votes shall be necessary to carry any questions (SGC 2.25.020). Vacant memberships shall be counted in determining whether this majority requirement is met. (SGC 2.25.010).

All voting will be done by voice vote unless done by roll call when requested by the Chair. The roll call will be done alphabetically. Roll call votes of every member will be recorded.

All voting at meetings with teleconferencing participants shall be by roll call vote (SGC 2.25.050 (e)).

**D ABSENCES**

The minutes shall show those in attendance at each meeting, and whether an absent member is excused or not. The members shall notify the Sustainability Coordinator of their absence at least twenty-four (24) hours before any regular meeting, and at least twelve (12) hours before any special meeting.

Three (3) unexcused absences, as determined by the appointed board or commission, in one (1) year by a member shall automatically be cause for forfeiture of membership (SGC 2.25.040).

**IV. MEETINGS****A REGULAR MEETINGS**

Meetings will be held once per month at such time as the chair or, in their absence, the vice chair shall determine (SGC 2.31.030). Meetings will normally take place at 6:00 PM on the first Monday of each month at Harrigan Centennial Hall. The Commission will give reasonable public notice by advertising its meetings at least one (1) business day in advance and comply in all respects with the Alaska Open Meetings Act.

**B WORK SESSIONS**

In between regular meetings, the Commission will hold Work Sessions at the normal meeting time. No formal action will be taken; the Commission will give reasonable public notice by advertising its meetings at least one (1) business day in advance and comply in all respects with the Alaska Open Meetings Act.

**C QUORUM**

A quorum of four (4) members is required to hold a meeting. Vacancies in memberships shall be counted in determining whether there is a quorum (SGC 2.25.010).

**D SPECIAL MEETINGS**

Special meetings may be called with seven (7) days advance notice. Special meetings may be called by the Chair or by request to the Chair. Reasonable public notice will be given by advertising its meetings at least one (1) business day in advance.

**E INFORMAL WORKING GROUPS**

The Commission may form informal working groups to address key areas that may evolve if needed. To remain in compliance with the Alaska Open Meetings Act, the number of members in an informal working group is limited to three (3) Commissioners. The purpose is to develop operational, and engagement plans as well as implementation strategies for review of the entire Commission. Example

areas may include but are not limited to electric vehicles and city infrastructure, sustainable tourism, greenhouse gas emissions inventories, and solid waste management.

## **F ORDER OF BUSINESS**

The order of business shall normally be:

- i. Call to Order and Roll Call
- ii. Consideration of the Agenda
- iii. Consideration of the Minutes
- iv. Persons to be Heard (*not to exceed 3 minutes on topics off the agenda*)
- v. Special Reports
- vi. Unfinished Business
- vii. New Business
- viii. Persons to be Heard (*not to exceed 3 minutes on topics on or off the agenda*)
- ix. Reports (*Staff, Chair, Assembly, Commissioners*)
- x. Set Next Meeting Date and Agenda
- xi. Adjournment

## **V. SETTING THE AGENDA**

### **A ADDING ITEMS TO THE NEXT AGENDA**

The agenda shall normally be set seven (7) days in advance of the regular meeting. To remain in compliance with the Alaska Open Meetings Act, items may not be added after the agenda has been publicly advertised or during a regular or special meeting. Items may be added to the next agenda:

- i. By Commissioner request during a meeting or by contacting and requesting to the Chair.
- ii. As requested by the Assembly, Administrator, and other Department Heads within the City.
- iii. Or the public may request items to be added through public testimony, written correspondence, or verbal request to a member of the Commission. Items requested by the public will be added to agendas at the discretion of the Chair.

### **B ITEMS NOT ADDED TO THE AGENDA**

Item requests made outside of meetings by Commissioners that are not added to the agenda will be published in the monthly meeting packet and accompanied by a rationale for submittal statement and a response from either the Chair or Staff Liaison for Commissioner review. A motion to add denied items to a future agenda may be made under Order of Business X: Set Next Meeting Date and Agenda.

## **VI. WORKING PROCEDURES**

### **A ANNUAL WORK CYCLE**

To best utilize Commissioner's time, City resources, align the workflow of the Commission with that of the City's, and meet annual reporting as deemed by the Assembly, the Commission will operate on the Annual Work Cycle outlined below. It should be noted that the City operates on a fiscal year (FY), which begins July 1, and ends on June 30. As such, the adopted timeframes align with City's budgeting process deadlines to minimize time spent waiting for the allocation of resources from the City.

The following dates are to serve as a guide and do not require strict adherence. It is subject to the discretion of the Commission to adjust timelines as needed to meet Assembly goals while remaining in sync with City operations.

**SUSTAINABLY COMMISSION ANNUAL WORK CYCLE OUTLINE (APPENDIX A)**

**July-March:** Execute current FY goals.

**September-October:** Public Input for upcoming FY.

**October-December:** Brainstorm goals, select, and define outcomes for upcoming FY.

**January-March:** Prepare annual report for Assembly with updates on the current FY goals and proposing upcoming FY goals.

**March-April:** Present report to Assembly.

**April-June:** Conclude work for current FY. Begin preparing for goals of the upcoming FY.

**B REPORTING TO THE ASSEMBLY**

Annually, the Commission will develop, identify, and present goals to the Assembly for approval. The approved goals shall be the Commission's primary focus for the following year. Concurrently with presenting goals to the Assembly, the Commission will submit a report to the Assembly on progress towards the previous year's goals and other activities which were approved and directed by the Assembly (SGC 2.31.060).

**C EXTERNAL RESOURCES**

With the approval and direction of the Assembly, the Commission will work with designated staff to provide information and outreach to the public, in order to understand community priorities and develop community consensus on matters concerning sustainability. This effort may require the commission to invite participation and technical expertise from community partners and professionals (e.g., engineers, public administration experts, earth system scientists, business leaders, educators, community group leaders, etc.). If City and Borough funds are needed to facilitate participation and technical expertise from community partners and professionals, the commission shall obtain prior approval and the necessary appropriation from the Assembly (SGC 2.31.060).

**VII. AMENDMENTS****A COMPLIANCE**

The Commission recognizes that these bylaws repeat provisions in the City Charter and SGC and that those provisions take precedence and cannot be altered, amended, or repealed.

**B AMENDMENTS**

Sections of these bylaws not established by City Charter or SGC may be altered, amended, or repealed by the affirmative vote of a majority of members at any regular or special meeting. Any amendments will be consistent with the Charter and SGC.

**C REVIEW OF BYLAWS**

The Commission shall annually review the bylaws at the first regular meeting in January.

**VIII. ADOPTION**

These foregoing bylaws have been **ADOPTED AND APPROVED** by the Sustainability Commission by 6-0 voice vote on this 14<sup>th</sup> day of November 2022.

ATTEST:

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Katie Riley, Chair

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Carol Voisin, Secretary

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**IX. AMENDMENT HISTORY**

**I. ARTICLE IV: MEETINGS, SECTION A: REGULAR MEETINGS**

Date and time change from 2<sup>nd</sup> Monday of each month at 6:30 P.M.

Amended: January 9, 2023

**II. ARTICLE V: SETTING THE AGENDA**

Added clarification to Section A: Adding Items to the Next Agenda and addition of Section B: Items Not Added to the Agenda.

Amended: February 7, 2023

**III. MEETINGS, SECTION A: REGULAR MEETINGS**

Date and time change from 1<sup>st</sup> Tuesday of each month at 6:00 P.M.

Amended: February 4, 2024

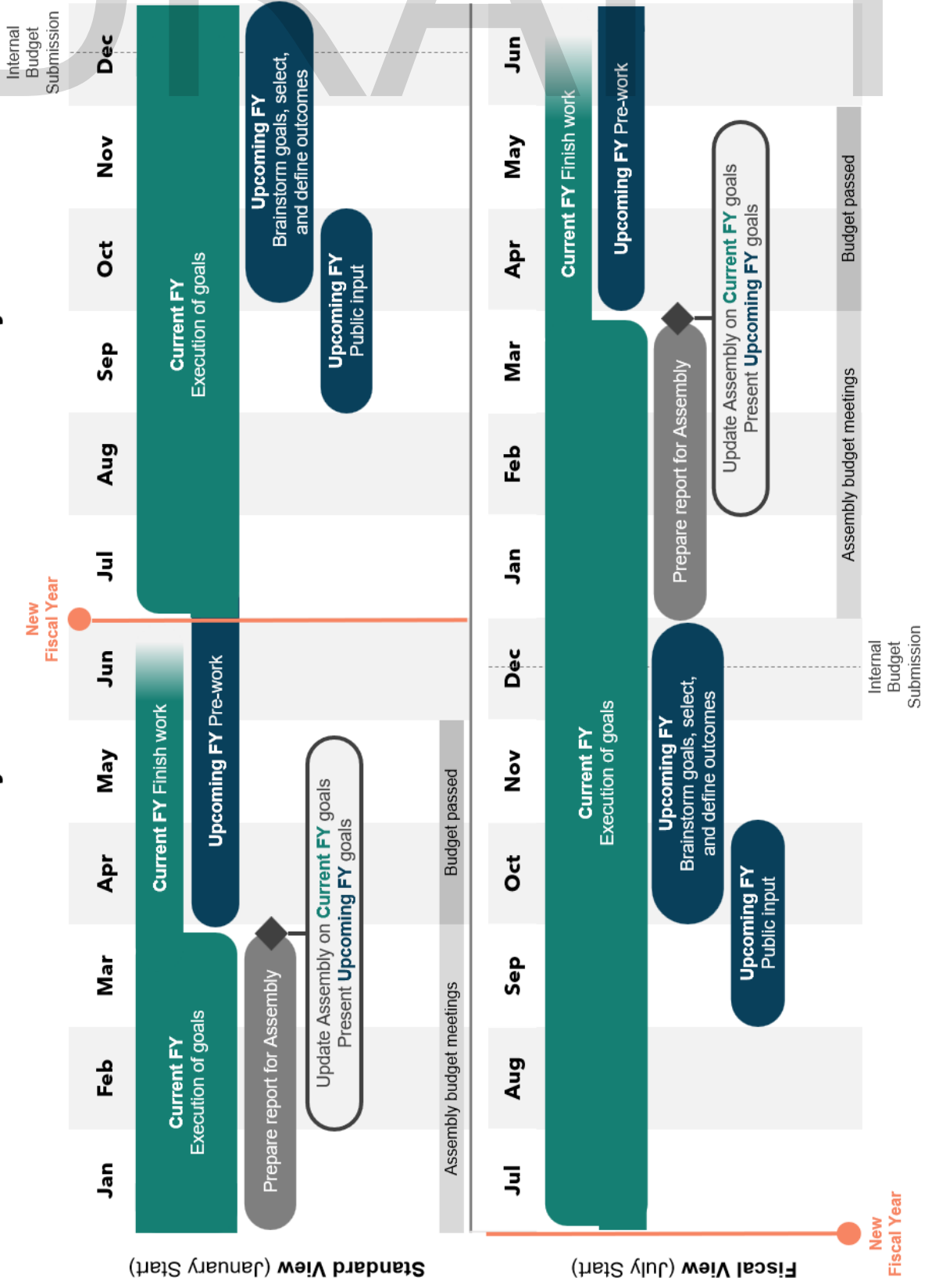
**IV. ARTICLE IV: MEETINGS, SECTION B: ORDER OF BUSINESS**

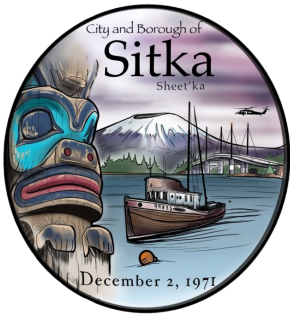
Added V. Special Reports and IX: Reports to order of business.

Amended: April 1, 2024

APPENDIX A

# Sustainability Commission Annual Work Cycle






# CITY AND BOROUGH OF SITKA

A COAST GUARD CITY

## MEMORANDUM

**To:** Sustainability Commission Members  
**From:** Bri Gabel, Sustainability Coordinator   
**Date:** December 22, 2025  
**Subject:** **Discussion/Direction/Decision on Sitka Community Greenhouse Gas Emission Inventory**

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### **Background**

As part of the Sitka Community Renewable Energy Strategy (SCRES), a community-wide greenhouse gas (GHG) emissions inventory is included. GHG inventories are often conducted by specific organizations and/or locations using aggregated, scaled, and/or modeled data to estimate the greenhouse gases emitted in a given timeframe, typically annually.

Throughout the process, the SCRES technical team has collaborated with the Sustainability Commission to create appropriate assumptions for a Sitka-specific inventory, which due to its islanded nature and renewable electricity generation, does not clearly fit standard methodologies.

A draft was released on November 29<sup>th</sup>, 2024 and public comment was taken via email or phone until December 31<sup>st</sup>, 2024. This draft received over 40 pages of public comments from 16 individuals.

Throughout 2025, the technical team revised the report (enclosed) to reflect direction given by the Sustainability Commission, address public comment as applicable, and update assumptions based on new information. Many comments provided additional information regarding the marine sector that was used to refine the calculations as well as specifics for tourism, and home heating ratios. A general request was for more transparency and clarity in methodology.

### **Next Steps**

An updated version (enclosed) was released December 16<sup>th</sup>, and public comments are being taken until January 25<sup>th</sup>.

### **Recommendation**

Commissioners should provide any additional comments they may have. The Commission should consider how to use this report in its annual goal setting. Advise staff on what they would like to see on future agendas regarding the report.

### **Encl**

2023 Sitka Greenhouse Gas Emissions Inventory Public Review Draft

# SCRES

SITKA COMMUNITY RENEWABLE ENERGY STRATEGY  
A City and Borough of Sitka Project

# GREENHOUSE GAS EMISSIONS INVENTORY

## DRAFT

**Public comment is open until January 25<sup>th</sup>, 2026**

Email comments to [sustainability@cityofsitka.org](mailto:sustainability@cityofsitka.org)

For questions or assistance, please call (907) 747-1856

**2023  
ENERGY BASELINE**

## **Greenhouse Gas Emissions Inventory Guiding Questions:**

*If you want to leave public comment but don't know where to start, here are some prompting questions to help get you thinking:*

Is the document clear and easy to understand?

Are there areas you want more information or clarity?

Are the assumptions used to calculate emissions easy to understand?

Are there any categories/sources of emissions that are missing?

What is the most useful piece of information in the GHG emissions inventory to you?

What would make this document more useful for you?

**Public Comment on Sitka's Greenhouse Gas Emissions Inventory  
is open until January 25<sup>th</sup>, 2026.**

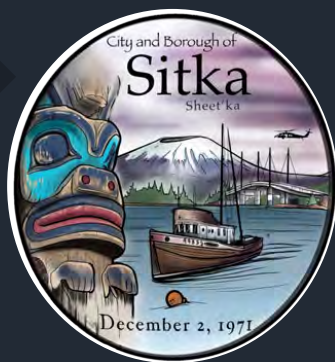
Please submit comments to [sustainability@cityofsitka.org](mailto:sustainability@cityofsitka.org)

For questions or assistance, please call (907) 747-1856



# SCRES

SITKA COMMUNITY RENEWABLE ENERGY STRATEGY  
A City and Borough of Sitka Project



## CITY AND BOROUGH OF SITKA

**Mission:** *To provide public services for Sitka that support a livable community for all.*

# ACKNOWLEDGEMENTS

**Andrea Mott, Ali Trueworthy, and Molly Gear**, of the Pacific Northwest National Laboratory (PNNL), provided research and methodology to support Sitka's requests

**Bri Gabel**, of the City and Borough of Sitka, provided support on research, methodology, data visualizations, and community engagement

**Erik de Jong**, of the Sustainability Commission, provided research and methodology on cruise ship emissions

## ADVISORY COMMITTEE

### City and Borough of Sitka Sustainability Commission

Aurora Taylor, *Chair*

Katie Riley, *Vice Chair*

Erik de Jong, *Secretary*

Elizabeth Bagley

Gerry Hope

Kevin Mosher, *Assembly Liaison*

Thor Christianson, *Assembly Liaison*

*Thank you, previous members*

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## THANK YOU TO ALL COMMUNITY MEMBERS WHO CONTRIBUTED INFORMATION & FEEDBACK

**A special thank you to those who contributed detailed information for specific emission sources**

**Sitka Tribe of Alaska**  
Public Transportation

**Sitka Dock Company, LLC.**  
Tourism-Related Ground  
Transportation

**Sitka Rocky Gutierrez Airport**  
Air Travel

**Alaska Longline  
Fishermen's Association  
Kempy Energetics  
Alaska Department of  
Fish and Game: Sitka Area  
Management Division of Sport Fish  
Marine Activity**

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## PHOTO CREDITS

Josh Houston, Lee House, Brittany Falch

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## RECOMMENDED CITATION

*2023 Sitka Greenhouse Gas Emissions Inventory.* City and Borough of Sitka, 2026.

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# ACRONYMS AND ABBREVIATIONS

<b>AIS</b> Automatic identification system	<b>GWP</b> Global warming potential
<b>AK</b> Alaska	<b>HCFC</b> Hydrochlorofluorocarbon
<b>AR6</b> 6 <sup>th</sup> assessment report by the IPCC	<b>IPCC</b> Intergovernmental Panel on Climate Change
<b>ATV</b> All-terrain vehicle	<b>HCH</b> Harrigan Centennial Hall
<b>Avg</b> Average	<b>MSW</b> Municipal solid waste
<b>BEV</b> Battery electric vehicle	<b>NHTSA</b> National Highway Traffic Safety Administration
<b>CBS</b> City and Borough of Sitka	<b>N<sub>2</sub>O</b> Nitrous oxide
<b>CFC</b> Chlorofluorocarbon	<b>PFC</b> Perfluorocarbon
<b>CH<sub>4</sub></b> Methane	<b>PHEV</b> Plug-in hybrid electric vehicle
<b>CO<sub>2</sub></b> Carbon dioxide	<b>PNNL</b> Pacific Northwest National Laboratory
<b>DHW</b> Domestic hot water	<b>STA</b> Sitka Tribe of Alaska
<b>DMV</b> Department of Motor Vehicles	<b>SUV</b> Sport utility vehicle
<b>DOT</b> U.S. Department of Transportation	<b>USACE</b> U.S. Army Corps of Engineers
<b>EIA</b> Energy Information Administration	<b>VEAT</b> Vessel Energy Analysis Tool
<b>ETIPP</b> Energy Technology Innovation Partnership Project	<b>VIN</b> Vehicle identification number
<b>EV</b> Electric vehicle (BEV and PHEV)	<b>vPIC</b> NHTSA's VIN decoder program
<b>FAA</b> Federal Aviation Administration	<b>WA</b> Washington State
<b>FHA</b> Federal Highway Administration	
<b>GHG</b> Greenhouse gas	
<b>GVWR</b> Gross vehicle weight rating	

# UNITS OF MEASUREMENT AND SYMBOLS

## Numerical Abbreviations

<b>k</b>	1,000, one thousand
<b>M</b>	1,000,000, one million
<b>~</b>	Approximately
<b>&gt; #</b>	Greater than
<b>&lt; #</b>	Less than
<b>≥ #</b>	Greater than or equal to
<b>≤ #</b>	Less than or equal to

## Weight, Volume and Distance

<b>g</b>	Gram
<b>kg</b>	Kilogram, 1,000 g   2.2 lb
<b>MT</b>	Metric ton, 1,000 kg
<b>lb</b>	U.S. pound   0.45 kg
<b>ton</b>	U.S. short ton   2,000 lb   0.9 MT
<b>gal</b>	U.S. gallon
<b>mi</b>	U.S. mile

## Emissions

<b>MTCO<sub>2</sub>e</b>	Metric ton of Carbon dioxide equivalent
<b>GWP</b>	Global warming potential

These units use CO<sub>2</sub> to compare other gases. See details on page 4.

## Electricity

<b>kW</b>	kilowatt
<b>MW</b>	Megawatt, 1,000 kW
<b>GW</b>	Gigawatt, 1,000 MW
<b>-Wh</b>	Watt-hour, kWh, MWh, GWh

Watts measure electrical power while watt-hours measure electricity that was used. Think of it as the diameter of a water pipe (W), vs how much water ends up in a bucket (Wh).

## Building Heating

<b>Btu</b>	British thermal unit, measures energy used for heat
<b>MMBtu</b>	1,000,000 Btu*
<b>sf</b>	Square-foot, measures floor space
<b>°F</b>	Degrees in Fahrenheit, measures temperature

\*unlike other units, Btu use different abbreviation prefixes; Mbtu = 1,000 Btu

## Air Travel

<b>RPM</b>	Revenue passenger miles, measures air traffic volume. Represents the number <i>occupied</i> seats and the miles they travel. For example, a plane with 100 passengers that travels 500 miles generates 50,000 RPM. RPM are reported in thousands. 1 RPM = 1,000 mi
<b>ASM</b>	Available seat miles, measures the <i>total number of seats</i> available and the miles they travel, like RPM. Dividing the RPM by the ASM tells you how full a route was. For example, if a plane with 100 seats with only 60 passengers travels 500 miles, it produces 50,000 ASM and 30,000 RPM. That means the flight was 60% full.

## Ground Transportation

<b>AADT</b>	Annual average daily traffic, measures traffic volume. Represents the number of vehicles that cross a certain point in either direction each day, over the course of one year.
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## Cruise Ships

<b>MCR</b>	Maximum continuous rating, measures how much a cruise ship engine is running and is reported as a percentage.
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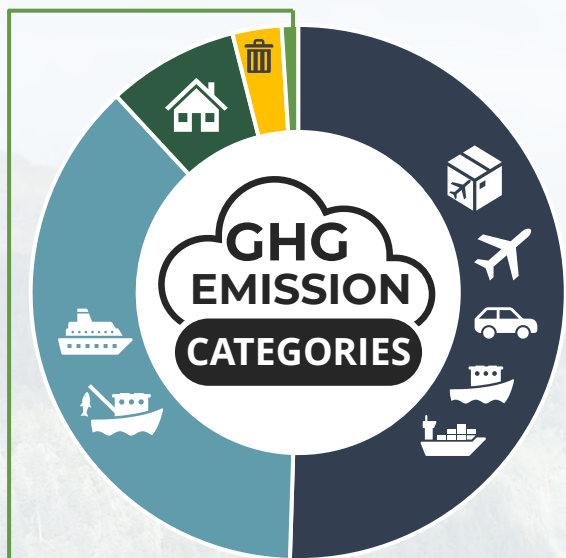


*The Blue Lake dam*

IN 2023, SITKA PRODUCED

# 128,675 MTCO<sub>2</sub>e

Metric Tons of Carbon Dioxide Equivalent



Scope 1

**33,275 MTCO<sub>2</sub>e**  
EMITTED DIRECTLY



Scope 3

**95,399 MTCO<sub>2</sub>e**  
EMITTED INDIRECTLY



**ELECTRICITY** ⚡

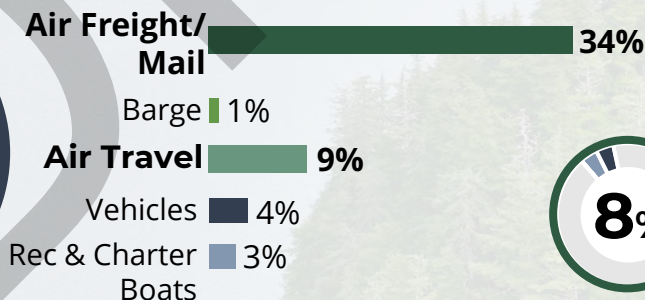
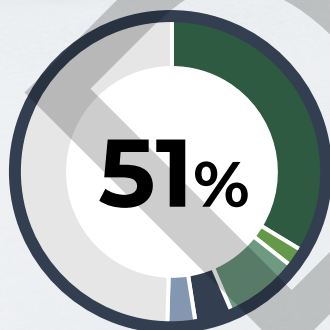
0.1%

**HYDROELECTRICITY REDUCED  
SITKA'S EMISSIONS BY**

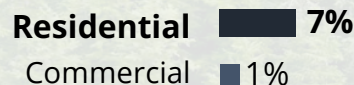
~110,000 MTCO<sub>2</sub>e from ~11M gallons of diesel

**↓46%**

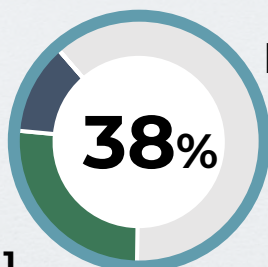
## TRANSPORTATION



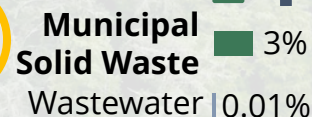
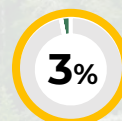
## BUILDINGS



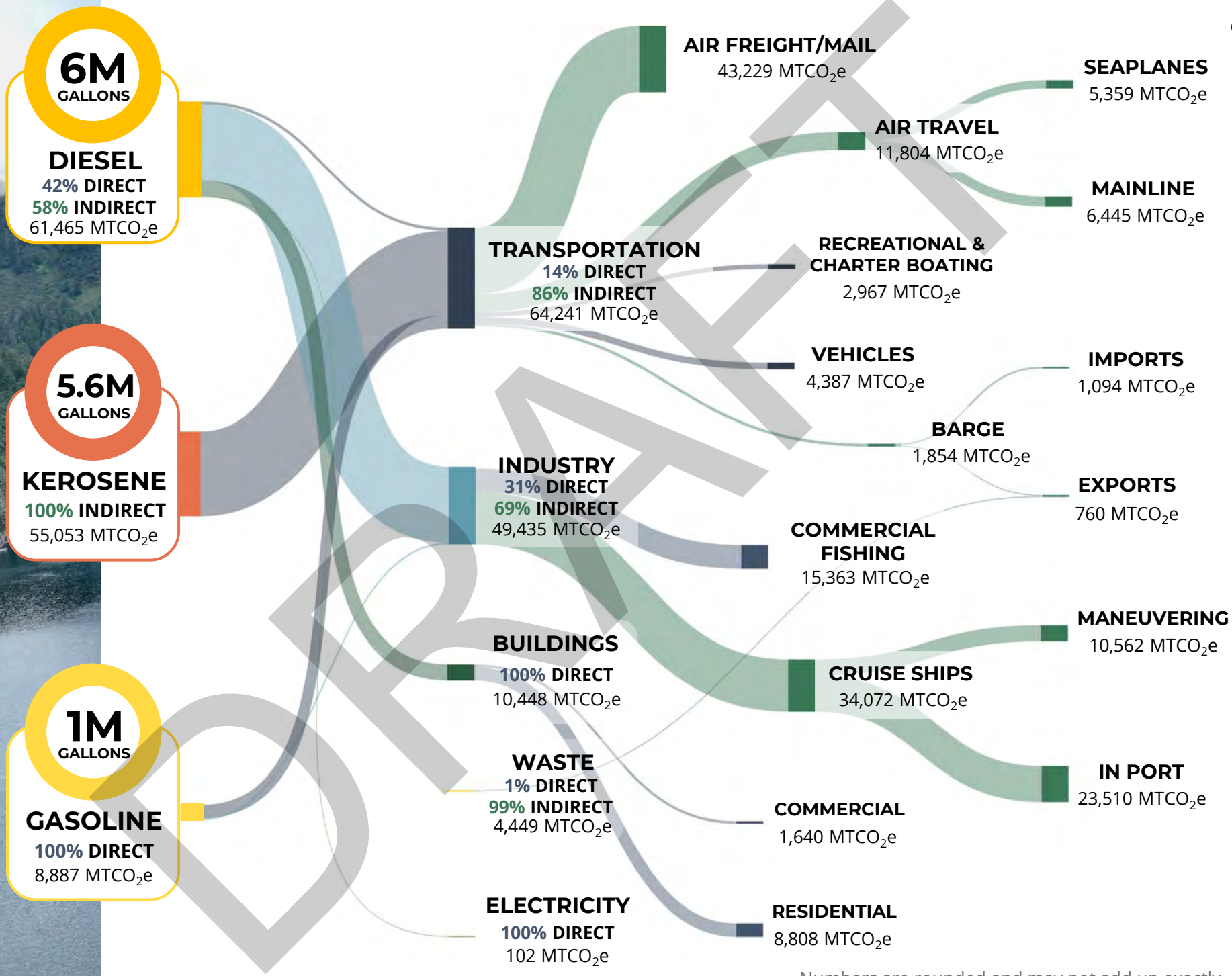
## INDUSTRY



## WASTE



# EMISSION SOURCE END USES



Numbers are rounded and may not add up exactly.



*The backside of the Blue Lake dam*

## SECTION 1

# INTRODUCTION TO GREENHOUSE GAS EMISSION INVENTORIES

# INTRODUCTION TO GHG EMISSION INVENTORIES

## What are Greenhouse Gases?

Solar radiation from the sun warms the Earth's surface, which in turn releases heat back into the atmosphere. Some of that heat leaves the atmosphere and dissipates into space, but some is absorbed and re-emitted by certain gases in the atmosphere, trapping the heat in the atmosphere. This is known as the *greenhouse effect*<sup>1</sup> (Figure 1).

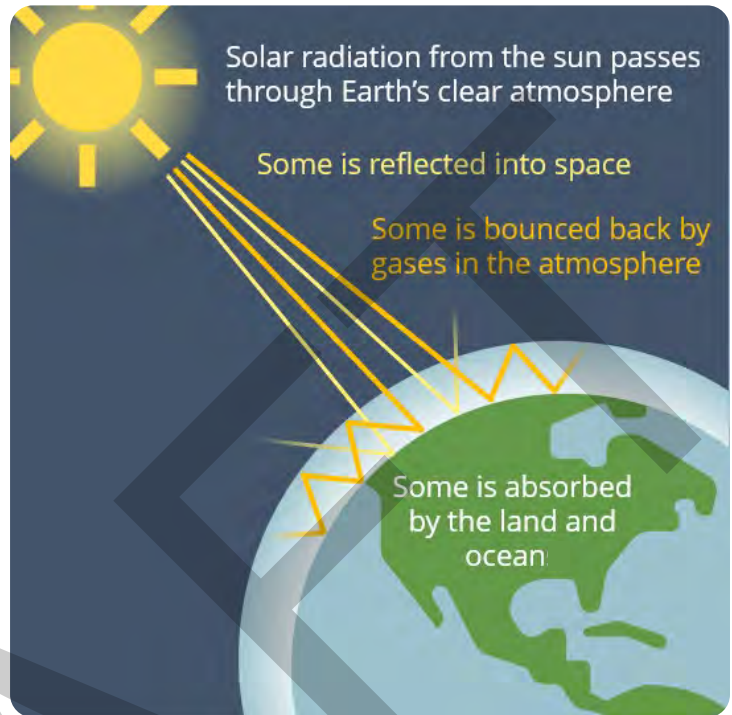


Figure 1: The Greenhouse Gas Effect. Increased GHGs means less heat from the sun escapes the atmosphere.

**Greenhouse gases** (GHG) are gases that contribute to this heat trapping effect. Many of these gases occur naturally in the atmosphere; however human activities that emit GHGs are responsible for increases in concentrations. This phenomenon is known as *global warming*, which plays a significant role in broader climate changes caused by human activities that rely on fossil fuels.

**Not all GHGs are the same.** Some GHGs are more effective at trapping heat. GHGs can remain in the atmosphere for different lengths of time, from just a few years to thousands of years. Global Warming Potential (GWP) is used to compare GHGs heat trapping capabilities compared to one ton of CO<sub>2</sub> over 100 years<sup>2</sup>.

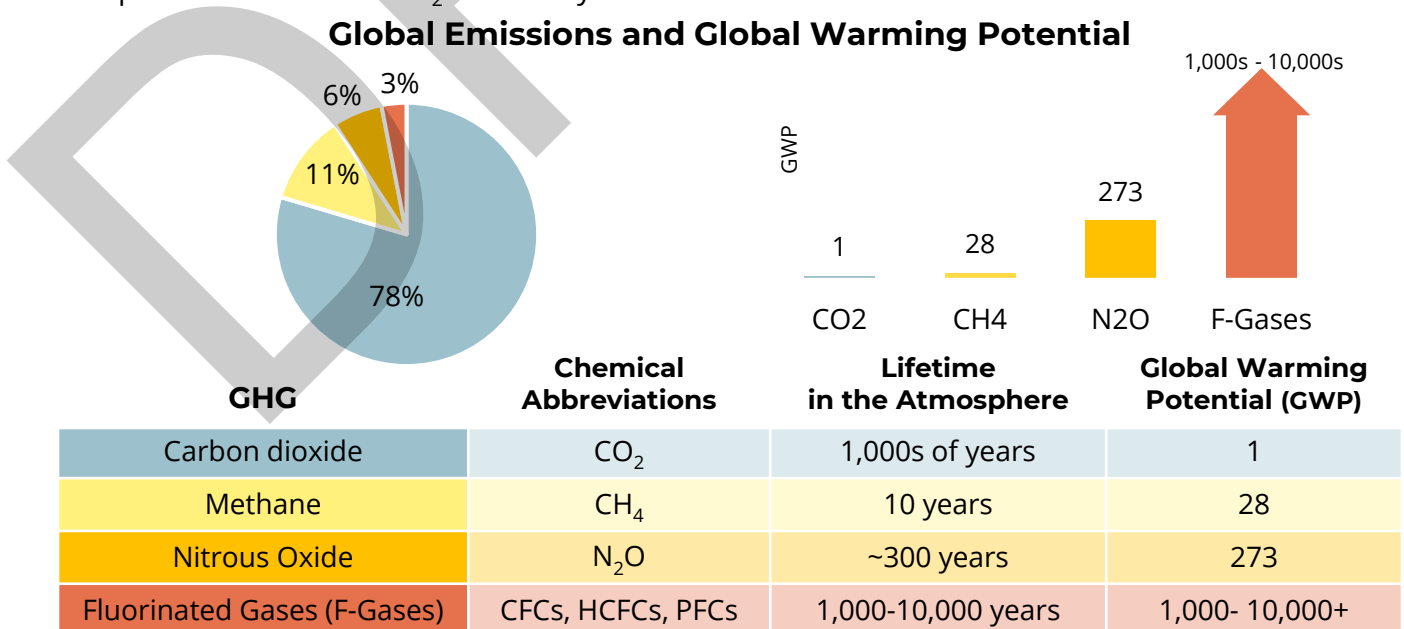


Figure 2 and Table 1: How Greenhouse Gases Warm Our Planet. AR6 values, IPCC Sixth Assessment<sup>2</sup>.

## What is a Greenhouse Gas Emissions Inventory?



Figure 3: Common sources of GHG emissions.

GHG emissions inventories consider human activities associated with GHG emissions and estimate the quantity of those emissions from those activities<sup>3</sup> (Figure 3). They are a tool to help communities understand where their energy comes from and where it goes. Greenhouse gas inventories can measure the amount of emissions released at any scale, like from a single home, operations of a business, an entire industry, or whole areas based on local, state, or national boundaries.

The amount of energy used and what it is used for is also known as an **energy baseline**. Since most human activities use energy from fossil fuel sources, a common way to estimate energy baselines is by measuring the amount of GHG emitted by human sources within a defined boundary over the course of a year. An example can be found below (Figure 4).

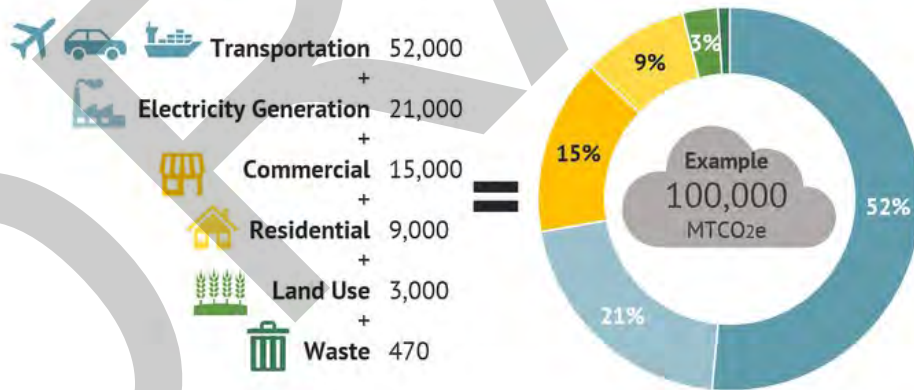


Figure 4: An example of a GHG emissions inventory.

## Why do you Inventory Greenhouse Gas Emissions?

Currently, fossil fuels are necessary in our society. While non-fossil fuel sources of energy are becoming more available every day, everyone directly or indirectly requires fossil fuels for daily life. It is important to remember that GHG emission inventories are a snapshot in time and reflect the level of technology available and should inform strategies that enhance energy independence and reduce harm to people and the environment — keeping the focus on solutions, not fault-finding.

GHG inventories serve as an energy baseline for a community and are essential for energy planning. They provide a comprehensive snapshot of local emissions, energy needs, and other information that can help individuals, organizations, and local government leaders prioritize actions and make informed decisions about their energy use. These inventories can be used to identify reduction targets and effective strategies for reducing emissions, they can also track increases and decreases in future emissions (Figure 5).

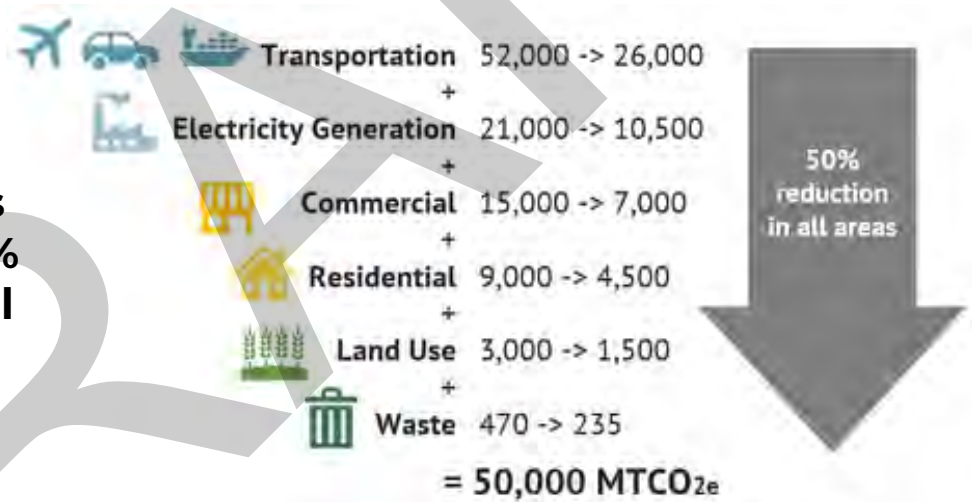
**With a Greenhouse Gas Emissions Inventory, goals can be set and accomplished strategically.**



**Example Target Goal:**

A community that emits 100,000 MTCO<sub>2e</sub> every year wants to reduce their overall emissions by 50% by 2050.

**The community can try to cut its emissions by 50% equally across all sources...**



**...or it can strategically target categories that are important to its livelihoods, have available technology, or are easy to reduce.**

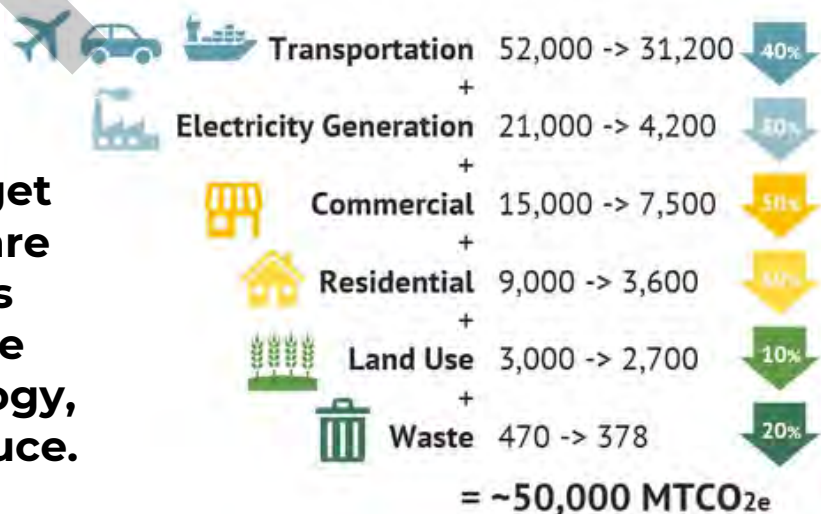
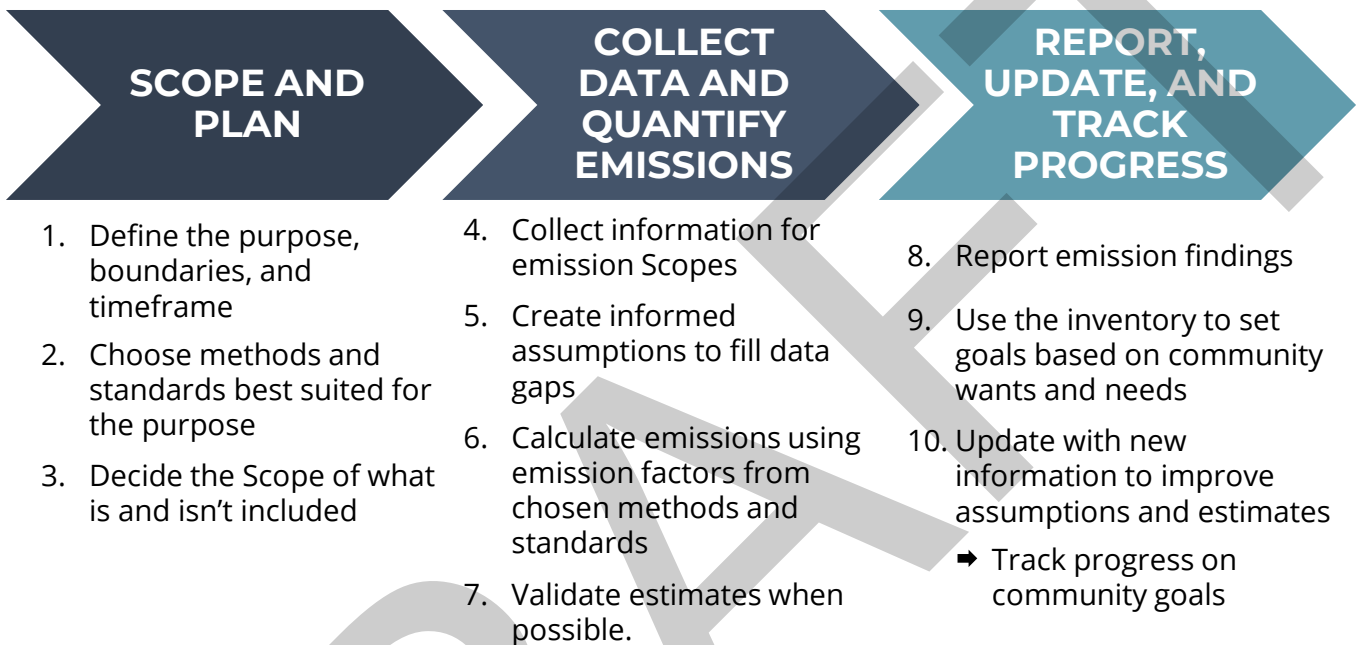


Figure 5: An example of how GHG emission inventories can be used to set strategic goals.

# THE GHG EMISSIONS INVENTORY PROCESS

Since GHG emission inventories are useful for all sorts of purposes. Standards exist to help inventories remain consistent and comparable. Generally, the process to create a GHG emissions inventory is conducted in the following phases and steps:

## GHG EMISSION INVENTORY DEVELOPMENT PHASES



### SCOPE AND PLAN

#### 1. Define the Purpose, Boundaries, and Timeframe

The purpose of an inventory varies depending on the kind of organization requesting the inventory. Similarly, the boundary of an inventory can range from a single business or industry to a larger community, covering the emissions released by all human activities that occur within the boundaries of a city, town, or county. The team conducting the inventory selects a timeframe, typically a year. Since information necessary for the inventory might take time to be published, the chosen year is often a few years prior to when the inventory is conducted.

#### 2. Choose Methods and Standards

The methodologies used and standards followed should be based on the purpose or specific activities in an inventory, availability of data, and consistency with a country's national inventory and/or other measurement and reporting programs. **The Greenhouse Gas Protocol for Cities** is the most widely used standard and guidance for governments, cities, and corporations for tracking emissions in their jurisdictions<sup>3</sup>. The protocol includes methodologies and formulas necessary calculate the total emissions of selected Scopes.

### 3. Decide the Scope

GHG emissions are commonly classified into three scopes, which are used to help categorize and track emissions (Table 2). **The GHG Protocol for Cities defines those Scopes as:**

Scope	DEFINITION	DIRECT/INDIRECT
<b>Scope 1</b> <i>BURN</i>	GHG emissions from sources located within the city boundary.	Direct
<b>Scope 2</b> <i>BUY</i>	GHG emissions occurring due to the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary.	Indirect
<b>Scope 3</b> <i>BEYOND</i>	All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary.	Indirect

Table 2: Definitions of Scopes for cities' GHG emissions, as defined by GHG Protocol for Cities with descriptions from the World Resource Institute<sup>3</sup>.

Most community-wide inventories include Scopes 1 and 2, and may include some Scope 3 emissions, depending on the purpose of the inventory and data availability. Frequently, Scope 3 is omitted because there is not enough high-quality data that is readily available. Fortunately, the GHG Protocol allows reporting of GHG emissions in a variety of formats depending on the purpose and audience (Figure 6).

## CATEGORIES OF GHG EMISSIONS

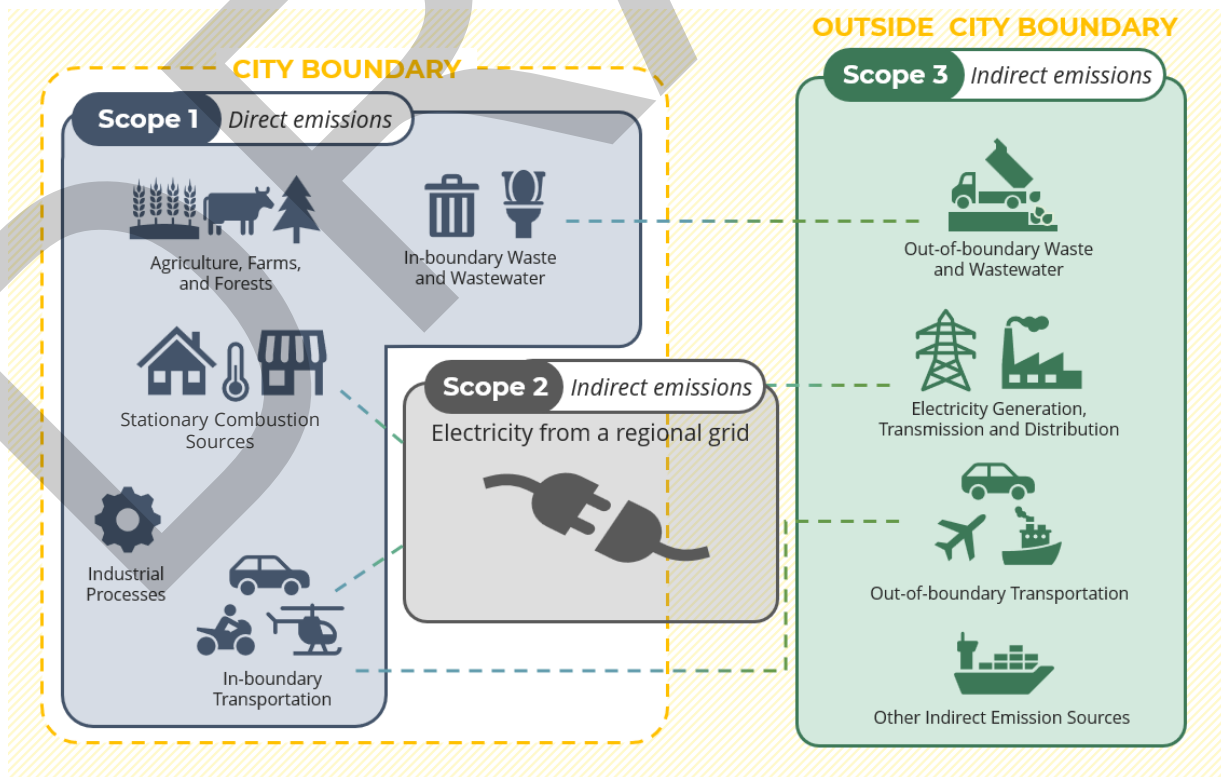


Figure 6: Visualization of the three Scopes of GHG emissions, based on Scope and whether they are emitted directly or indirectly. Adapted from the GHG for Cities Protocol<sup>3</sup>.

## Scope 1 *BURN*

Also known as *direct* emissions, Scope 1 emissions include all GHG emissions from the heating and cooling of residential and non-residential building as well as transport of people and freight occurring within a city's boundaries. A shorthand for Scope 1 emissions is *burn*, because it includes things a community burns. **Scope 1 emissions can be broken down further into:**



**Stationary combustion:** Fuel, like oil and gas, burned in buildings or equipment in the community. Think boilers and other fuel-powered machinery that does not move and is used for industrial processes.



**Mobile combustion:** Fuel used for vehicles and mobile equipment like cars, trucks, and other gas-powered tools within a geographic boundary.



**Fugitive emissions:** Refrigeration chemicals released from air conditioning and fire suppression chemicals used in building fire suppression systems or equipment like fire extinguishers.

## Scope 2 *BUY*

The shorthand to remember Scope 2 is *buy* because this scope includes emissions from the energy purchased to run things like heating, cooling, and home appliances. These are considered *indirect* emissions because in many communities, electricity is generated from fossil fuel sources, often outside the boundaries of a city and delivered via transmission powerlines. Scope 2 emissions are often one of the biggest emission sources for communities, which is why many strategies emphasize saving electricity or installing renewable generation sources.

## Scope 3 *BEYOND/BENEFIT*

Scope 3 emissions are *indirect* emissions from activities that support a community but are not necessarily within a community's boundaries. That is why they are emissions *beyond* the control of a community but still *benefit* the community. Scope 3 emissions are the most challenging to find good data for calculations, are challenging to regulate, and are therefore often excluded in GHG emissions inventories. However, understanding Scope 3 emissions help community members make informed decisions about their daily lives. The extent of inclusion of Scope 3 emissions depends on the purpose of the inventory.

**Scope 3 emissions can be further categorized into:**



**Upstream emissions** come from moving a good or person to a place, or the emissions in creating a product.



**Downstream emissions** come from disposing of a product or moving people from a place.

## COLLECT DATA AND QUANTIFY EMISSIONS

### 4. Collect Information

Information on energy use in the residential, commercial, and industrial sectors, as well as solid waste, water use and treatment, as well as transportation occurring within the defined boundary are collected from a variety of sources. However, in some cases, data is not available for all sectors. Depending on the scale and Scope needed, government agencies, researchers or other organizations work with a variety of local partners. Such partners may include local utilities, regional transit authorities, and local businesses to collect data to create estimates.

### 5. Create Informed Assumptions to Fill Data Gaps

Data gaps frequently occur in GHG emissions inventories, especially for larger-region inventories and Scope 3 emissions where data availability is less consistent or boundaries are less clear. In these cases, **assumptions**, or numbers derived from available information and research, are used to fill data gaps. Assumptions in GHG reports are common, especially for harder-to-track sectors, such as marine and air travel. Fortunately, GHG inventories are a living document and can be updated as new information or more accurate data becomes available. This inventory should be updated accordingly.

### 6. Calculate Emissions Using Emission Factors

Once all the information is gathered, the total emissions can be calculated based on either the quantity of fuel used in an area, estimated amount of activity, or a combination of both. Since not all fuels produce the same amount or kind of emissions and the fuel efficiency can vary from activity to activity, emission factors are used. **Emission factors**, or emissions per activity unit, are numbers published by the U.S. Environmental Protection Agency's (EPA) and can be found on the EPA GHG Factor Hub. These emissions factors may be occasionally updated as more scientific research is done.

### 7. Validate Estimations

Since almost all data sources and activity data have limitations, comparing multiple forms of data helps improve the accuracy of the inventory. By cross-referencing estimations with multiple sources, areas of improvement can be identified, further researched, and updated to better reflect reality. In many cases, data validation includes a combination of research and community input and requires back and forth collaboration to determine a reasonable level of accuracy. The accuracy of an estimate is indicated by a level of confidence (see page 24). Estimates with high confidence are considered very accurate while estimates with lower confidence may benefit from some updates which may or may not significantly change the estimate.

## REPORT, UPDATE, AND TRACK PROGRESS

### 8. Report Emissions Findings

Emissions are reported in *metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e)*, which is the standard unit for GHG emission reports. Since some GHGs are more effective at trapping heat and remain in the atmosphere for longer periods of time, the Intergovernmental Panel on Climate Change (IPCC), publishes conversions of all GHGs to the global warming potential of one metric ton of carbon dioxide (CO<sub>2</sub>) over 100 years<sup>2</sup>. By converting all GHG to MTCO<sub>2</sub>e, other GHGs like methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) can be compared side-by-side (Figure 7). This also has the benefit of enabling comparison between emissions categories that emit different kinds gases either within the inventory or with other GHG emission inventories.

**ONE METRIC TON OF CARBON DIOXIDE (MTCO<sub>2</sub>e)  
has the same global warming potential as:**

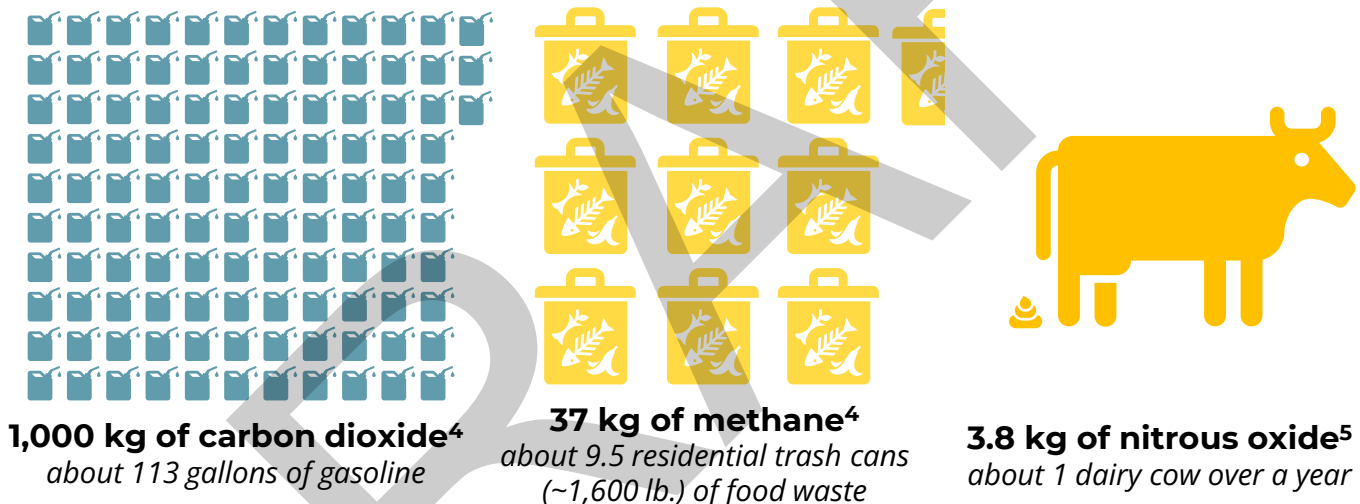


Figure 7: Examples of one Metric Ton of Carbon dioxide equivalent.

### 9. Use the GHG Inventory to Set Goals

GHG emission inventories are a tool that provides a comprehensive snapshot where energy comes from and where it goes. Since a GHG emission inventory is a tool, it does not include recommendations for action. However, the information in the inventory can help individuals, organizations, and local government leaders prioritize actions and make informed decisions about their energy use. It can be used to identify reduction targets and effective strategies for reducing emissions and track increases and decreases in future emissions.

### 10. Update and Track Progress on Goals

GHG inventories are a living document and can be updated as new information or more accurate data becomes available. this inventory should be updated accordingly. Additionally, once goals are set, updating the inventory helps track progress on meeting those goals. The frequency of the updates typically ranges between every five to ten years and should be determined based on the kinds of goals set and when a community hopes to accomplish them.





*Panorama of the Blue Lake Hydroelectric Project*

## SECTION 2

# ABOUT SITKA'S GREENHOUSE GAS EMISSION INVENTORY

# ABOUT SITKA'S GHG INVENTORY

The purpose of this inventory is to **quantify GHG emissions for the entire community and serve as an energy baseline for Sitka**. It can be used for future energy planning efforts, goal identification, and progress tracking for emission reduction, improving energy independence, or simply better understanding how Sitka uses energy. As an energy baseline, this document does not make any policy recommendations.

Based on available data, the chosen **baseline year for Sitka's inventory is 2023**, though some data sources are from 2021 or 2022. While the best available information was used at the time of this report, amounts, figures, and statistics can be updated as new data become available.

## Who Prepared Sitka's Greenhouse Gas Emissions Inventory?

Sitka's GHG emissions inventory was prepared as part of the City and Borough of Sitka's (CBS) Sitka Community Renewable Energy Strategy (SCRES) project, supported by the 2023 cohort of the Department of Energy's Energy Technology Innovation Partnership Project (ETIPP), focused on aiding remote and islanded communities that are interested in creating a more reliable, affordable, and efficient energy system. Through ETIPP, CBS partnered with the Pacific Northwest National Laboratory (PNNL). Throughout the process, PNNL was guided and advised by the CBS Sustainability Commission to ensure the inventory accurately reflected the unique needs of Sitka and that assumptions were based on local data that was as accurate as possible.

In this report, the term "Sitka" indicates the community at large, "CBS" indicates the local municipality which includes the municipally owned electric utility, and "Sitka Sustainability Commission" indicates the group of local community members appointed to a city board to advise CBS on matters of sustainability.

## How Was Sitka's GHG Emissions Inventory Conducted?

Sitka's GHG emissions inventory was conducted iteratively over two years following the Greenhouse Gas Protocol for Cities with modifications to better capture the nuances of an islanded community like Sitka. Throughout the process, PNNL was guided and advised by the CBS Sustainability Commission and public comment to ensure the inventory accurately reflected the unique needs of Sitka and that assumptions were based on local data that was as accurate as possible (*Figure 8 and Table 3*).

## Sitka's GHG Inventory was Built Iteratively and Collaboratively

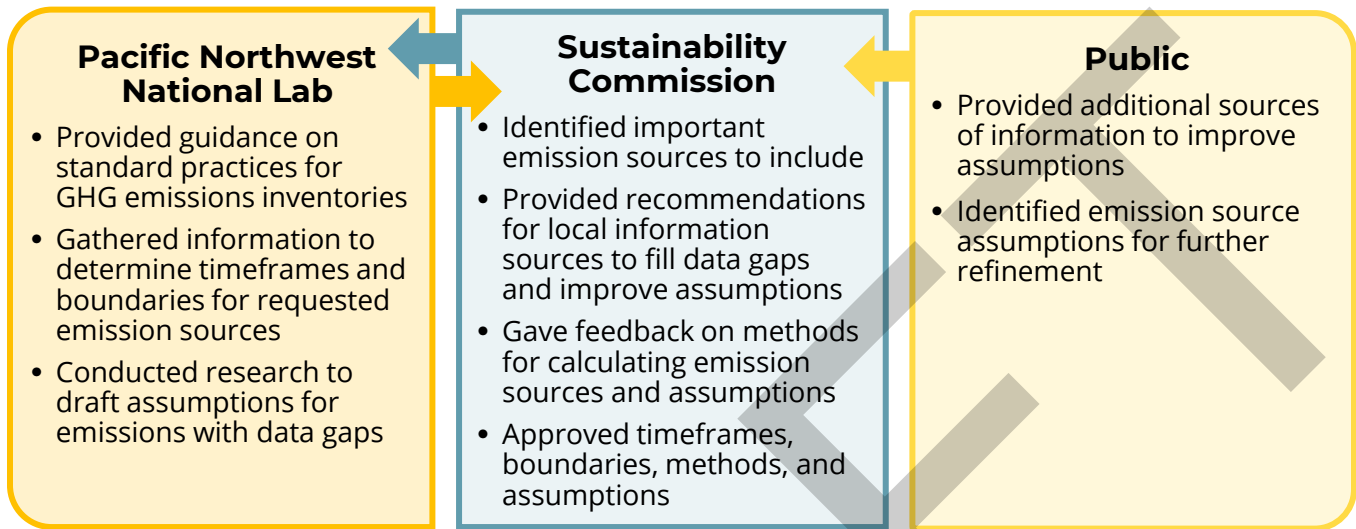


Figure 8: The working relationship between PNNL, the Sustainability Commission, and the public.

### Key Actions and Approvals

2023	Oct	Presented GHG emission inventory standard practices and methods to the Commission
	Nov	Reviewed draft inventory Scope Provided feedback on emission sources of importance to Sitka
	<b>Dec</b>	Approved SCRES Scope with Sitka-specific GHG emission sources
2024	Jan	Collected information and drafted methods
	<b>May</b>	Approved timeframe and Scope 1 emission methods
	Jun	Review and advised on draft Scope 3 emission methods
	<b>Aug</b>	Approved Scope 3 emission methods
	Nov	Draft GHG emission inventory released
2024	Dec	Gave feedback on draft GHG emissions inventory First round of public comment
	Jan	Commissioner and public comment integrated into updated inventory
2025	Dec	Updated draft released Second round of public comment
	<b>Jan</b>	Final recommendations on GHG emissions inventory <b>Final GHG emissions inventory released</b>

Table 3: Timeline of actions and steps to prepare this inventory.

# THE SCOPE OF SITKA'S INVENTORY



## EMISSION SOURCES INCLUDED IN SITKA'S GHG INVENTORY

**Scope 1** GHG emissions from sources located within the **city boundary**



**Electricity Generation** – Backup Diesel Generation



**Building Heating** – Residential and Commercial



**Ground Transportation** – Cars, Trucks, Buses, Motorcycles, etc.



**Marine Activity** – Commercial Fishing; Recreational and Charter Boats



**Wastewater Treatment** – Year-Round Residents and Visitors

**Scope 2**  
**NOT APPLICABLE**

GHG emissions occurring due to the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary.

**Scope 3**

All other GHG emissions that occur outside the city boundary as a result of activities taking place within the **city boundary**



**Shipping** – Tons of Material to/from Sitka via Barge and Aircraft



**Soild Waste Disposal** – Tons of Waste and Recycling Decomposing in a Landfill



**Air Travel** – Commercial Travel, Seaplanes, Helicopters, Small Personal Planes



**Cruise Ships** – Ship Maneuvering while in Sitka and in port

Figure 9 & Table 4: Map approximating sources and boundaries of Sitka's GHG inventory and table with descriptions.

## SITKA'S GHG INVENTORY CHALLENGES



### Sitka does not have clear boundaries for some emission sources

As a remote, islanded community, Sitka does not have clear boundaries that are typically used in GHG emission inventory methods (Figure 10). While land-based emissions are much easier to calculate as the sources have clear boundaries, many Scope 3 sources are minimally included or excluded in community-wide inventories, but for islanded communities, the role of Scope 3 emissions sources are critical and important to understand and include. Sitka's emissions sources are not necessarily confined to its land and Sitka is generally more reliant on indirect, Scope 3 sources.

Indirect, Scope 3 emissions presented a set of challenges for creating an inventory that is representative of Sitka's unique lifestyle while remaining helpful, accurate, and not overly broad. To address this, many boundaries used for Sitka were created based on the emission source, available information, and community context provided by the Sustainability Commission and by the public.

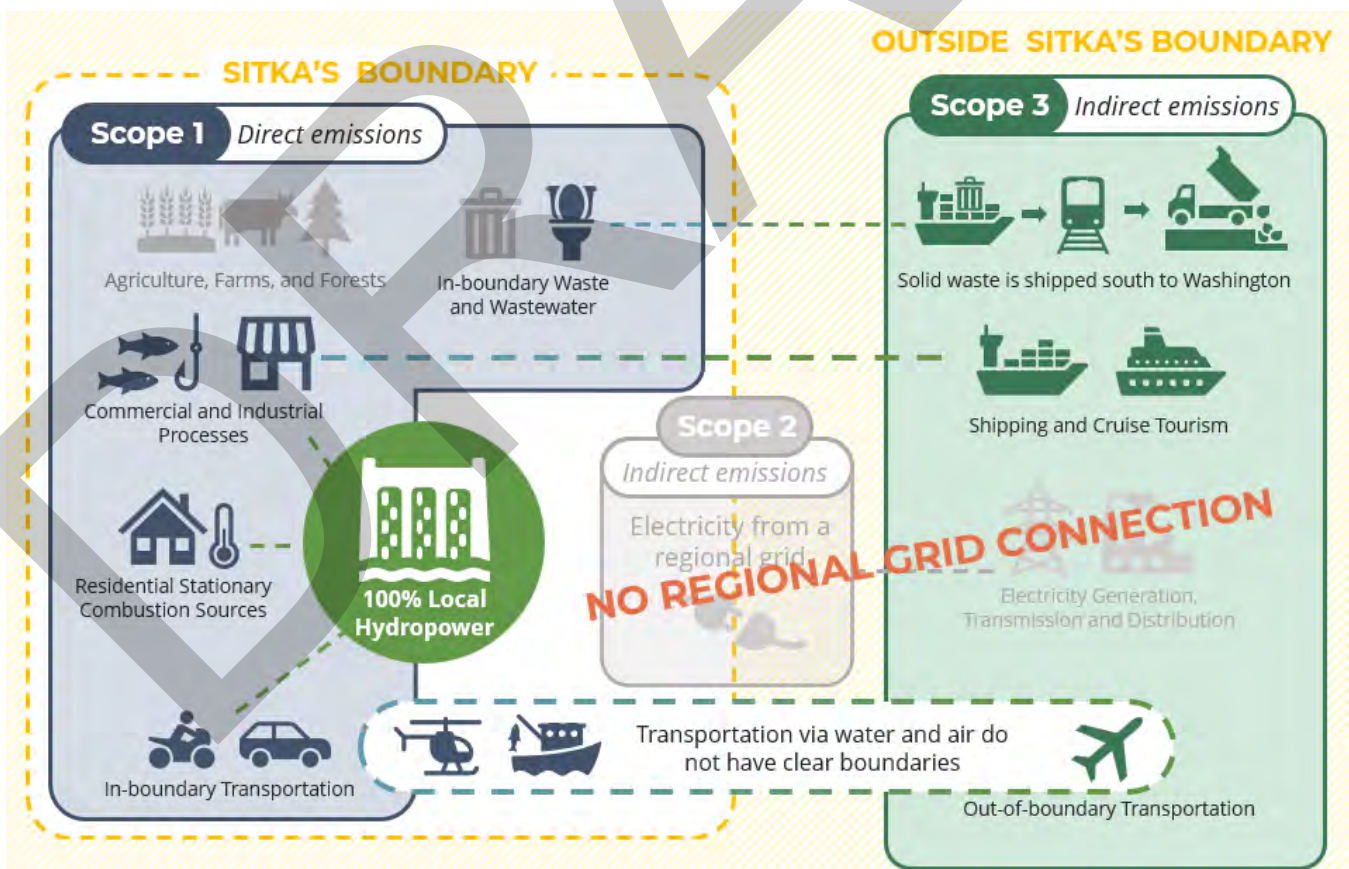


Figure 10: Sitka's categories of GHG emissions differ from standard methodologies.

## SITKA'S GHG INVENTORY CHALLENGES, CONTINUED



### **Sitka is only accessible by plane or boat.**

As an islanded community, residents and visitors can only arrive by plane or boat. As Scope 3 sources, these emissions are difficult to calculate as they are often linked to information that is considered proprietary and not publicly available.



### **Sitka relies on shipping for goods and waste disposal.**

Since all goods arrive in Sitka via barge, these emissions are important to include in the inventory. However, there is no standard way to calculate this.

Similarly, Sitka does not have a landfill that accepts most municipal solid waste. Instead, waste is shipped south to Seattle, where it is then taken to the Roosevelt landfill in Southeastern Washington.



### **Sitka is not connected to a regional electric grid.**

All electricity used in Sitka is generated locally by the Blue Lake and Green Lake Hydroelectric Projects, which means electricity generation falls in Scope 1, not Scope 2. There is no connection to a larger regional grid, so Scope 2 does not apply to Sitka. Nearly 100% of electricity in Sitka is renewable and does not emit greenhouse gases. That is good for the total emissions in Scope 1 and means Scope 2 does not apply. In many community GHG emissions inventories, Scope 2 is the largest contribution to the total emissions, depending on the available renewable energy resources.

## What does Sitka's GHG Emissions Inventory NOT Include?



### Natural Process that Emit or Absorb Greenhouse Gases

GHG emission inventories are designed to capture emissions from unintentional human behavior. As such, this inventory does not include natural processes like trees removing CO<sub>2</sub> from the atmosphere (carbon sequestration) or other non-human emission sources such as decomposition of materials or other natural processes. The Tongass National Forest stores the most carbon of any U.S. National Forest<sup>6</sup> (Figure 11).

While various policies and practices have established ways of quantifying and crediting individuals or organizations for reforestation or forest protection, these methods of crediting are not standard in greenhouse gas inventories. This is especially true when the land in question is not managed or designed intentionally for carbon sequestration. In short, we do not credit Sitka for what the trees do, but that's okay!

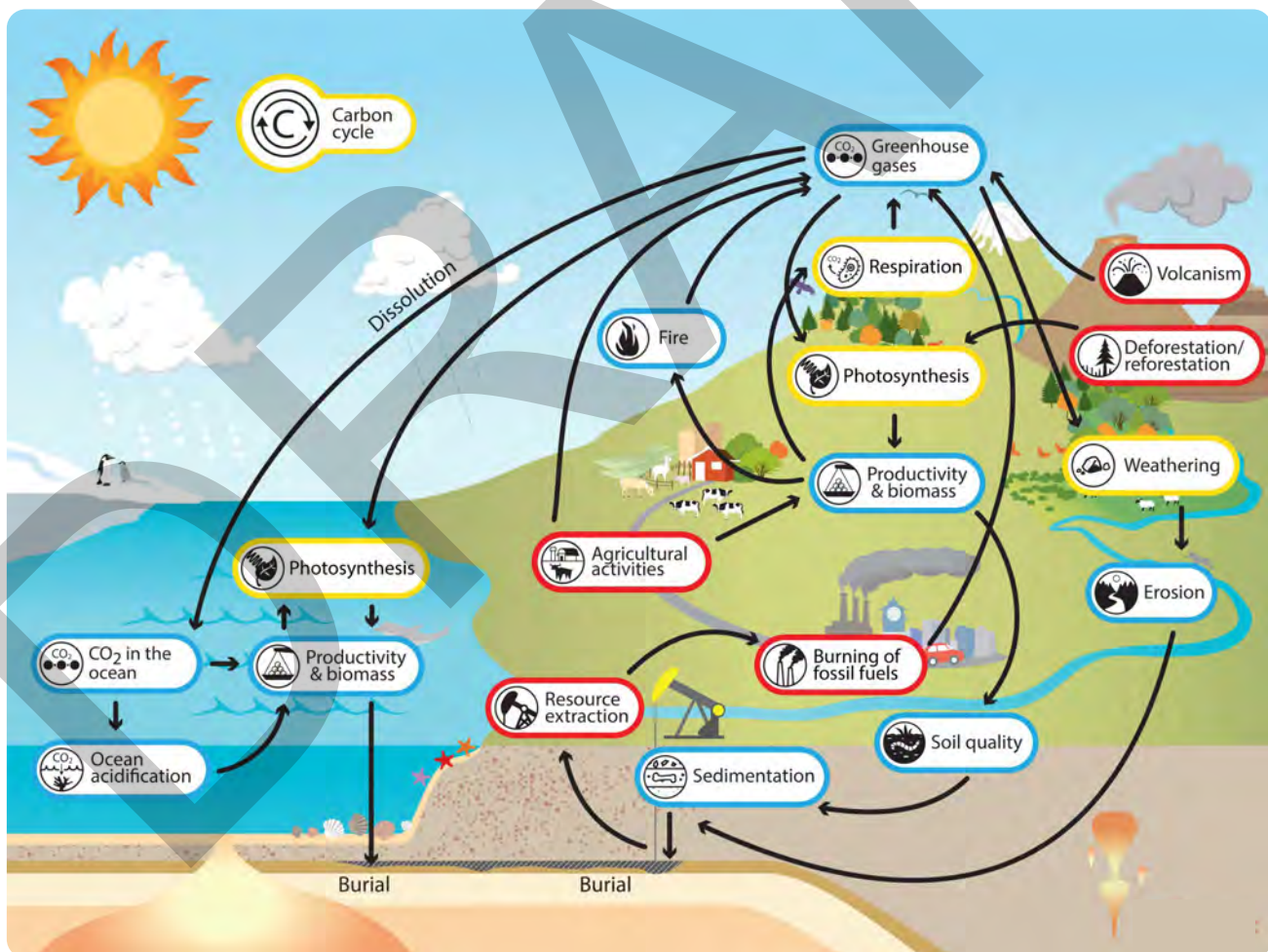


Figure 11: The carbon cycle (yellow) is a naturally occurring process that influences the climate. Human activity is currently adding more carbon than the cycle can handle, increasing the amount of carbon in the atmosphere which warms the planet. Graphic by University of California Berkley Museum of Paleontology.



## Fugitive Refrigerant Emissions

Refrigerants are fluorinated gases (F-gases) that, for the most part, are created by humans and do not occur in nature. Many residential and industrial technologies use refrigerants in refrigerators, air conditioners, industrial ice production facilities, and data centers. Due to the high warming potential (GWP) of refrigerants and the length of time they remain in the atmosphere, the small volume of direct emissions that are released accounts for approximately 1% of U.S. emissions<sup>7</sup> (Table 1 and Figure 2). In theory, refrigerants can be collected from machinery and reused, however this does not often happen because the costs of recovering refrigerants currently outweigh the potential revenue from resale.

### Global Warming Potential of GHGs

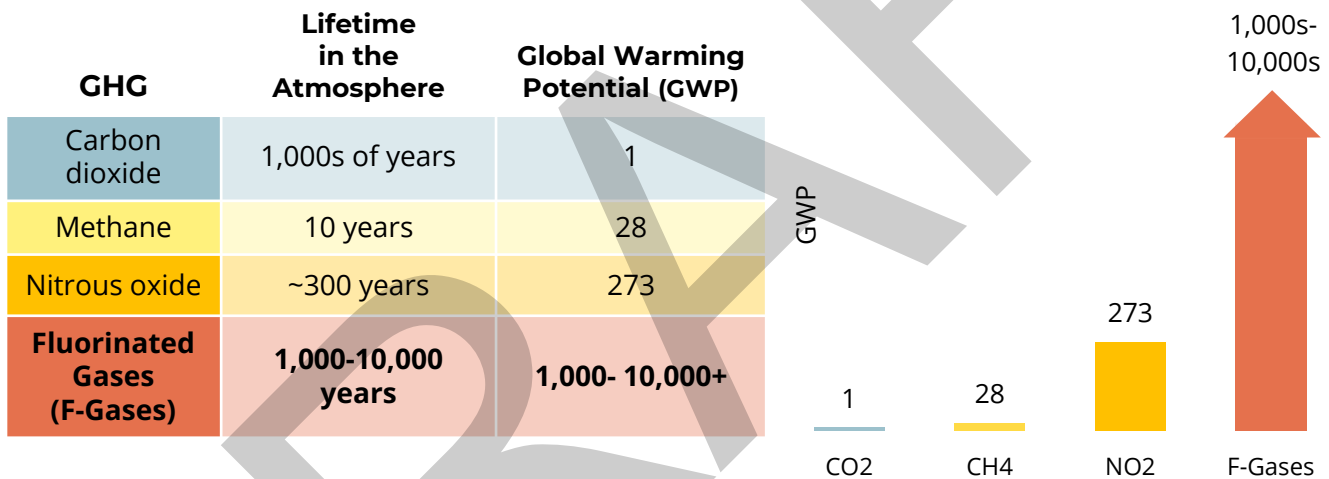


Table 1 & Figure 2: How Greenhouse Gases Warm Our Planet. AR6 values, IPCC Sixth Assessment<sup>2</sup>.

Refrigerant emissions are not included in this inventory, primarily due to the difficulty and uncertainty of quantifying those emissions. Ideally, a refrigerant is contained within the technology where it exists. However, technologies using refrigerants are prone to leakage or improper disposal, which leads to the refrigerants being released into the atmosphere. This leakage is the main source of direct emissions and therefore is extremely difficult to quantify and track.

That said, refrigerants are still abundant in Sitka, especially in the technologies used by the seafood processing industry. Any steps taken to make seafood processing more efficient or to prevent refrigerant leakage in the industry could lead to decreased emissions. Similarly, the shipping of goods that require refrigeration is another major source of refrigerant emissions. After fishing vessels, refrigerated bulk carriers are responsible for the highest amount of refrigerant emissions for refrigeration (but not for air conditioning) compared to other ships globally<sup>8</sup>. In 2018, refrigerated containers accounted for 18.2 million MTCO<sub>2</sub>e worldwide.

## HOW SITKA'S EMISSIONS WERE CALCULATED

Throughout the process of conducting this inventory, the technical experts worked to find the best available data to create estimates for each emission source. In addition to guidance from the Greenhouse Gas Protocol for Cities<sup>3</sup>, calculations were shaped by feedback from the Sustainability Commission and public input. Assumptions were iterated upon to improve the estimates as new information became available, and they were validated as much as possible through comparison with available data.

### In General, Two Kinds of Data Were Used to Create Estimates

**Fuel imports** were used to calculate the quantity of emissions from different fuel types that arrive in Sitka and **activity data** was used to break down how that fuel was used in Sitka by sectors and sub-sectors. Breaking fuel and emissions down into finer resolution categories helps determine which policy mechanisms or community actions could have the highest impact to achieve goals.

FUEL IMPORTS		ACTIVITY DATA	
<b>PROS</b>	<ul style="list-style-type: none"> <li>Quantifies different types of fuels</li> <li>Works well for land-based emission sources</li> </ul>	<b>PROS</b>	<ul style="list-style-type: none"> <li>Uses well researched emission factors for each fuel type</li> <li>Activities like wastewater treatment have standardized calculations</li> <li>Customizable for specific sources</li> </ul>
<b>CONS</b>	<ul style="list-style-type: none"> <li>Doesn't specify what the fuel types are used for</li> <li>Can be inconsistent year-to-year</li> <li>Doesn't account for fuels brought in from other locations ex. a boat refueled in Juneau and traveling to Sitka</li> </ul>	<b>CONS</b>	<ul style="list-style-type: none"> <li>Requires additional information to determine accurate activity levels, especially for small communities</li> <li>Some necessary information is not publicly available, especially if it is related to a business's operations</li> </ul>

Table 5: Pros and cons of using fuel import data vs activity data.

### FUEL IMPORTS

U.S. Army Corps of Engineers' (USACE) 2022 5-Year Cargo Report for Sitka Harbor<sup>9</sup> is a record of all shipments in and out of the city, including fuels, which are broken into categories of gasoline, kerosene, distillate fuel oil, residual fuel oil, hydrocarbons and petrol gases, and "petro products" not elsewhere counted (NEC). If we were to assume the amount of fuel burned is the same as the amount of fuel imported, emission estimates from burning fossil fuels using the Cargo Report would be simple. However, due to both fluctuations in the Cargo Report data from year to year and some issues with data quality (discussed in detail in Appendix A), this is not the only data source relied upon. Instead, a combination of Cargo Report data and activity data is used (Table 5).

## ACTIVITY DATA

Activity data is data that allows us to estimate how often certain emissions-related activities take place in Sitka. Using activity data, emissions are calculated from the ground up by estimating how often certain activities take place and what levels of emissions are caused by those activities. Each emission source's activity data comes from a variety of sources with a variety of uncertainties, which are outlined in each section.

Breaking fuel and emissions down into specific categories helps determine which policy mechanisms or community actions can have the highest impact in reducing emissions. Policy mechanisms can include incentivizing building energy efficiency measures and electrifying vehicles, buildings, or boats. For example, understanding the emissions tied to heating residential housing can determine the emissions impact of incentivizing home electrification measures.

### In 2022, Sitka imported an estimated...

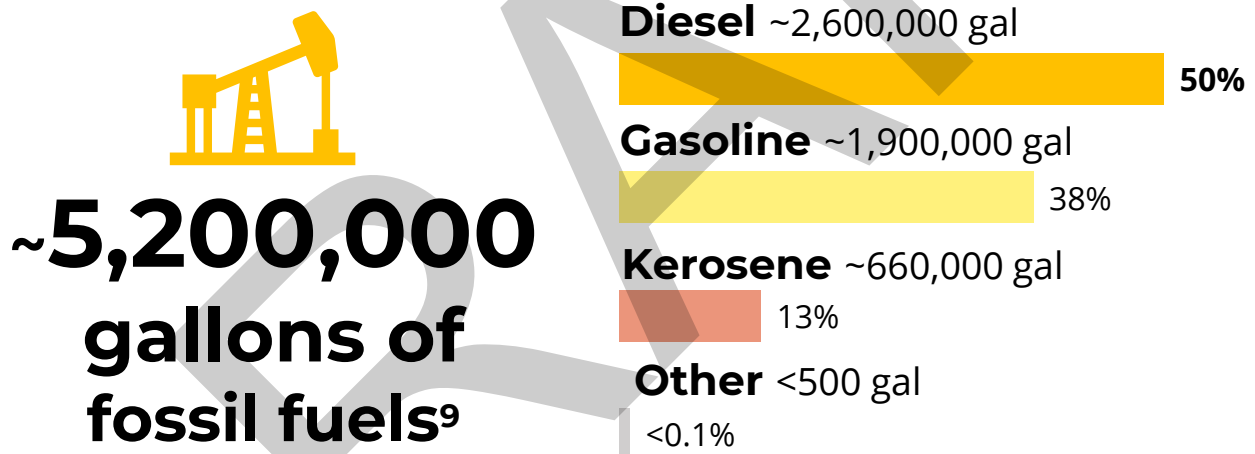


Figure 12: For simplification, this report uses the term diesel in place of "Distillate Fuel Oil", which includes diesel used for transportation and heating (Diesel #1 and #2). Most of the fossil fuel imported to Sitka is diesel.

## DATA VALIDATION

Throughout the process of conducting this inventory, the best available data was used, and assumptions were updated iteratively with help from knowledge members of the Sitka community. Once emissions were calculated from both the fuel import and activity data, they were compared. Since both fuel import data and activity data have limitations, comparing the two forms of data helped improve estimates. Each time assumptions were updated, estimates were verified by checking that activity data fell within reasonable estimates as compared with fuel import data. In addition, we compared the total amount of fossil fuels using sales tax information. The total sales were consistent with the USACE Cargo Report. For recreational fishing vessels, seaplanes, small planes, helicopter trips, and for other activities for which there was limited activity data, the estimates relied more on Cargo Report data.

# LIMITATIONS

## How Accurate is Sitka's Greenhouse Gas Emissions Inventory?

GHG inventories are a strategic tool and are not 100% accurate, nor do they have to be. While some information necessary for developing GHG emissions inventories is readily available, other information is not as easy to obtain. While doing additional research may improve some estimates, the improvements are often small compared to the resources needed to create the most accurate inventory possible.

Sitka's GHG emissions inventory uses a combination of commonly used data sources and community sources, such as data from CBS departments and surveys, or local organizations with expertise. Where data gaps remained, **assumptions** were created based on CBS Sustainability Commission feedback and public comment. Throughout this report, the confidence of an emission estimate is clearly stated.

## What are Assumptions?

Gaps in data are a challenge in conducting a GHG emissions inventory, especially for larger-region inventories where data availability is less consistent. Assumptions, or numbers derived from available information and research, are used to fill data gaps. Assumptions in GHG reports are common, especially for harder-to-track sectors, such as marine and air travel. Fortunately, GHG inventories are a living document and can be updated as new information or more accurate data becomes available. This inventory should be updated accordingly.



*Photo of Molly Grear, PNNL, presenting information about Sitka's GHG inventory to the Sustainability Commission*

# CONFIDENCE LEVELS

## How do you know how accurate a GHG emission estimate is?

For this inventory, each estimate includes the inputs used to create the assumptions that were used to calculate the emissions and the data sources. These data sources were ranked based how detailed they were, and the kind of information provided. Once all the sources were ranked, the overall emissions category was also ranked based on the quality of the inputs. If they fell between levels, the score was rounded down to the lower confidence level.

Confidence Level	Rationale
<b>Great</b>	Values with this ranking use values that are unlikely to need to be adjusted in the future, except in response to major community changes or changes to scientific understanding. Datasets used were specific to Sitka and contained detailed information or were not dependent on Sitka-specific data. EPA emission factors are an example
<b>Good</b>	Values used may be specific to Sitka but may have been aggregated and some detail obscured, or the inputs are research-based and adapted to Sitka based on additional information and community input if provided. While more information would improve the estimate, the overall impact would likely be small, and these inputs are still justifiable with a general understanding.
<b>OK</b>	Values used was not specific to Sitka. Additional, better, or more local data could improve the estimate, but the overall impact would likely be small unless additional inputs were also changed. These inputs are still justifiable with a general understanding.
<b>Poor</b>	Information was likely unavailable or too obscure to be useful for creating the input. More or better data could improve the estimate, and the overall impact could be meaningful to the category.

Table 6: Categories of the confidence level and descriptions

# SUMMARY OF ASSUMPTIONS AND CONFIDENCE

The following tables provide a summary of the confidence levels of each input for each emission source. Details about each input can be found in the methodology section for that source.

## Scope 1

Emission Source	Assumption Inputs				
<b>Electricity Generation - Great</b>					
<b>Hydroelectricity</b>	123,035 MWh from hydroelectricity				
<b>Diesel Backup</b>	9,975 gallons of diesel used in generators	86.9 gallons of diesel needed to generate 1 MWh			
<b>Building Heating - Good</b>					
<b>Residential</b>	3,513 occupied houses	1,689 sf average	76MMBtu/sf of heating energy	41% of houses use fuel oil	
<b>Commercial</b>	2.3 million sf of building space	75% of the space requires heating	25 kBtu/sf of heating energy	51% of buildings use fuel oil	
<b>Ground Transportation - Good</b>					
<b>All Vehicles</b>	8,132 conventional vehicles	70% of vehicles are actively driven	Avg 4 miles are driven daily	Avg fuel efficiency by vehicle type	Vehicles are active 350 days
<b>Public Transportation</b>	13,945 gallons of gas used by The RIDE				
<b>Cruise-related Transportation</b>	140,000 miles driven by buses	100 vehicles permitted at HCH	25% of tourists take a tour	Each tour is ~20 miles	
<b>Marine Activity - Good</b>					
<b>Commercial Fishing</b>	510 vessels participate	95% are active	Vessel Fuel efficiency (varies)		
<b>Recreational Fishing</b>	~1,500 vessels registered	66% are active	540 miles traveled per year	Fuel efficiency of 3 mpg	
<b>Charter Boats</b>	7,920 trips	25 miles per trip	Fuel efficiency of 2.5 mpg		
<b>Wastewater Treatment - Great</b>					
<b>Residents</b>	8,380 residents	0.009g/ N2O per day			
<b>Seasonal Visitors</b>	694 equivalent year-round residents				

Table 7: Summary of confidence levels for all emission sources included in Scope 1.

## Scope 2

Scope 2 Emissions are not applicable to Sitka. See page 48 for details.

## Scope 3

Emission Source		Assumption Inputs		
<b>Solid Waste Disposal - Great</b>				
<b>Municipal Solid Waste (MSW)</b>	7,618 tons of waste	240 tons of recycling	Mixed MSW emissions factor	Recycling emission factor
<b>Shipping - Great</b>				
<b>Marine/Barge Transport</b>	117,658 tons of materials shipped and received	1,000 miles on a barge to/from Seattle	1 gallon of diesel moves 1 ton 650 miles	
<b>MSW/Recycling Disposal</b>	7,858 tons of material to Seattle			
<b>Air Transport</b>	3,963 tons of materials to/from Sitka	850 miles from Seattle to Sitka	t0.00109 MTCO <sub>2</sub> e per Ton-mile emission factor	
<b>Air Travel – Good</b>				
<b>Mainline Flights</b>	40,586 revenue passenger miles (RPM)	67% of flights are medium-haul 32% are short-haul	Weighted average emission factor 0.159 MTCO <sub>2</sub> e/ RPM	
<b>Seaplanes, Small Planes, Helicopters</b>	657,784 gallons of kerosene imported	Aviation fuel emission factor 0.84kg MTCO <sub>2</sub> e/gal	80% of imported fuel is used for this sector	
<b>Cruise Ship Emissions – Good</b>				
<b>Cruise Ship Hotel</b>	9 hours average time in port	29% Hotel MCR	Installed power (kW) and generator efficiency varies	
<b>Cruise Ship Maneuvering</b>	4 hours average approaching/leaving Sitka	54% Propulsion MCR		
<b>Number/Types of Cruise Ships</b>	333 scheduled trips	39 ships		

Table 8: Summary of confidence levels for all emission sources included in Scope 3.

# HOW TO READ THIS INVENTORY

This inventory is structured and written to be easily understandable and not require extensive knowledge on GHG emission inventories or the science behind it. As such, the following sections are highly visual and are presented in a way that is intended to be easily digestible.

**Before beginning, please keep in mind two things:**

**The numbers and percentages are rounded and may not add up perfectly.** For ease of reading, each section utilizes only whole numbers, there may be instances where percentages add to 99% or 101%. Similarly, MTCO<sub>2</sub>e are also rounded, and may not add up exactly.

**The amount of fossil fuels used will not perfectly match the estimated total of imported fuels.** In 2022, it was estimated that Sitka imported 5.2 million gallons of fossil fuels<sup>9</sup>. Each section converts emissions into total gallons of fuel, and, if possible, fuel type. Since the 5-year cargo report is reported in short tons and not gallons, there is some room for conversion differences depending on the density of the fuel. Similarly, the same amount of fuel is not imported each year and the fuel used may carry over in some years (See Appendix A for more details). Lastly, some emission sources use data from both fuel imports and activity data, which accounts for emissions from fuel from other places used in Sitka.

**Each emission source will have a one-page summary followed by a methodology section that details how inputs were created and more information about the sources used (Figure 13).**

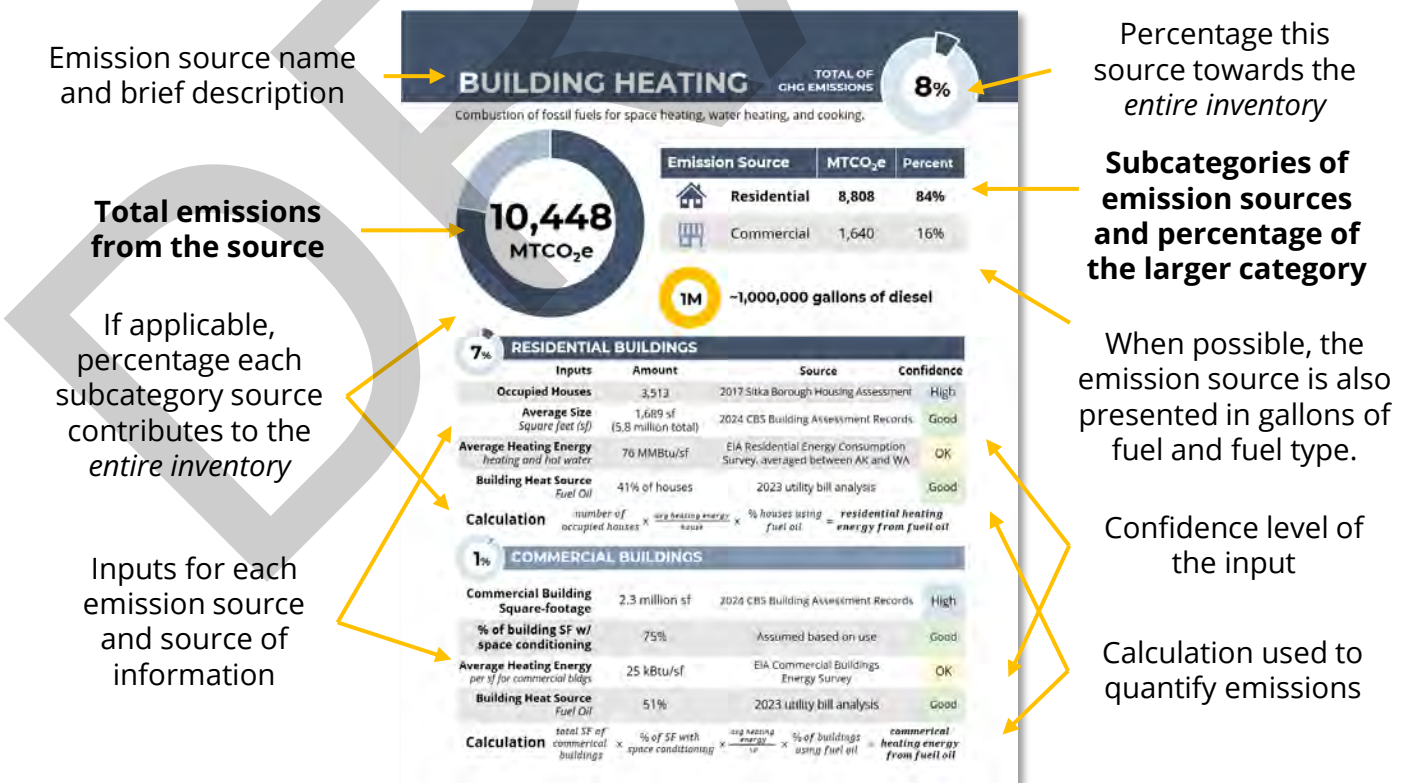


Figure 13: Example inventory page with notes on what different sections mean.



*The backside of the Green Lake dam*

## SECTION 3

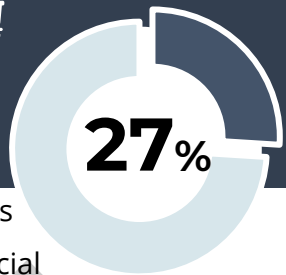
# SCOPE 1: DIRECT EMISSIONS



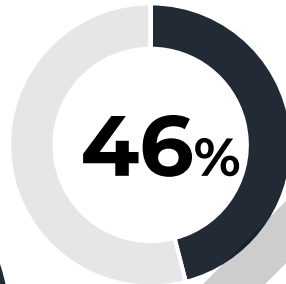
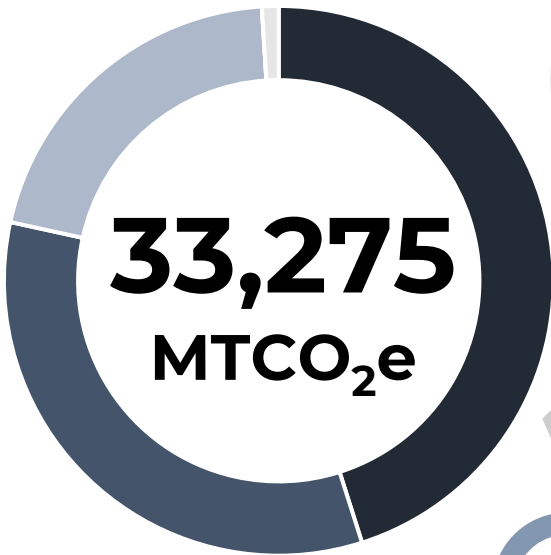
# Scope 1 SUMMARY



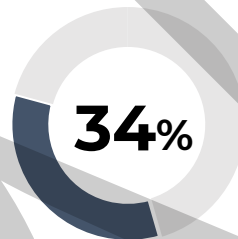
TOTAL OF GHG EMISSIONS



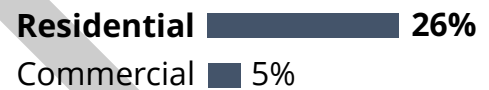
**Direct emissions that occur within Sitka's boundaries.** These include emissions from electricity generation, buildings, vehicles, marine activity such as commercial recreational, and charter transportation fishing, and wastewater treatment.



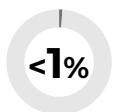
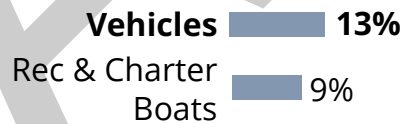
## Industry



## Buildings

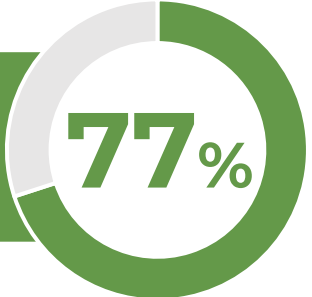


## Transportation



Electricity | 0.3%  
Wastewater | 0.03%

**HYDROELECTRICITY REDUCED SITKA'S Scope 1 EMISSIONS BY 77%**  
~110,000 MTCO<sub>2</sub>e from ~11M gallons of diesel



## TOTAL FUEL



## ENERGY FLOW



# Scope 1 SUMMARY

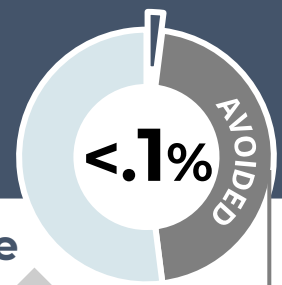
## CONFIDENCE LEVELS OF ESTIMATIONS

Emission Source		Assumption Inputs			
<b>Electricity Generation - Great</b>					
<b>Hydroelectricity</b>	123,035 MWh from hydroelectricity				
<b>Diesel Backup</b>	9,975 gallons of diesel used in generators	86.9 gallons of diesel needed to generate 1 MWh			
<b>Building Heating - Good</b>					
<b>Residential</b>	3,513 occupied houses	1,689 sf average	76MMBtu/sf of heating energy	41% of houses use fuel oil	
<b>Commercial</b>	2.3 million sf of building space	75% of the space requires heating	25 kBtu/sf of heating energy	51% of buildings use fuel oil	
<b>Ground Transportation - Good</b>					
<b>All Vehicles</b>	8,132 conventional vehicles	70% of vehicles are actively driven	Avg 4 miles are driven daily	Avg fuel efficiency by vehicle type	Vehicles are active 350 days
<b>Public Transportation</b>	13,945 gallons of gas used by The RIDE				
<b>Cruise-related transportation</b>	140,000 miles driven by buses	100 vehicles permitted at HCH	25% of tourists take a tour	Each tour is ~20 miles	
<b>Marine Activity - Good</b>					
<b>Commercial Fishing</b>	510 vessels participate	95% are active	Vessel Fuel efficiency (varies)		
<b>Recreational Fishing</b>	~1,500 vessels registered	66% are active	540 miles traveled per year	Fuel efficiency of 3 mpg	
<b>Charter Boats</b>	7,920 trips	25 miles per trip	Fuel efficiency of 2.5 mpg		
<b>Wastewater Treatment - Great</b>					
<b>Residents</b>	8,380 residents		0.009g/ N <sub>2</sub> O per day		
<b>Seasonal Visitors</b>	694 equivalent year-round residents				

Table 7: Summary of confidence levels for all emission sources included in Scope 1.

# ELECTRICITY GENERATION

TOTAL OF POTENTIAL GHG EMISSIONS



Sitka's Electricity Generation is 99.9% Renewable

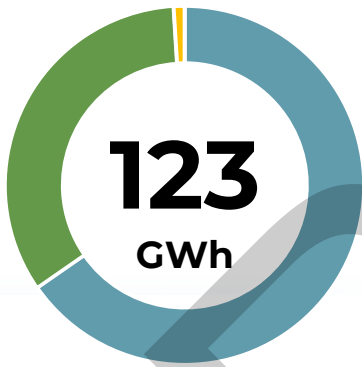


Emission Source	MTCO <sub>2</sub> e	Percent
Hydroelectricity Emissions Avoided	109,443	0%
Diesel Generators	102	100%

9,975 gallons of Diesel



~11,000,000 gallons of diesel avoided



Generation Source	MWh	Percent
Blue Lake	80,992	65.8%
Green Lake	42,043	34.1%
Diesel Generators	111	0.09%

## 46% HYDROELECTRICITY

Inputs	Amount	Calculation	Confidence
Generation	123,035 MWh	$\frac{\sim 86.9 \text{ gallons}}{\text{MWh generated}}$	Great
Diesel Avoided	10,686,820 gal		

## <0.1% BACKUP DIESEL GENERATOR

Inputs	Amount	Calculation	Confidence
Diesel Used	9,975 gal	$\frac{10,240 \text{ g CO}_2\text{e} *}{\text{gallon}}$	Great

Avoided emissions were calculated by multiplying the amount of diesel needed to generate electricity using generator efficiencies reported by the Electric Department by the \*EPA diesel emission factor<sup>4</sup>. The calculation does not include marginal emission factors.

# ABOUT SITKA'S ELECTRICITY GENERATION

Sitka's electricity is generated by hydropower, which does not have emissions associated with its primary electricity generation. Backup diesel generators are available in case of long failures or outages. Any longer failures or outages of the dams resulting in diesel being burned for electricity lead to increased emissions from this source. Since the Blue Lake Expansion Project, no significant amount of diesel has been used to meet Sitka's electricity needs.

## HYDROELECTRIC GENERATION

CBS runs two hydroelectric projects, which together produce 99.9% of Sitka's electricity. Power generation is split between the two projects, with the Blue Lake Project generating about two-thirds of the power.

**The Blue Lake Hydroelectric Project** has three vertical 8.5 MW turbines and can produce 15.9 MW of electricity. In 2014, the Blue Lake Expansion Project was completed, which raised the dam 83 ft to its maximum height of 425 ft. This increased the amount of water stored in the reservoir. The expansion also upgraded the turbines, penstock, and powerhouse. Blue Lake is also the primary source of Sitka's water.



*Aerial photo of the Blue Lake dam with the reservoir lake spilling over the top.*



**The Green Lake Hydroelectric Project** has two horizontal 9 MW turbines and can produce 18 MW of electricity. The Green Lake Project was originally built in 1982 as the Blue Lake Project neared its generation capacity. It has been running nearly continuously since.



*Aerial photo of the Green Lake Powerhouse.*

### BACKUP DIESEL GENERATION

CBS has 27 MW of diesel generators to act as backup to the hydroelectric projects. These generators are exercised periodically throughout the year to ensure they are available if needed. The amount of fuel fluctuates slightly year to year but does not significantly change the amount of emissions from the generators when compared to the total electricity produced by the hydroelectric projects. The five-year average of emissions from diesel generators is 159 MTCO<sub>2</sub>e (Figure 14).

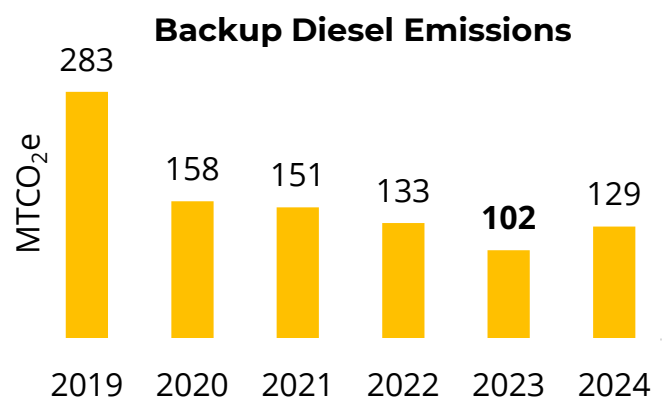
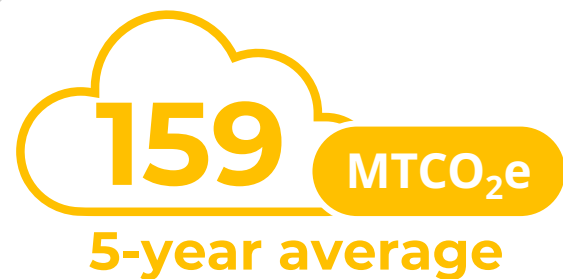
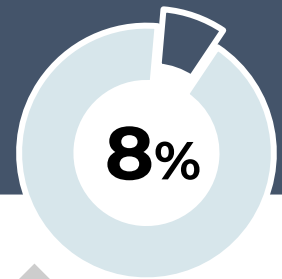


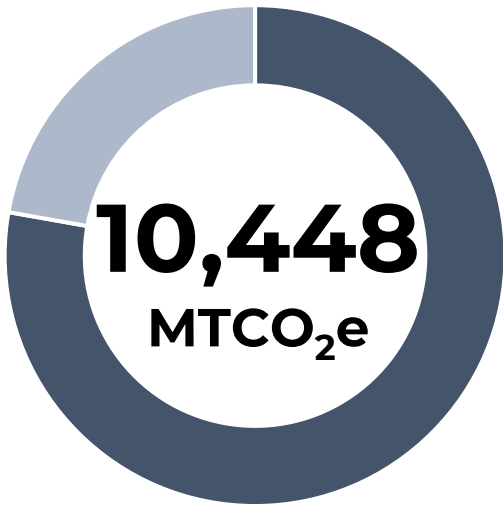
Figure 14: Sitka's back-up diesel emissions over 5 years

# BUILDING HEATING

TOTAL OF  
GHG EMISSIONS



Combustion of fossil fuels for space heating, water heating, and cooking.



Emission Source	MTCO <sub>2</sub> e	Percent
Residential	8,808	84%
Commercial	1,640	16%



~1,000,000 gallons of diesel

## 7% RESIDENTIAL BUILDINGS

Inputs	Amount	Source	Confidence
Occupied Houses	3,513	Alaska Housing Finance Corporation <sup>10</sup>	Great
Average Size Square feet (sf)	1,689 sf (5.8 million total)	2024 CBS Assessing Department Records	Good
Average Heating Energy heating and hot water	76 MMBtu/sf	EIA Residential Energy Consumption Survey, averaged between AK and WA <sup>12</sup>	OK
Building Heat Source Fuel Oil	41% of houses	2023 utility bill analysis	Good

**Calculation**  $\frac{\text{number of occupied houses}}{\text{house}} \times \frac{\text{avg heating energy}}{\text{house}} \times \% \text{ houses using fuel oil} = \text{residential heating energy from fuel oil}$

## 1% COMMERCIAL BUILDINGS

Commercial Building Square-footage	2.3 million sf	2024 CBS Building Assessment Records	Great
% of Building sf w/ Space Conditioning	75%	Assumed based on typical commercial buildings	Good
Average Heating Energy per sf for commercial bldgs	25 kBtu/sf	EIA Commercial Buildings Energy Survey <sup>11</sup>	OK
Building Heat Source Fuel oil	51%	2023 utility bill analysis	Good

**Calculation**  $\frac{\text{total sf of commercial buildings}}{\text{space conditioning}} \times \frac{\text{avg heating energy}}{\text{sf}} \times \% \text{ of buildings using fuel oil} = \text{commercial heating energy from fuel oil}$

# METHODOLOGY



Buildings have emissions associated with their electricity and fuel oil consumption. Since Sitka's electricity generation is supplied from hydropower, which has no emissions associated with its generation, the building emissions are solely from combustion that occurs onsite for the purposes of space heating, domestic hot water (DHW), and cooking. Since energy data for every building's space heating, DHW, and cooking is unavailable, we estimated their associated emissions based on square footage (sf), electricity utility bills, fuel source, and energy intensity estimates for homes and commercial spaces from the Energy Information Administration (EIA) <sup>11</sup>.

## AVERAGE HEATING ENERGY

### RESIDENTIAL BUILDINGS

Sitka is more temperate than the majority of Alaska. To avoid overestimating Sitka's residential heating requirements, metrics for space heating and hot water were averaged between Alaska and Washington's energy consumption profiles from the EIA Residential Energy Consumption Survey (RECS)<sup>12</sup> (Table 9). **The total amount of energy used by residential buildings is estimated to be 266,988 MMBtu/yr.**

ENERGY USE	AK	WA	Avg	SITKA
Heating MMBtu	81	30	56	Avg AK and WA
Hot Water MMBtu	25	15	20	
<b>TOTAL MMBtu</b>	<b>106</b>	<b>45</b>	<b>76</b>	

### TEMPERATURE

Winter Avg °F	21°	43°	32°	39°
Summer Avg °F	54°	65°	60°	56°

Table 9. MMBtu for major energy needs in Alaska and Washington and their average, which is used for Sitka. When compared to the average seasonal temperatures of each location, the energy average between AK and WA is close to Sitka's seasonal averages.

### COMMERCIAL BUILDINGS

Since Sitka does not have a large industrial footprint, commercial and industrial buildings were combined. City Assessing Department data shows a footprint of 2.3 million square feet for Sitka's commercial and industrial buildings. To account for spaces that are either unoccupied (especially seasonally) or are used as warehouses or storage space and not space conditioned (heating or cooled), we assume that 75% of commercial buildings' square footage is actively used year-round and conditioned. The EIA estimates that commercial buildings in mixed-to-cold climates use, on average, 25 kBtu/SF for space heating<sup>11</sup>. **This results in the total amount of energy used by commercial building estimated to be 42,418 MMBtu/yr.**

### CONFIDENCE LEVEL: OK

Metrics related to humans and generalized for the entire state of Alaska are often skewed towards Southcentral as it is the most populated region. While this is somewhat fixed with the average, it is not based on local data, however, it is still justifiable with general understanding. More research into energy use in Sitka would improve the estimate but would likely have a small impact on the results.



## BUILDING HEAT SOURCE

To calculate how much of this energy is from fuel oil, which diesel is a type of, and produces emissions, the fuel source of the building must be determined. In U.S. homes, space heating and water heating combined account for more than 28% of household electricity use<sup>12</sup>. Since air conditioning is not common in Sitka, and space heating is seasonal due to the mild climate, it can be assumed the heating accounts for an even higher percentage of electricity use in the winter. Homes that heat with electricity will have a significant difference between summer and winter electrical consumption. While some houses' monthly electricity data may be influenced by changes in occupancy (e.g. decrease of energy one month from traveling out of town), these fluctuations even out across the large number of households. Similarly, houses that have multiple heating sources (heat pumps and baseboards), or that use primarily fuel oil for heat and use supplemental heaters, also likely evens out.

## UTILITY BILL ANALYSIS

To estimate how many buildings use electricity as their primary heat source, utility bills from 2023 were analyzed with the following logic: if the average electricity consumption over the summer months (June, July, August) was 50% lower than the winter months (November, December, January), the building was determined to have an electric heat source (Figure 15). If houses were not heated by electricity, they were assumed to be heated by fuel oil and, in the case of residential buildings, a small percentage by wood. In all cases, it is assumed that if a building has electric heat, it also has electric hot water.

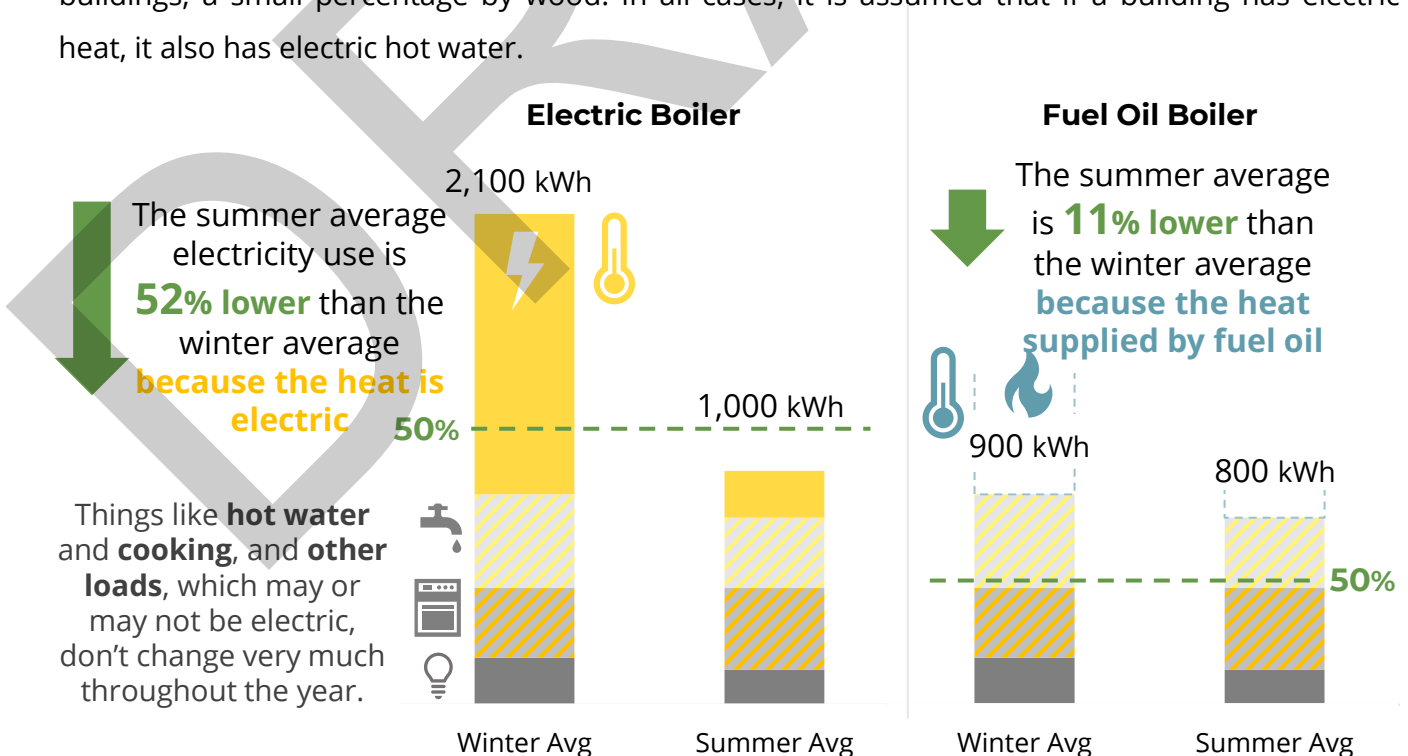


Figure 15. Utility bill analysis can be used to determine which homes use electricity and fuel oil heat for heating.



### UTILITY BILL ANALYSIS RESULTS

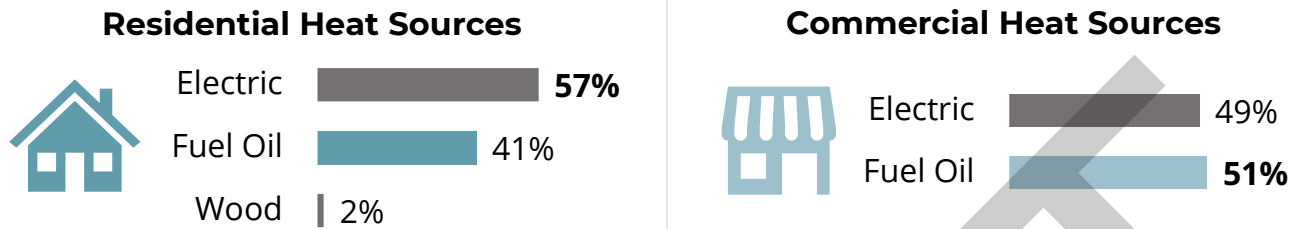


Figure 16. Most homes in Sitka use electric heat while most commercial buildings use fuel oil.

### LIMITATIONS

**RESIDENTIAL BUILDINGS:** The 50% seasonal change works best to capture homes heated with less efficient electric heat sources, like resistive heaters and boilers. Heat pumps, which are becoming increasingly common and are far more efficient than other electric heat sources, may not always cross the 50% threshold and may be incorrectly categorized as a fuel oil home. While the number of heat pumps and their exact impact on electrical consumption in Sitka is not known, they can use up to two-thirds less energy than other electric systems (Figure 17). Because of this, 41% is likely an overestimate of homes that are heated by fuel oil.

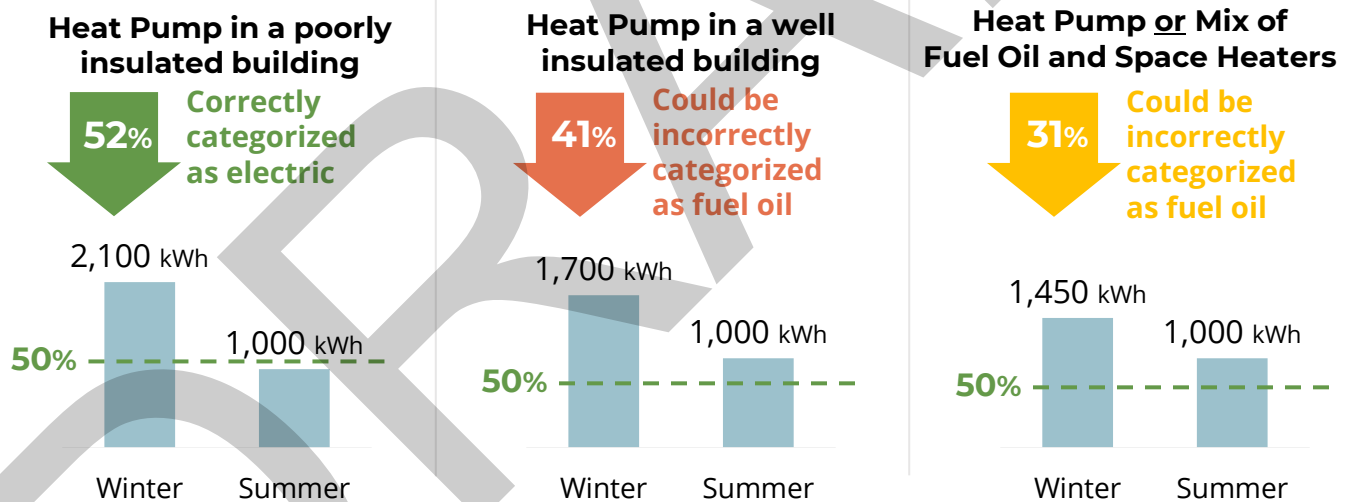


Figure 17. Example of how heat pumps may be incorrectly categorized as fuel oil due to their efficiency.

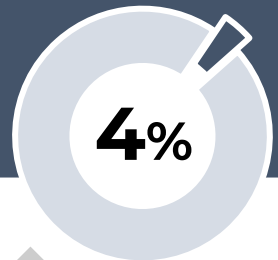
**COMMERCIAL BUILDINGS:** The limitations on commercial buildings are similar to residential buildings. While this approach works best for stores that are open year-round, some of Sitka's largest commercial consumers are seafood processing plants, whose consumption is greatest in late summer.

### CONFIDENCE LEVEL: GOOD

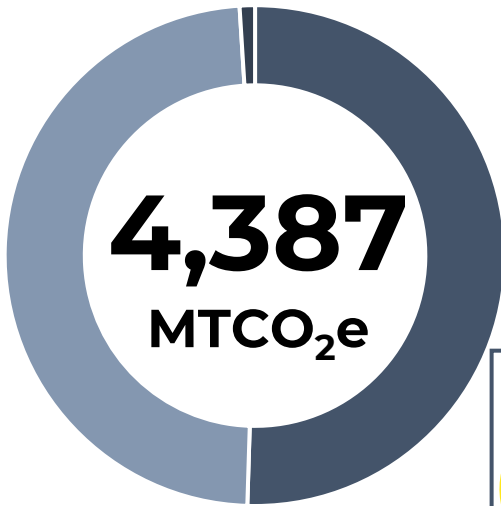
Additional analyses on local residential and commercial building heating systems could improve assumptions. This could also have other benefits for CBS and residents and businesses.

# GROUND TRANSPORTATION

TOTAL OF GHG EMISSIONS



Combustion of fossil fuels for vehicles.



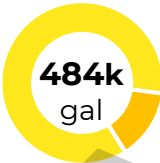
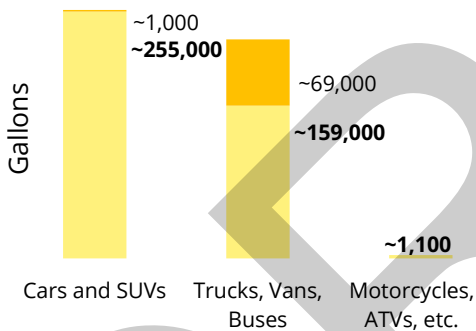
138 MTCO<sub>2</sub>e avoided by EVs

Emission Source	MTCO <sub>2</sub> e	Percent
Cars and SUVs	2,280	52%
Trucks, Vans, Buses	2,097	48%
Motorcycles, ATVs, etc.	10	<1%

Fuel Types	MTCO <sub>2</sub> e	Percent
Gas	3,767	86%
Diesel	747	14%

Vehicle Type	Fuel			Total
	Gas	Diesel	Electric	
Cars and SUVs	5,222	0	221	5,443
Trucks, Vans, Buses	2,423	339	0	2,762
Light Duty	2,309	202	0	2,511
Medium Duty	251		0	232
Heavy Duty	0		0	19
Motorcycles, ATVs, etc.	148	0	0	148
<b>Total</b>	<b>7,765</b>	<b>367</b>	<b>221</b>	<b>8,353</b>

Fuel Use by Vehicle Types



## VEHICLE EMISSIONS

Inputs	Amount	Source	Confidence
Conventional Vehicles	8,132	2024 AK DMV	Great
Actively Driven Vehicles	70%	Assumption based on AK DOT Traffic AADT <sup>14</sup>	Good
Avg Daily Miles Driven	4 mi/day	CBS Short-term Tourism Plan End of Season Survey <sup>13</sup>	Great
Avg Fuel Efficiency	20 mpg (Cars) 15 mpg (Trucks) 6 mpg (Heavy-Duty) 30 mpg (ATV)	Adjusted from U.S. avg efficiency report <sup>15</sup>	OK
Active Days per Year	350 days (Vehicles) 80 days (ATV)	Assumption	Good

**Calculation**  $\text{number of active vehicles} \times \frac{\text{total miles driven}}{\text{year}} \times \frac{\text{miles}}{\text{gallon}} = \text{gallons of fuel used by vehicles}$

# METHODOLOGY



A list of every vehicle identification number (VIN) registered in Sitka was provided by the Alaska Department of Motor Vehicles (DMV) and was decoded using the National Highway Traffic Safety Administration's (NHTSA) Vehicle Product Information Catalog and Vehicle Listing (vPIC) tool. **8,353 vehicles** had valid VINs and were decoded to find the following information:

## VEHICLE TYPES AND CLASSIFICATIONS

The NHTSA classifies all vehicles into six categories, while the Federal Highway Administration and (FHA) categorizes all vehicles by weight (GVWR) as either light, medium, or heavy-duty. Neither completely translate to how the public use these terms. For example, the NHTSA defines anything that can carry more than ten people as a bus, and anything designed to carry cargo as a truck. While all passenger cars and SUVs are considered light-duty, a "pickup" truck is considered a body style and can be considered either light or medium-duty depending on weight. To learn more about how these classifications vary between agencies, see Appendix B.

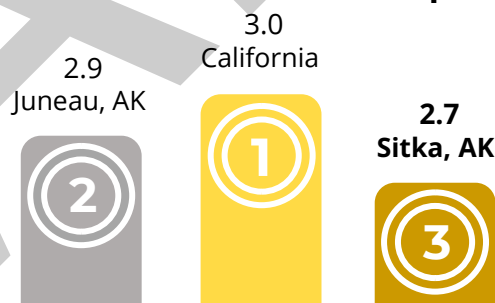
## FUEL TYPES

Vehicles were categorized as powered by either gasoline, diesel, or electricity. Plug-in hybrid electric vehicles (PHEV) were considered all electric as many PHEVs have batteries capable of driving 20-30 miles. With limited roads, these vehicles were assumed to primarily run on electricity.

Similarly, while 145 vehicles in Sitka are "fuel-flexible" they were categorized given that gasoline as is it generally cheaper and given high-ethanol gasoline is not widely available.

**2.6% of all vehicles in Sitka are electric**, with 201 battery electric vehicles (BEV) and 20 PHEVs. When compared to population, that puts Sitka as a top adopter of EVs in the country. The number of EVs is also rising. Since 2022, the number of EVs in Sitka has increased by 75% and could reach over 450 EVs in 2030.

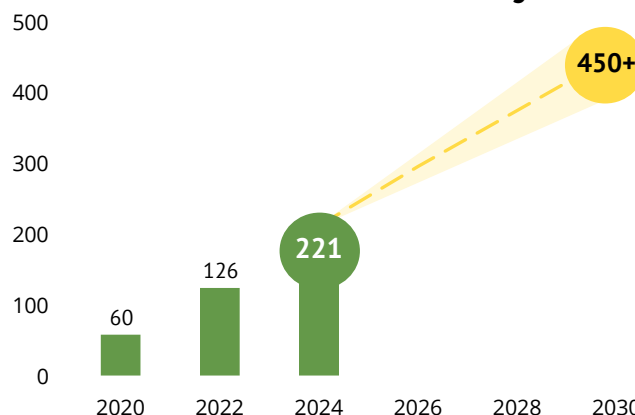
### Sitka is a leader in EV adoption



Top EVs Cities per 100 people

**Runner Ups:** Washington (1.8), Hawai'i (1.7), Oregon (1.4), Alaska (0.5, 40<sup>th</sup> place)

### The number of EVs in Sitka could more than double by 2030



Figs 18 & 19. Sitka is one of the highest EV adopting communities and is only expected to grow.



### DAILY MILES TRAVELED

The 2022 Short-term Tourism Plan End-of-Season Survey asked respondents to estimate where they lived and worked. The distance between each point was estimated, and based on the 466 valid responses, the average Sitkan traveled 4 ± 2.5 miles per day or ~ 1,400 miles a year<sup>13</sup>. (Figure 20).

For heavy-duty vehicles, 4 miles per day was used and supplemented with additional information provided information from local operators with heavy-duty vehicles.

**Most Sitkan's Drive <4 Mi per Day**  
or ~1,400 mi per year, about 10% of the U.S. Avg.

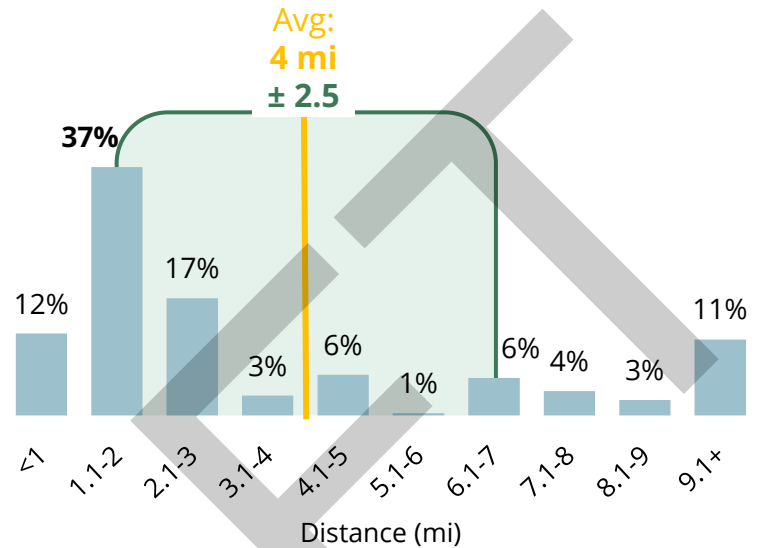


Figure 20. Estimated annual miles traveled per Sitkan is between 1.5 and 6.5 miles per day<sup>10</sup>.

### CONFIDENCE LEVEL: Great

Information was provided directly from the DMV in September 2024. While some errors existed in the VINs, the overall numbers remained close to annually reported numbers from the DMV. In combination with the 2022 Short Term Tourism Plan End-of-Season survey, these inputs are built with local information.

### ACTIVE VEHICLES

The Alaska Department of Transportation (DOT) monitors annual average daily traffic (AADT) on major roads year-round at three sites in Sitka<sup>14</sup> (Figure 21). Based on the average volume of 7,310 AADT, and to adjust for vehicles passing through multiple points or for vehicles used multiple times a day, **it is estimated that about ~6,000 (70%) vehicles are used consistently throughout the year.**

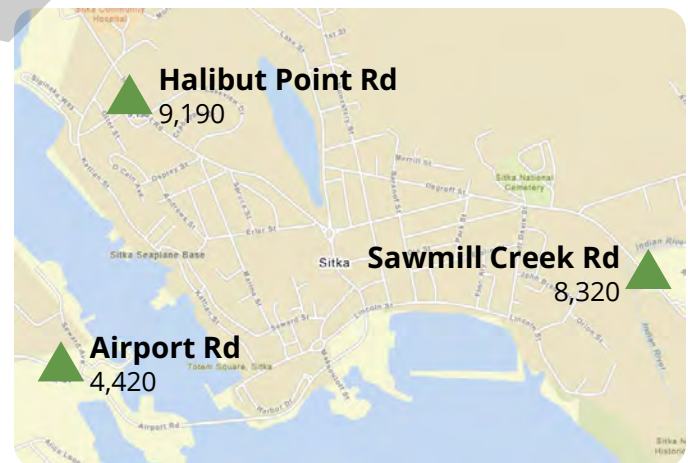


Figure 21. Annual Average Daily Traffic (AADT) stations in Sitka.

### CONFIDENCE LEVEL: GOOD

Not all vehicles that are registered are frequently driven. AADT is a measurement of volume and does not directly convert to vehicles driven. Additional local information could improve these estimates but given the large sample size and low overall emissions from vehicles, the impact would be small.



### ACTIVE DAYS PER YEAR

Most vehicles are not driven every day of the year. Active days per year was set at 350 days out of 365 days, or about 95%. This is about 2 weeks of inactivity, which could include weekends vehicles were not driven or longer vacations. Motorcycles and ATVs were adjusted to 80 days, or about 2.5 months, to account for weather and seasonal usage. While extended out of town travel is common for many Sitka residents, this likely evens out due to the large data set used.

### Vehicles in Sitka are ~33% more active in the summer than in the winter

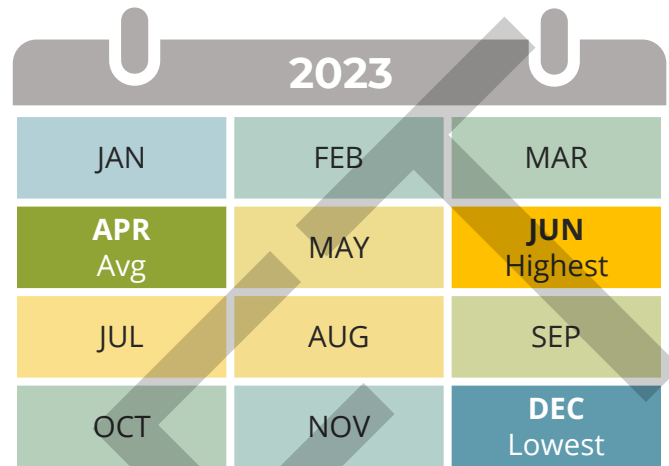


Figure 22. Graphic showing seasonal traffic volume changes in Sitka. Volumes are highest in June and lowest in December<sup>14</sup>.

### CONFIDENCE LEVEL: GOOD

While this data isn't locally sourced, it is a reasonable assumption to account for inactivity. While local data would improve the estimate, changes to overall emissions would be minimal.

### FUEL EFFICIENCY

The average fuel efficiency for cars in the United States is 24 miles per gallon (mpg), which is combined between low-speed driving and frequent stops (city) and high-speed driving with few stops (freeway)<sup>15</sup>. Because of the lack of long-distance driving in Sitka, the overall mpg was lowered to reflect the driving conditions of Sitka.

### Avg Fuel Efficiency of Vehicles in the U.S. (Miles per Gallon)

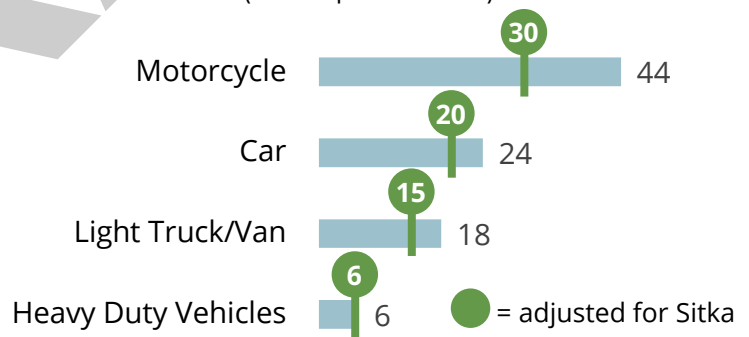


Figure 23. Fuel efficiencies for different vehicle types used in Sitka's GHG emission inventory (green circles) vs national avg<sup>12</sup>.

### CONFIDENCE LEVEL: OK

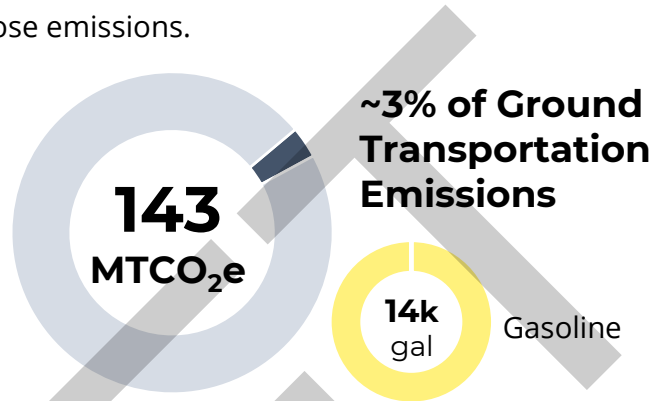
These numbers are based on national averages and not local data. More local data would improve the method of calculation which would better account for efficiency differences or other changes, but such changes would have minimal impacts on overall emissions. This estimate is still justifiable with general understanding.

# ADDITIONAL TRANSPORTATION ANALYSES

Emissions from these analyses are not an *addition* to the previously counted ground transportation emissions but rather a *portion* of those emissions.

## PUBLIC TRANSPORTATION

Public transportation in Sitka is offered through The RIDE, which is operated by the Sitka Tribe of Alaska (STA). Information provided by STA stated that in **2023, 13,945 gallons of gasoline was used for buses, resulting in 143 MTCO<sub>2</sub>e.**



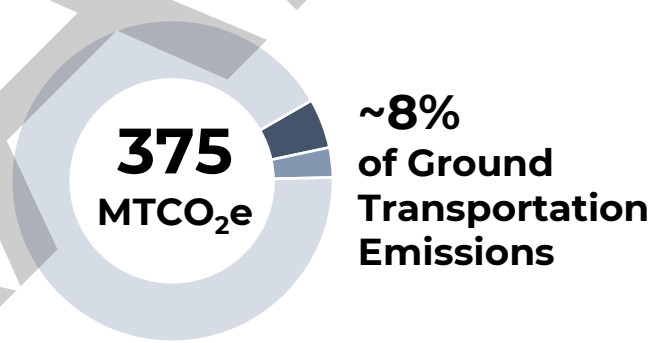
### CONFIDENCE LEVEL: Great

Quantity and type of fuel used is the most preferred and accurate level of data possible.

## TOURISM-RELATED GROUND TRANSPORTATION EMISSIONS

### TRANSPORTATION TO DOWNTOWN

Information provided by Sitka Dock Company LLC stated that in 2023, the bus fleet drove 140,000 miles. Large motorcoach-style buses are heavy-duty (6 mpg). This results in **~23,300 gallons of diesel and 238 MTCO<sub>2</sub>e.**



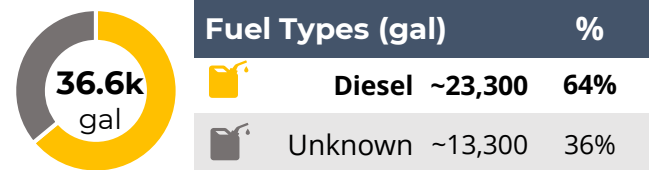
### CONFIDENCE LEVEL: GOOD

Data provided for transportation to downtown was reported in miles traveled, not gallons of fuel.

### TOUR TRANSPORTATION

According to Harrigan Centennial Hall, there are 100 permits for small passenger vans or buses to load/unload tourists. Most of these are medium-duty (15 mpg). Assuming one in four tourists (~25%) takes a tour of ~20 miles, this results in **~13,300 gallons of fuel, or 137 MTCO<sub>2</sub>e.**

Destination	MTCO <sub>2</sub> e	Percent
● To Downtown	238	5%
● Tours	137	3%

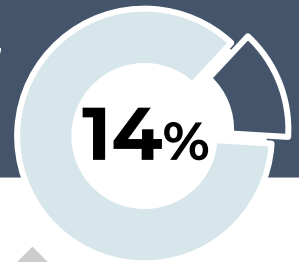


### CONFIDENCE LEVEL: OK

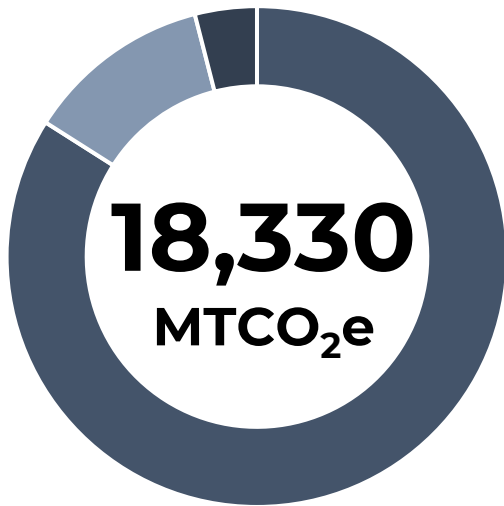
Data for tour transportation was based on estimated capacity of tour vehicles operating on cruise ship days and may be slightly overestimated. While additional data would improve this estimate, the impact would likely be small.

# MARINE ACTIVITY

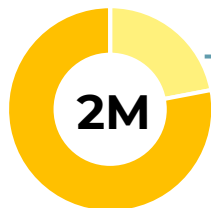
TOTAL OF  
GHG EMISSIONS



Commercial fishing, recreational fishing and boating, and charter boats.

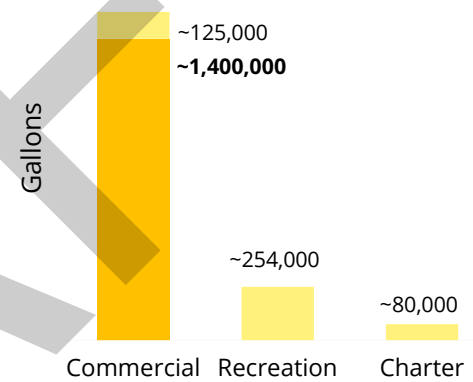


Emission Source	MTCO <sub>2e</sub>	Percent
Commercial Fishing	15,363	84%
Recreational Boats	2,256	12%
Charter Boats	711	4%



Fuel Types	MTCO <sub>2e</sub>	%
Gas ~459,000 gal	4,078	22%
Diesel ~1,400,000 gal	14,252	78%

### Fuel Use by Vessel Types



## 12% COMMERCIAL FISHING

Inputs	Amount	Source	Confidence
Vessels	510	State of AK Commercial Fishing Database <sup>16</sup>	Great
Active Vessels	95%	Assumption	Good
Fuel Efficiency	Variable	See Appendix C for details	OK

## 2% RECREATIONAL BOATS

Vessels	~1,500	2024 AK DMV Boating Registrations	OK
Active Vessels	66%		
Miles Traveled	540/miles/year/boat	Assumptions	Good
Fuel Efficiency	3 miles/gallon		OK

## 1% CHARTER BOATS

Number of Trips	7,920 trips	2023 Charter Boat Logbook, Sitka Area Management, Division of Sport Fish	Great
Miles per Trip	25 miles		Good
Fuel Efficiency	2.5 miles/gallon	Assumption	OK

**Calculation**  $\frac{\text{number of active vessels or trips}}{\text{year}} \times \frac{\text{total miles driven}}{\text{year}} \times \frac{\text{miles}}{\text{gallon}} = \text{gallons of fuel used by vessels}$

# METHODOLOGY



Fishing is a large portion of Sitka's economic activity and boating is a significant aspect of Sitka's lifestyle. However, marine activity is challenging to quantify as vessels come into Sitka Sound or other from elsewhere, and some of Sitka's vessels leave the nearby area. For Scope 1 emissions, only activity from Sitka's registered vessels is included. Shipping is included in Scope 3 section.

## VESSEL CLASSIFICATIONS

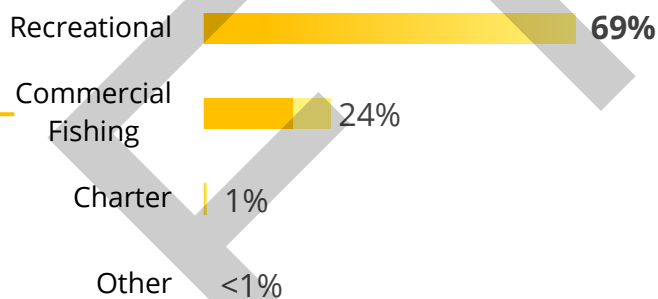
In 2023, the Alaska DMV reported that 2,167 motorized boats were registered in Sitka.

510 of those vessels were related to commercial fishing<sup>16</sup>. Of the registered vessels, 71% were diesel engines, 28% gas, and 1% left no answer. Given the importance of commercial fishing in Sitka, a detailed breakdown is provided in Appendix C.

142 vessels were used for fishing charters. According to feedback from the community, most of these are gas-powered. Some diesel charter boats do exist but how many is unknown.

The remaining ~1,500 vessels were assumed to be for recreational boating and fishing, with a small number of "unclassified" vessels. Information on these vessels, like the U.S. Coast Guard Cutter, was unavailable and not included in this inventory.

### Most Vessels in Sitka are Used for Recreation



### Most Commercial Fishing Vessels in Sitka Have Diesel Engines

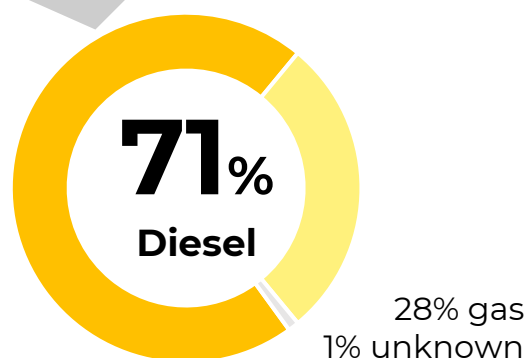


Figure 24. Most vessels in Sitka are for recreational use, but the fuel type is unknown. Most commercial vessels in Sitka use diesel.

## OVERALL CONFIDENCE: GOOD

**Commercial and Charter: Great** The number of commercial fishing vessels and charter boats were provided by the State's Commercial Fishing Database and the Department of Fish and Game (AKDFG), Sitka Area Management Division of Sport Fish's charter boat logbook.

**Recreational: OK** More detailed, local data would improve the number of recreational boats and their fuel efficiencies and would better distinguish recreational and other vessels, such as search and rescue and larger tour vessels that operate in Sitka. Depending on the level of data available, this could change overall emissions in this category or create new categories, but the extent is unknown. This estimate is still justifiable with general understanding.



## ACTIVE VESSELS

Similar to vehicles, not all boats were assumed to be used. Fortunately, the number of active charter vessels was provided by the AKDFG Sitka Area Management Division. For commercial fishing, 5% of vessels were assumed inactive and 66% assumed inactive for recreational boats.

### CONFIDENCE LEVEL: GOOD

While this data isn't locally sourced, it is a reasonable assumption to account for inactivity. While local data would improve the estimate, changes to overall emissions would be minimal.

## MILES TRAVELED & FUEL EFFICIENCY

To determine emissions of marine activity in Sitka, information about the miles traveled and fuel efficiency of vessels must be determined, however, this information is not readily available. For the purposes of this inventory, the following assumptions were used:

**Charter boats: 25 miles per trip, 2.5 mpg.** 25 miles is a reasonable distance for day trips around Sitka Sound. 2.5 mpg is a conservative estimate. With 7,920 reported trips, this results in 79,200 gallons of fuel. Based on community input, charter boats primarily run on gasoline, although some diesel charter boats exist.

**Recreational boats: 540 miles per year, 5 mpg.** In this assumption, we assume that most boats take an average of 20-mile trips, 4 times per month, 6 months per year. This equals about 540 miles per boat. The fuel efficiency for recreational boats is 5 mpg, or approximately the fuel efficiency of a 20-ft aluminum Hewescraft. This results in about 254,000 gallons of fuel which is assumed to be primarily gasoline.

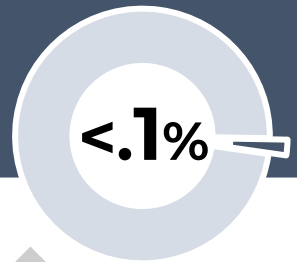
**Commercial Fishing:** In addition to the challenges that affect all boats, commercial vessels' fuel efficiency can also drastically differ depending on the kind of gear used and the vessel activity depends on the kind of fisheries that are opened, which can vary drastically from year to year. Data from the Vessel Energy Analysis Tool (VEAT) by Kempy Energetics<sup>17</sup> was used to estimate the fuel efficiency of a variety of fishing boats that take into account gear type and other factors with a full breakdown available in Appendix C. This resulted in 1,393,760 gallons of diesel and 124,619 gallons of gasoline.

### CONFIDENCE LEVEL: OK

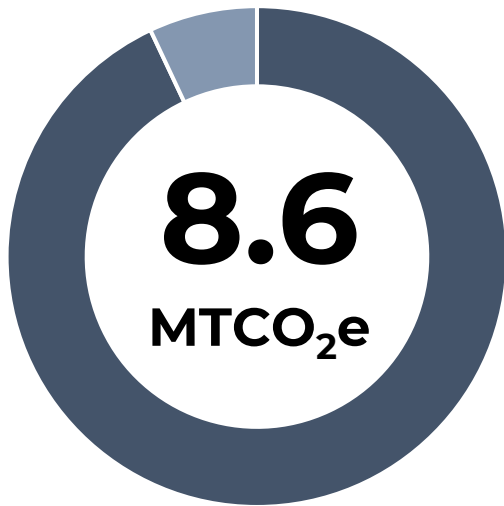
This data was based on research and not actualized local information, which was unavailable. More detailed, local data would improve the miles traveled and fuel efficiencies, however the impact on emissions is unknown. Given the complexity and lack of physical boundary for marine activity, this estimate is still justifiable with general understanding.

# WASTEWATER TREATMENT

TOTAL OF GHG EMISSIONS



Nitrous oxide (N<sub>2</sub>O) from the biological treatment process of wastewater.



Emission Source	MTCO <sub>2</sub> e	Percent
Residents	8	93%
Seasonal Visitors	0.6	7%

## METHODOLOGY

Sitka's Wastewater treatment does not have nitrification or denitrification processes. Wastewater treatment emissions are calculated based on the total population served and type of treatment, using the federal GHG wastewater reporting methodology and corresponding emission factor<sup>18</sup>. Although the emissions from wastewater is small, it is included for completeness.

## WASTEWATER EMISSIONS

Inputs	Amount	Source	Confidence
Residential Population	8,380	2023 U.S. Census Bureau	Great
Seasonal Visitors	694*	*Assuming 607,000 tourists spend ten hours in Sitka equates to this many people year-round residents	Good
Emission Factor	0.009 g N <sub>2</sub> O /person/day	Federal GHG Accounting and Reporting Guidance	Great
Calculation	$Number\ of\ People \times \frac{0.009g}{person} \times 365\ days = g\ of\ N_2O$		

### CONFIDENCE LEVEL: Great

Scientific understanding of emissions associated with wastewater treatment plants is evolving. Using this emission factor is still considered best practice under current guidelines.

### CONFIDENCE LEVEL: GOOD

This metric assumes every visitor to Sitka uses a facility connected to Sitka's sewer system. This is likely overestimated, however, given the small amount of emissions from this source, additional refinement to this section would not change emissions significantly.



*High-voltage transmission lines (not in Sitka)*

SECTION 4

**SCOPE 2: INDIRECT  
EMISSIONS | ELECTRICITY**  
*NOT APPLICABLE*

# Scope 2 SUMMARY

TOTAL OF  
GHG EMISSIONS

N/A

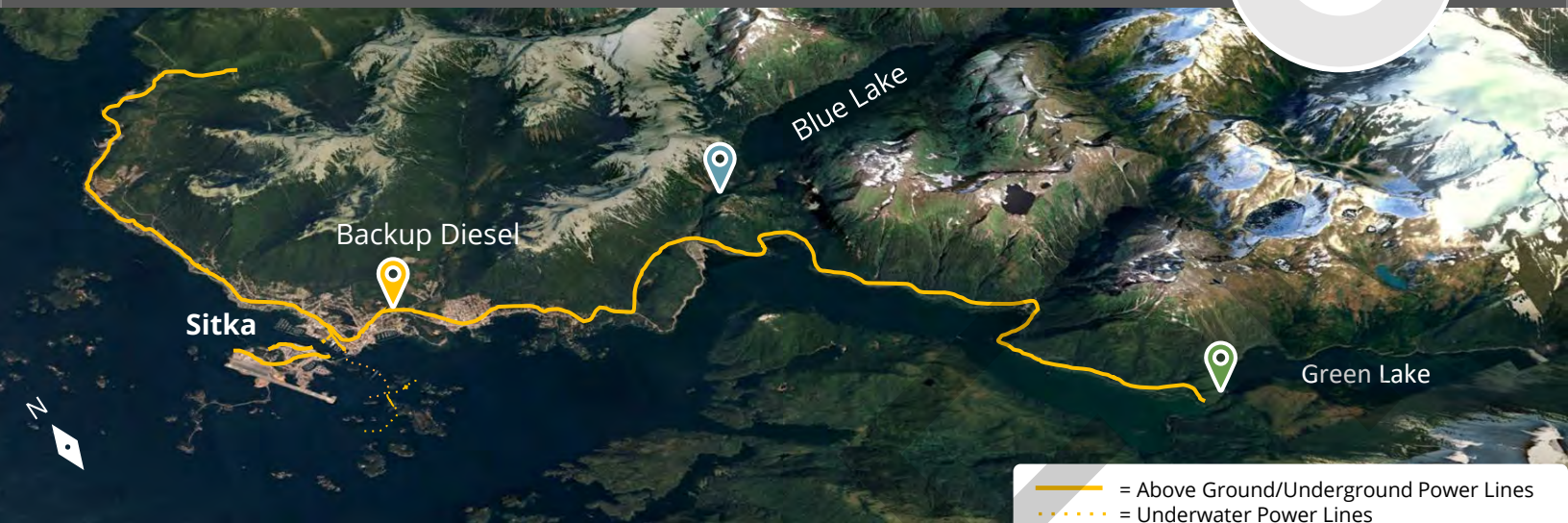


Figure 25 : Sitka's electric grid (orange line) is not connected to any other community

## SITKA DOES NOT HAVE ANY Scope 2 EMISSIONS

Scope 2 emissions are indirect emissions associated with energy that is generated outside of Sitka's boundaries but consumed within Sitka's boundaries. Most commonly, Scope 2 emissions are from GHGs that are burned in power plants outside the boundaries of an area, but supply electricity via the grid connection (Figure 25 and 10). Because Sitka generates all electricity locally, there are no Scope 2 emissions.

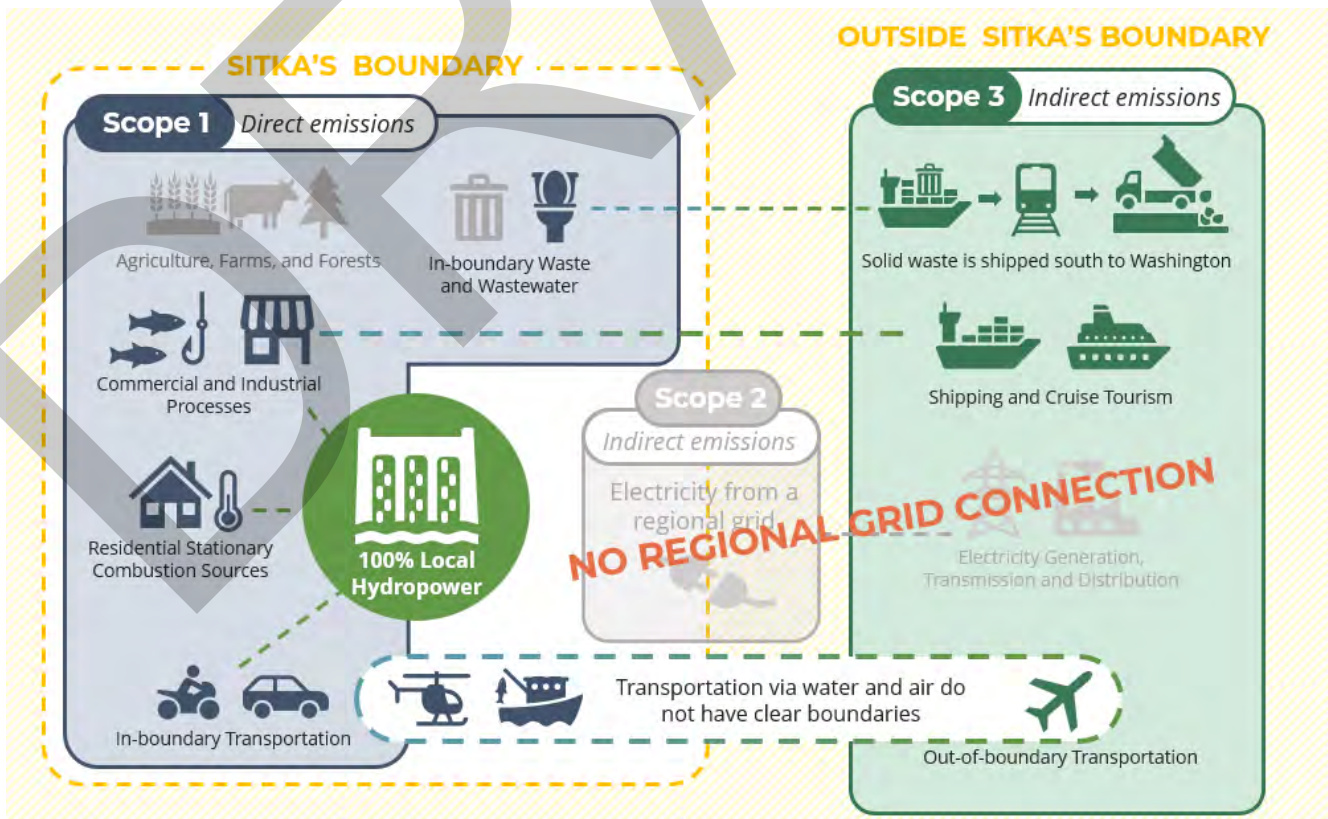


Figure 10: Sitka's categories of GHG emissions differ from standard methodologies.





*The Green Lake powerhouse on Silver Bay*

## SECTION 5

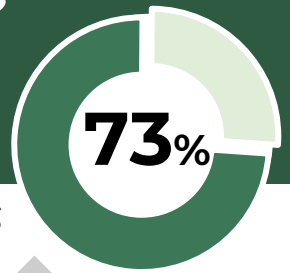
# SCOPE 3: INDIRECT EMISSIONS



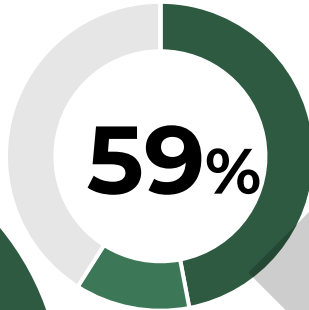
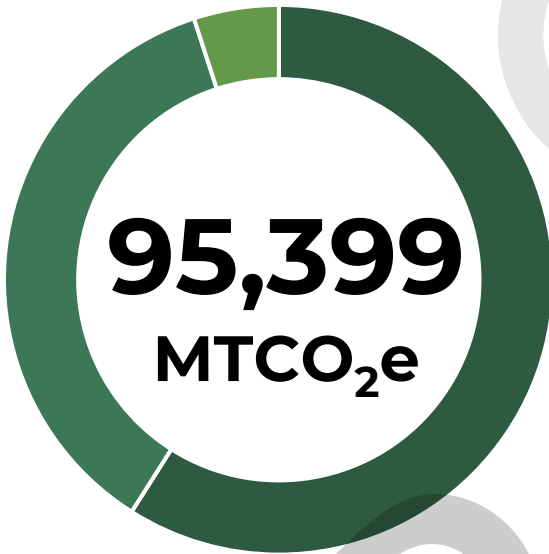
# Scope 3 SUMMARY



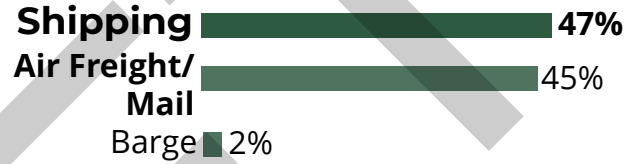
TOTAL OF GHG  
EMISSIONS



Indirect emissions that occur outside of Sitka as a result of activities taking place within the boundary. Because Sitka is an island, certain Scope 3 emissions were included to more accurately reflect the community. These include solid waste, shipping via barge and air, air travel, and cruise ships.



## Transportation

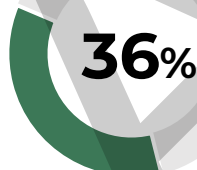


## Air Travel



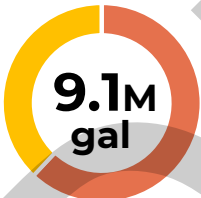
## Industry

### Cruise Ships

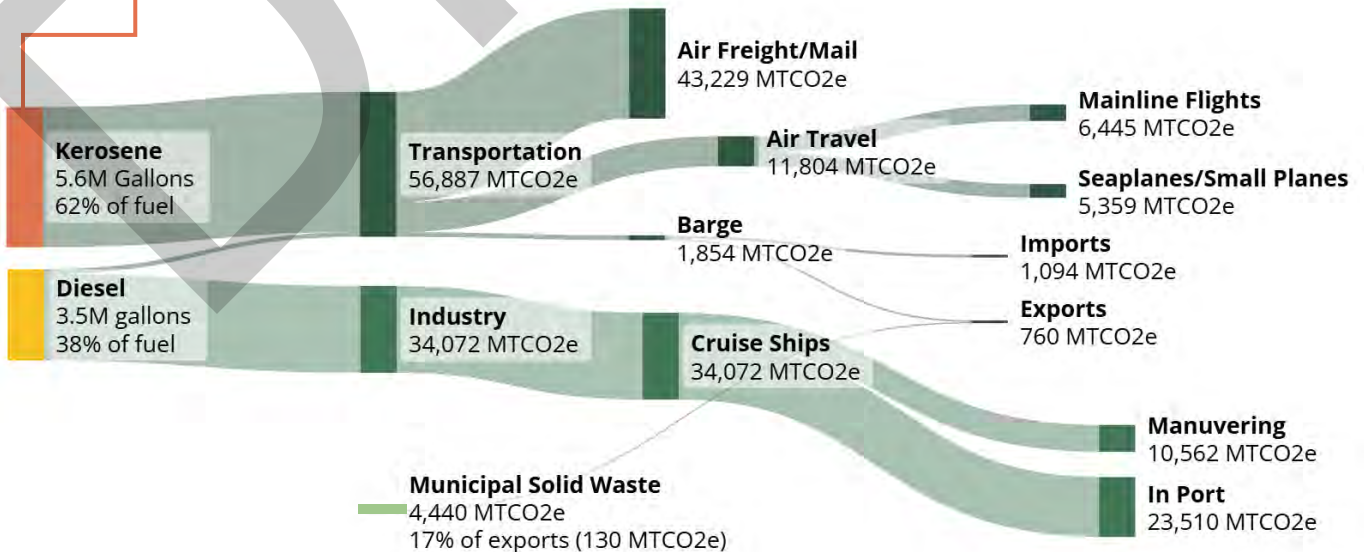


Municipal  
Solid Waste 5%

## TOTAL FUEL



## ENERGY FLOW



# Scope 3 SUMMARY

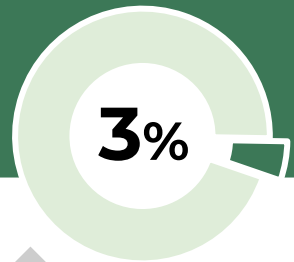
## CONFIDENCE LEVELS OF ESTIMATIONS

Emission Source		Assumption Inputs		
<b>Solid Waste Disposal - Great</b>				
<b>Municipal Solid Waste (MSW)</b>	7,618 tons of waste	240 tons of recycling	Mixed MSW emissions factor	Recycling emission factor
<b>Shipping - Great</b>				
<b>Marine/Barge Transport</b>	117,658 tons of materials shipped and received	1,000 miles on a barge to/from Seattle	1 gallon of diesel moves 1 ton 650 miles	
<b>MSW/Recycling Disposal</b>	7,858 tons of material to Seattle			
<b>Air Transport</b>	3,963 tons of materials to/from Sitka	850 miles from Seattle to Sitka	0.00109 MTCO <sub>2</sub> e per ton-mile emission factor	
<b>Air Travel – Good</b>				
<b>Mainline Flights</b>	40,586 revenue passenger miles (RPM)	67% of flights are medium-haul 32% are short-haul	Weighted average emission factor 0.159 MTCO <sub>2</sub> e/ RPM	
<b>Seaplanes, Small Planes, Helicopters</b>	657,784 gallons of kerosene imported	Aviation fuel emission factor 0.84kg MTCO <sub>2</sub> e/gal	80% of imported fuel is used for this sector	
<b>Cruise Ship Emissions – Good</b>				
<b>Cruise Ship Hotel</b>	9 hours average time in port	29% Hotel MCR	Installed power (kW) and generator efficiency varies	
<b>Cruise Ship Maneuvering</b>	4 hours average approaching/leaving Sitka	54% Propulsion MCR		
<b>Number/Types of Cruise Ships</b>	333 scheduled trips	39 ships		

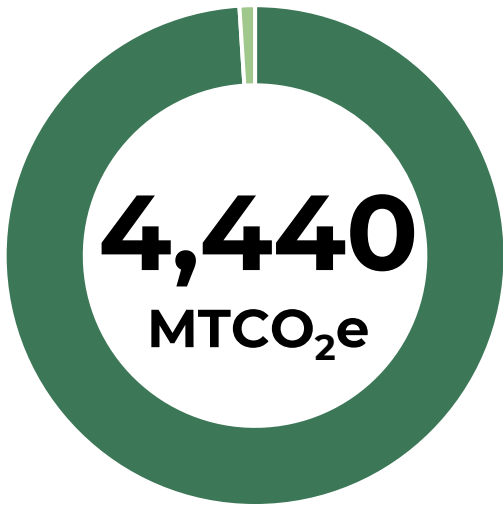
Table 8: Summary of confidence levels for all emission sources included in Scope 3.

# MUNICIPAL SOLID WASTE

TOTAL OF GHG EMISSIONS

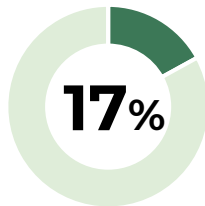


Decomposition of organic matter in landfills



Emission Source	MTCO <sub>2</sub> e	Percent
Municipal Solid Waste	4,418	99%
Recycling	22	<1%

## Shipping



Barge Shipping 130 \*

### Barge Export Shipping Emissions

\*this is not included in the total emissions for solid waste but is accounted for under shipping on page 54.

## MUNICIPAL SOLID WASTE (MSW) EMISSIONS

Inputs	Amount	Source	Confidence
MSW Shipped	7,618 tons	Republic Services 2023 Summary	Great
Recycling Shipped	240 tons		
Mixed MSW Emission Factor	0.58 MTCO <sub>2</sub> e/ton	EPA Emissions Factor <sup>4</sup>	
Recycling Emission Factor	$\frac{0.09 \text{ MTCO}_2\text{e}}{\text{ton}}$		

**Calculation**  $\left( \frac{\text{tons of MSW}}{\text{ton}} \times \frac{0.58 \text{ MTCO}_2\text{e}}{\text{ton}} \right) \times \left( \frac{\text{tons of recycling}}{\text{ton}} \times \frac{0.09 \text{ MTCO}_2\text{e}}{\text{ton}} \right) = \text{Emissions from Solid Waste}$

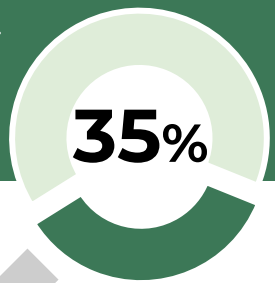
## SHIPPING

Inputs	Amount	Source	Confidence
Distance Traveled	1,000 miles	Assumption of approximate one-way distance from Sitka to Seattle	Good
Miles one gallon can move one ton	650 miles		
Diesel Consumed to Transport to/from Sitka to/from Seattle	$\frac{1.54 \text{ gallons}}{\text{ton}}$	Texas A & M Transportation <sup>20</sup>	Great

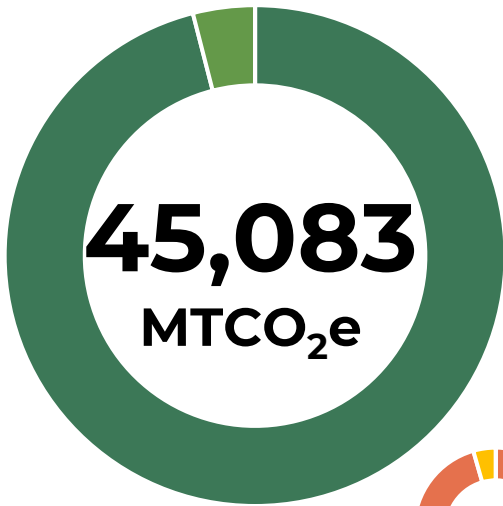
**Calculation**  $\text{Tons of Waste Transported} \times \frac{1.54 \text{ gallons}}{\text{ton}} = \text{gallons of diesel to transport waste to seattle}$

# TRANSPORTATION SHIPPING

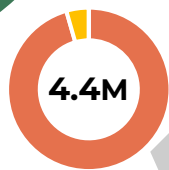
TOTAL OF GHG EMISSIONS



Emissions from transporting goods to and from Sitka via plane and barge.



Emission Source	MTCO <sub>2</sub> e	Percent
Air Cargo	43,229	96%
Barge	1,854	4%
Received Goods ( <i>Imports</i> )	1,094	2.5%
Shipped Goods ( <i>Exports</i> )	760	1.5%
Solid Waste and Recycling	130	0.3%



Fuel Types			
	<b>Kerosene</b>	~4,200,000	43,229 96%
	Diesel	~180,000	1,854 4%

## 34% AIR CARGO

Inputs	Amount	Source	Confidence
Freight/Mail	46,658 tons	Bureau of Transportation Statistics	Great
Distance	850 mi	Estimated Distance from Seattle to Sitka	
Emission Factor	0.00109 MTCO <sub>2</sub> e/ Ton-mile	EPA Emission Factor	

**Calculation**  $\frac{\text{Tons of Freight/Mail}}{\text{Ton-mile}} \times \text{Distance Traveled} \times \text{Emission Factor} = \text{emissions from air shipping}$

## 1% BARGE

Inputs	Amount	Source	Confidence
Tons of Materials Shipped and Received	117,658 tons	USACE Cargo Report <sup>9</sup>	Great
Distance Traveled	1,000 miles	Assumption of approximate one-way distance from Sitka to Seattle	Good
Miles one gallon can move one ton	650 miles		
Diesel Consumed to Transport to/from Sitka to/from Seattle	$\frac{1.54 \text{ gallons}}{\text{ton}}$	Texas A & M Transportation <sup>20</sup>	Great

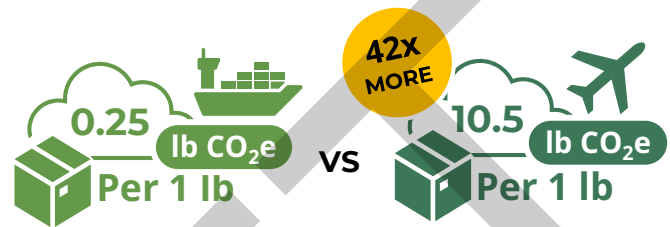
**Calculation**  $\text{tons of material transported} \times \frac{1.54 \text{ gallons}}{\text{ton}} = \text{gallons of diesel to transport to/from Sitka}$

# METHODOLOGY



Sitka is dependent on shipping for nearly all goods. Emissions from shipping are considered Scope 3 and are not always included in GHG inventories because of the difficulties estimating and lack of available information. It should be noted that although expensive, barge shipping is highly efficient when compared to other transportation. This is because more material can be loaded on ships compared to other forms of shipping, like trains, trucks, or planes. Similarly, air shipment is both expensive and extremely emission intense (Figure 26).

## SHIPPING TO SITKA VIA AIR EMITS 42 TIMES MORE EMISSIONS THAN BY BARGE



Most of the material shipped to/from Sitka was by **barge**...



### MATERIAL VS EMISSIONS

...but almost all of shipping emissions were from **air cargo**.

Figure 26: Comparison of emissions between shipping methods to Sitka.

## AIR CARGO

The amount of freight and mail that arrives, and departs, from Sitka via mainline carriers (see page 60 for definition) is reported to the Bureau of Transportation Statistics<sup>19</sup> but is not divided into import and exports like with barge shipments. **In 2023, Sitka shipped and received 46,658 tons of freight and mail by air<sup>19</sup>** (Figure 27).

### TONS OF AIR CARGO IN 2023

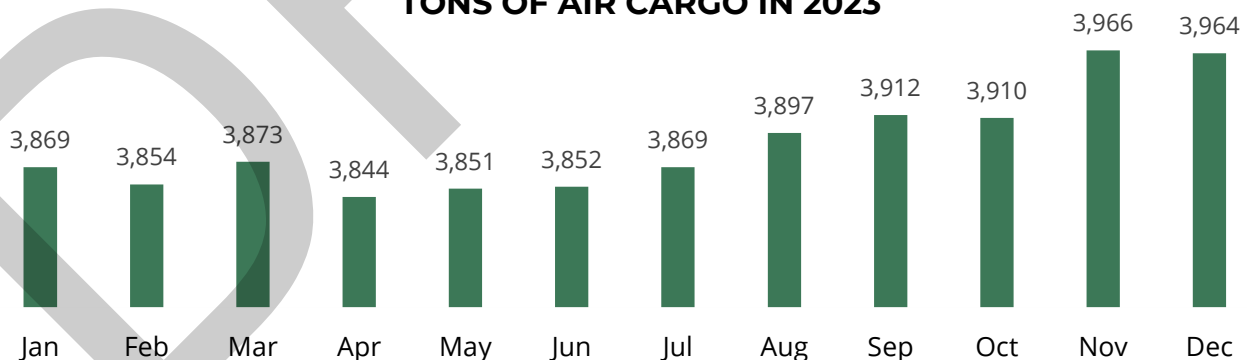


Figure 27: Sitka gets more air cargo in the winter months. This is consistent with the rest of the country when holidays increase the amount shipped.

## OVERALL CONFIDENCE: Great

This estimate uses data reported from the Bureau of Transportation Statistics that is specific to Sitka. While the kinds of goods shipped and received would be insightful, they do not impact the estimate of emissions.



## BARGE SHIPMENTS

According to the 2022 Cargo Report, **Sitka shipped and received 118,000 tons of material via barges<sup>9</sup>**. Materials moved on waterways are categorized with **commodity codes** as described by the Waterborne Commerce of the United States<sup>21</sup>. These four-digit numbers include information about broad categories of goods but contain some details about the cargo (*Figure 28 and Table 10*).

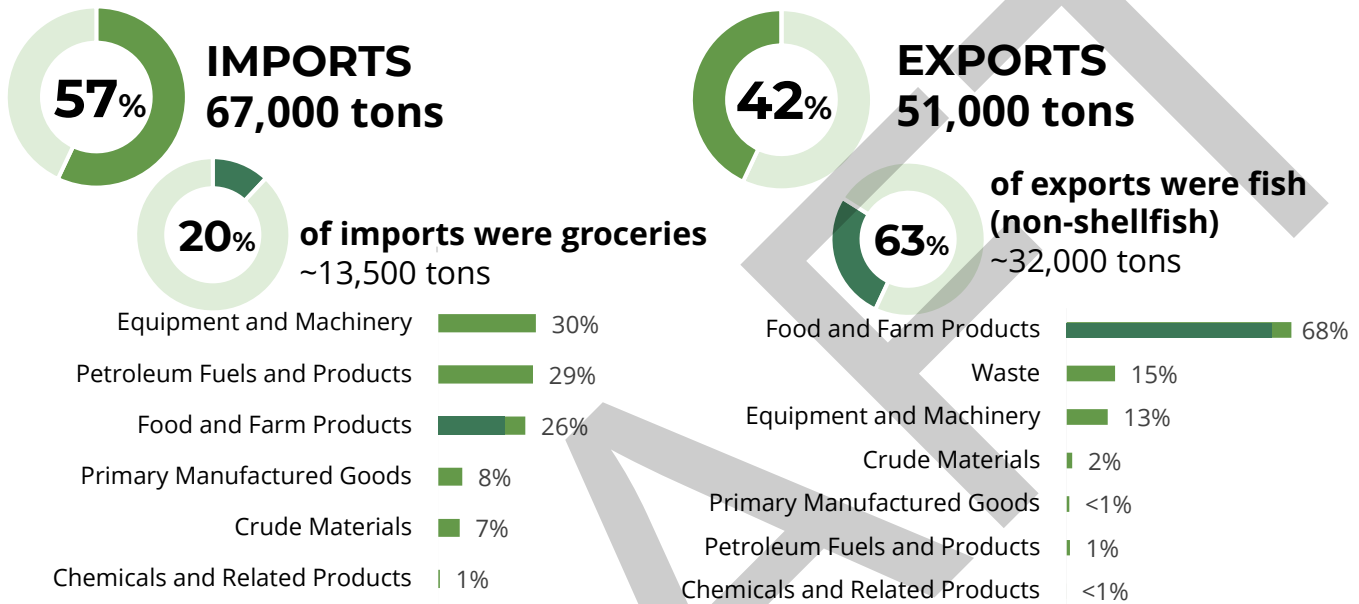


Figure 28: Groceries were the single biggest import to Sitka while fish was the biggest export.

Commodity Category	Examples
<b>Petroleum Fuels and Products</b>	Gasoline, diesel, kerosene, asphalt, tar, pitch
<b>Chemicals and Related Products</b>	Alcohols, some plastics, paints, chemical additives
<b>Crude Materials</b>	Inedible items, excludes petroleum Includes lumber, iron, salt, sand, gravel
<b>Primary Manufactured Goods</b>	Paper products, pipes, glass, metal sheets
<b>Foods and Farm Products</b>	Animal-sourced proteins, fruits, vegetables and other edible grocery items, alcoholic beverages, animal feed
<b>Equipment, Machinery and Other Manufactured Goods</b>	Electronics, vehicles, boats, aircrafts, parts, other machinery, clothes, plastic products
<b>Waste Material</b>	Garbage and landfill-destined items

Table 10: Definitions of commodity categories used in the Cargo Report<sup>9, 21</sup>.

## OVERALL CONFIDENCE: GOOD

Though the shipping distance may vary based on agencies or material, it is a reasonable assumption to account for stops in other communities. While using distances of specific routes would improve the estimate, changes to overall emissions would be minimal. Although the emissions factor is not specific to Southeast barges, it is based on a large dataset over a long period of time. More specific would improve the estimate, but changes to overall emissions would be minimal.

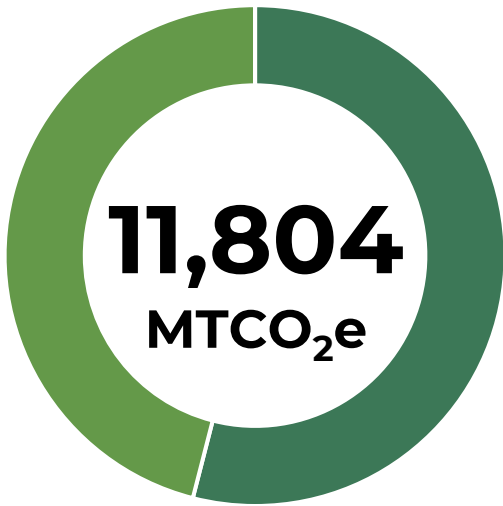
# TRANSPORTATION AIR TRAVEL

TOTAL OF  
GHG EMISSIONS



9%

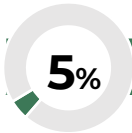
Emissions from commercial, personal, cargo, and general aviation.



Emission Source	MTCO <sub>2</sub> e	Percent
Mainline Flights	6,445	54%
Seaplanes, Small Planes, Helicopters	5,359	46%



~1,200,000 gallons of kerosene

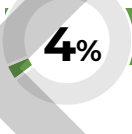


## MAINLINE FLIGHTS

Inputs	Amount	Source	Confidence
Revenue Passenger Miles (RPM)	40,586	Rocky Gutierrez Airport T-100 Segment Data, Bureau of Transportation Statics <sup>22</sup>	Great
Flight Distance	67% Medium-haul 32% Short-haul	Rocky Gutierrez Airport T-100 Segment Data, Bureau of Transportation Statics <sup>19</sup>	
Flight Emission Factor	0.159 MTCO <sub>2</sub> e/ RPM	EPA Emission Factor, weighted avg been short and medium-haul flights <sup>4</sup>	

### Calculation

$$\text{number of RPM} \times \text{flight emission factor} = \text{emissions from commercial air travel}$$



## SEAPLANES, SMALL PLANES, HELICOPTERS

Total Imported Kerosene	657,784 gallons	USACE 2022 Cargo Report <sup>9</sup>	OK
Aviation Fuel Emission Factor	0.84kg MTCO <sub>2</sub> e/gal	EPA Emission Factor <sup>4</sup>	Great
% of Imported Kerosene Used	80%	No supporting data	Poor

### Calculation

$$\text{gallons of kerosene used} \times \text{aviation fuel emission factor} = \text{emissions from sea planes, small planes helicopters}$$



Because Sitka is on an island, air travel is the primary mode of transportation to anywhere outside the city. This inventory includes emissions from aviation fuel combustion occurring within the city boundary and from portions of one-way transboundary journeys outside the city boundary (e.g., a flight to New York that has a layover in Seattle).

## **MAINLINE FLIGHTS**

Ideally, this estimate would be calculated based on the amount of fuel used on flights destined for or originating from Sitka; however, that data is not reported to entities like the Federal Aviation Administration (FAA). Instead, this estimate uses available metrics reported by airlines with a method known as passenger-miles and associated emission factors. This section only includes mainline airlines that report to the Bureau of Transportation Statistics<sup>12</sup>. In 2023, that included Alaska Airlines and Delta Air Lines. Commercial travel for small planes/seaplanes is not reported and therefore not included in section. Instead, commercial travel by seaplanes is included in seaplanes, small plane, and helicopter category, which generally lacks specific information.

## **REFUELING IN SITKA**

The 5-Year Cargo Report shows Sitka imported 658,000 gallons of kerosene in 2022, which, in its highly refined form, is a type of jet fuel. This jet fuel is used for smaller, more local air travel such as seaplanes, small personal planes, and helicopters used for Coast Guard or medical evacuation. Emissions from burning this jet fuel are 5,359 MTCO<sub>2</sub>e. However, according to community feedback, the Sitka Rocky Gutterez Airport does some portion of refueling on-site, meaning some portion of this fuel imported goes toward refueling mainline air carriers at the airport. However, requests to obtain on-site refueling information from Alaska Airlines were unsuccessful. For this report, it is estimated that 20% of fuel in Sitka is used by mainline carriers, as it is assumed most of the fuel is used locally.

## **REVENUE PASSENGER MILES**

Revenue passenger miles (RPM) is a metric reported by airlines that combines air traffic volume and distance traveled. For example, a plane with 100 passengers that travels 500 miles generates 50,000 RPM. For simplicity, RPM is reported in thousands. That means Sitka's 40,586 RPM represents 40,586,000 miles and includes flight segments arriving to and departing from Sitka. This metric should not be confused with Available Seat Miles (ASM), which measures total carrying capacity.



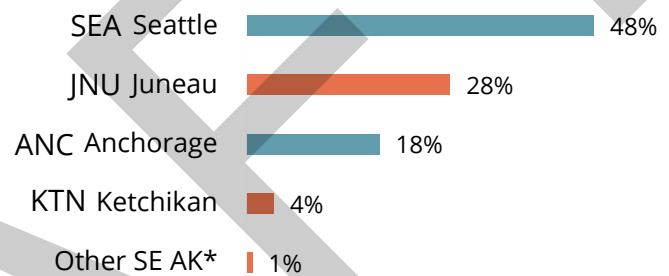
### AIR TRAVEL HAUL EMISSION FACTORS

The distance a plane travels impacts its fuel efficiency. EPA emission factors are divided into three categories based on distance (Table 11). Flights to/from Sitka can be categorized as either short-haul (SIT-JNU, ~100 mi) or medium-haul (SIT-SEA, ~850 mi). For this inventory, the factor used is a weighted average of 67% medium-haul and 32% short-haul flights. Reporting for air taxi/seaplanes is optional and makes up ~1% of reported flights<sup>22</sup> (Figures 28 and 29).

Haul	Distance (mi)	MTCO <sub>2</sub> e per RPM
Short	<300	0.22
Medium	≥300 - <2,300	0.13
Long	≥2,300	0.17

Table 11: Seattle was the most common destination from Sitka and is considered a medium-haul flight.

### Top Destination Airports and Haul-Distance



### Most of Sitka's Flights are Considered Medium-Haul

\*Other reported Southeast communities include Klawock, Kake, Wrangell, Petersburg, Port Alexander and Port Armstrong. Graphic does not reflect actual flightpaths.

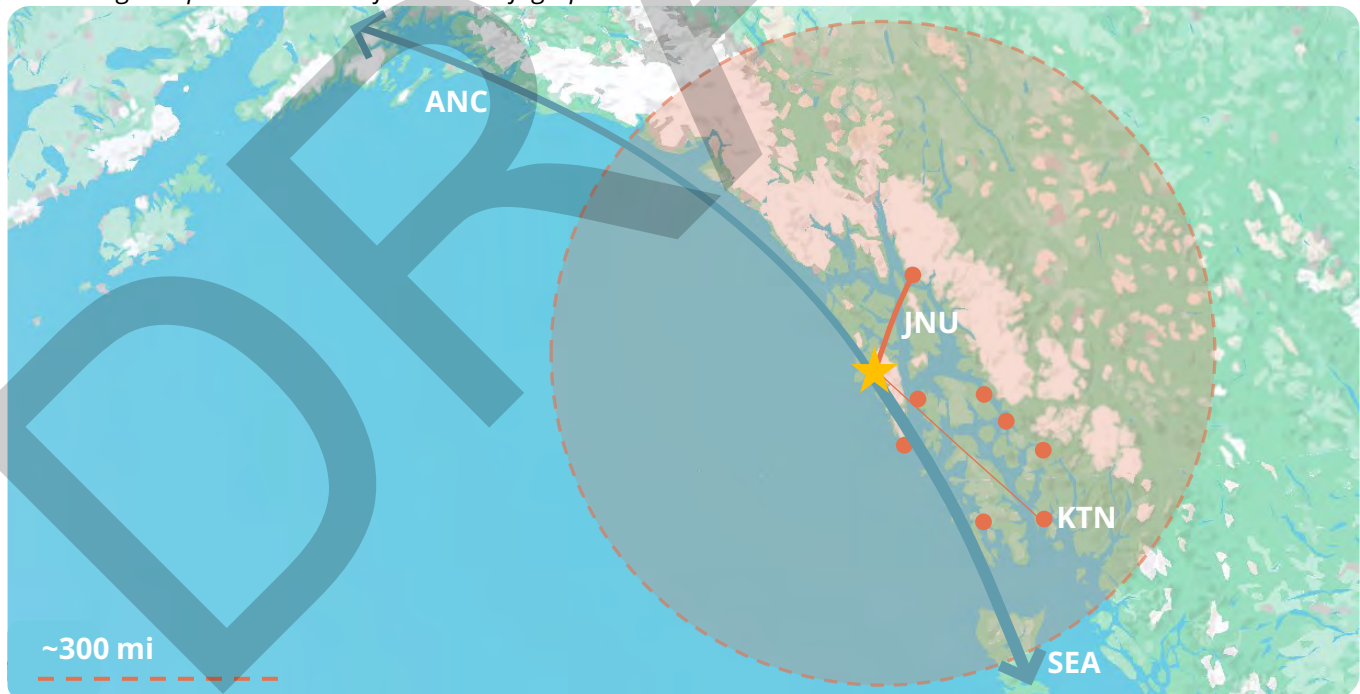


Figure 29 & 30: Destinations from the Sitka Rocky Gutierrez Airport and haul-category.

### OVERALL CONFIDENCE: Great

This estimate uses Sitka-specific data. While the emission factor for aviation is considered accurate, this estimate is likely slightly underestimated, as the emissions factor and reporting is specific to mainline carriers. Even so, it is justifiable with general understanding.



## SEAPLANES, SMALL PLANES, HELICOPTERS

This section includes seaplane flights, including commercial passenger flights with fewer than 60 passengers and any associated cargo, as well as A29 Seaplane Base (float planes, which are Alaska Seaplanes and float planes for hire). The estimate assumes that 80% of jet fuel shipped to Sitka is used for these aircrafts.

### OVERALL CONFIDENCE: NEEDS WORK

This estimate assumes that 80% of the jet fuel in Sitka goes to this sector with no additional supporting data. Details about flights, passengers, cargo, etc. could be impactful to this section and could be significant. It is unknown how additional data would affect the estimate.

### FUTURE AIR TRAVEL WORK

This data is included in case additional information becomes available regarding refueling and local air travel in Sitka. The Sitka Rocky Gutierrez Airport tracks and report flights to the FAA. However, the FAA categories do not separate passenger flights, cargo flights, or track distances. As such, flight data provided by the Sitka Rocky Gutierrez Airport did not contain required information to quantify emissions from specific types of aviation but did provide some insight into the kinds of flights that take place. The following category descriptions are interpreted from official definitions provided by the FAA and contextualized for Sitka (Figure 30 and Table 12).

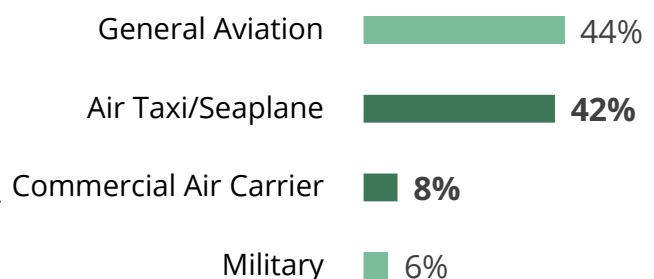
**Commercial Air Carriers:** Aircraft with a seating capacity of more than 60 passengers or a payload of >18,000 lbs that carry passengers and/or cargo. This includes mainline passenger jets and large cargo planes.

**Commercial Air Taxis/ Seaplanes:** Aircraft with a seating capacity of fewer than 60 or a payload of <18,000 lbs that carry passengers and/or cargo. This includes seaplanes and other small planes.

**Military:** Operations performed by military aircraft. The size and type of aircraft can vary widely depending on what operation is performed.

**General Aviation:** Private or rented civil aircraft used for recreation, training, or other private uses. These are generally smaller aircraft but may include small personal jets.

### Half of flights in Sitka are commercial flights for passengers and/or cargo

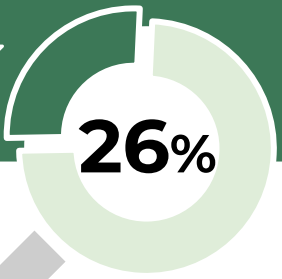


Type	Number of Flights
Commercial Air Carrier	1,812
Air Taxi/Seaplane	9,860
Military	1,325
General aviation	10,342
<b>Total in 2023</b>	<b>23,339</b>

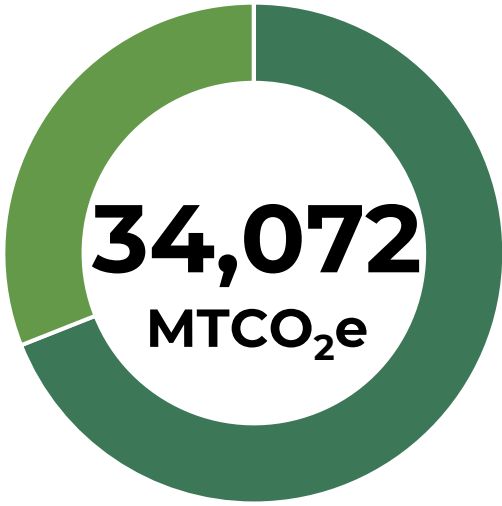
Figure 31 & Table 12: Types of flights to/from Sitka.

# INDUSTRY CRUISE SHIPS

TOTAL OF  
GHG EMISSIONS



Emissions from cruise ships entering, docking, and leaving Sitka.



Emission Source	MTCO <sub>2</sub> e	Percent
Cruise Ship in Port	23,510	69%
Cruise Ship Maneuvering	10,562	31%



~3,300,000 gallons of diesel

Inputs	Amount	Source	Confidence
Avg Maneuver Time	4 hours	Historical Automatic Identification System (AIS)	Good
Avg Hours in Port (Hotel)	9 hours avg	2024 cruise ship schedule	Great
Propulsion MCR	25%	Input from cruise captain	Good
Hotel MCR	29%	Input from cruise captain	Good
Installed Power (kW) of Ship	Varies	Models from Alaska Cruise Schedule and additional research	Great
Generator Efficiency	Varies (grams of diesel/kWh)		

### Calculation

$$\text{Hours in Sitka} \times \text{MCR \%} \times \text{Installed power} \times \text{Generator efficiency} = \text{Gallons of diesel used by a cruise ship}$$

# METHODOLOGY



The cruise industry accounts for a large portion of Sitka's economic activity. Cruise ships do not draw power from Sitka's port, and they do not refuel in Sitka; however, they burn fuels while in port in Sitka. Although this combustion happens within Sitka's boundaries, it is standard practice in GHG reporting to count emissions from intercity or international trips as Scope 3 emissions. Only GHG emissions for cruise ships are reported. Additional pollutants such as nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and fine particulate matter emissions (PM 2.5) are not included<sup>23</sup>.

The schedule of cruise ships that visit Sitka each year includes specifics on dates, times, and names of ships. **In 2024, there were 333 scheduled trips to Sitka from 39 ships carrying ~600,000 passengers.**

**On average, cruise ships spent 13 hours in Sitka.**

## TIME SPENT IN SITKA

**BOUNDARY:** To better understand the emissions produced within Sitka, a line connecting Cape Edgecumbe and Biorka Island served as Sitka's "boundary" (Figure 31).

**MANEUVERING TIME:** The time necessary for a cruise ship to approach Sitka, dock, and leave Sitka. Historical data from the Automatic Identification System (AIS), a system used to track ships, indicated that the average maneuver time for a cruise ship was four hours.

**HOURS IN PORT:** The 2024 cruise calendar times were analyzed and found that the average time spent in Sitka was nine hours.

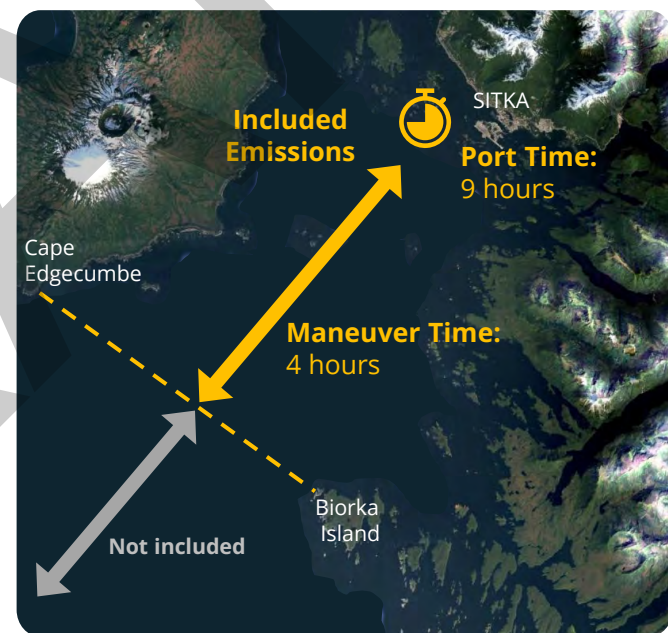


Figure 32. Map of cruise ship emission boundary and included parameters (orange).

## CRUISE SHIPS ENGINES - MCR

Cruise ships use diesel engines to generate electricity, which is then used to power all aspects of the ship. Similar to generators, these operate at different loads depending on what the ship is doing. **How much an engine runs is reported as the maximum continuous rating (MCR) in the form of a percentage.** To estimate emissions, two MCRs are used, one while the ship moves and one while the ship is docked. The MCR estimates were provided by cruise ship captains and were noted to be slightly conservative.



**PROPULSION:** The power that is needed to run the diesel-electric motors that spin the propellers that move the ship. This was reported to be **25% MCR** (Figure 32).

**HOTEL:** The power that is needed to run lighting, air conditioning, and other amenities on cruise ships while stationary. This was reported to be **29% MCR** (Figure 32).

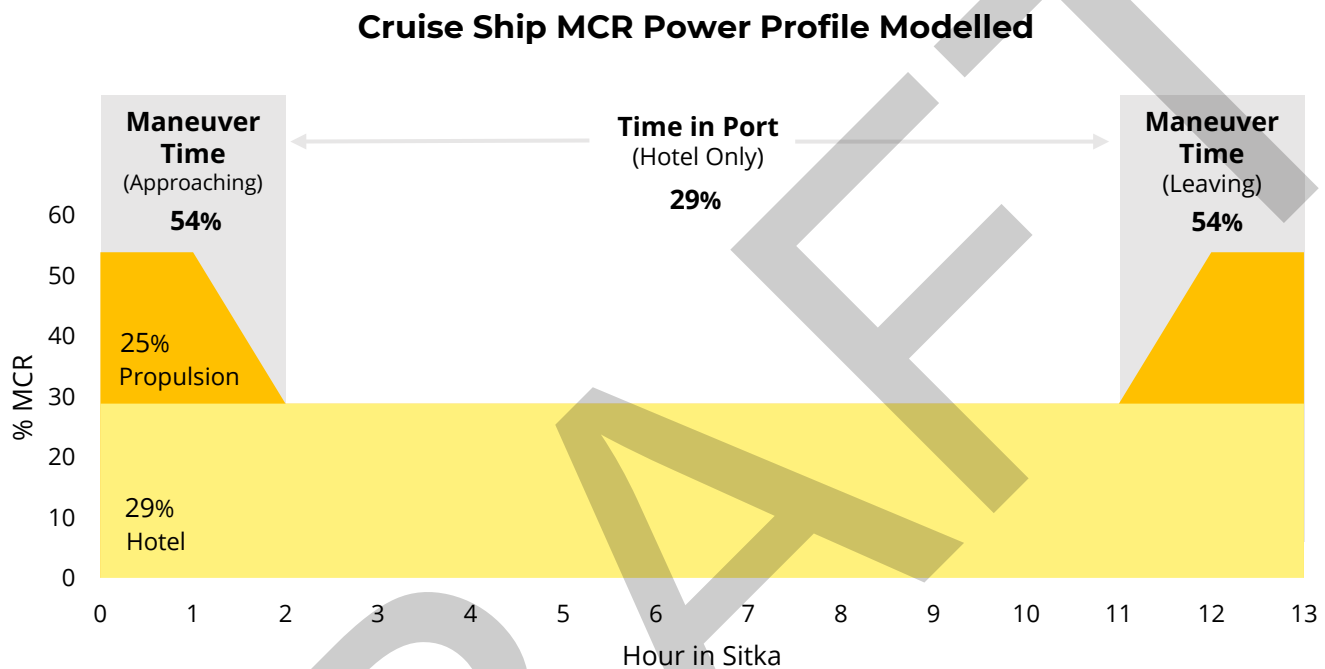


Figure 33: Cruise ships spend most of their time at the Hotel level of MCR.

## OVERALL CONFIDENCE: GOOD

This estimate uses time-based information, researched data, and input from operators of cruise ships; however, each cruise ship operates differently, and information on propulsion is generalized. Improved data on fuel usage would improve the estimate, but the impact would likely be small.

## CRUISE SHIP-RELATED GROUND TRANSPORTATION EMISSIONS

This is a subset of the emissions already considered from trucks and buses in the ground transportation section of Scope 1. This means emissions from tourism-related ground transportation are not an *addition* to the previously counted ground transportation emissions but rather a *portion* of these emissions. **This specific section of transportation resulted in ~36,600 gallons of gasoline/diesel and 375 MTCO<sub>2</sub>e per year, or ~8% of ground transportation emissions.** Details of the methodology used can be found on page 42).



*The Blue Lake reservoir*

## SECTION 6

# REFERENCES AND APPENDICES

Appendices A and C are currently under final review and are not yet approved for public release. This document will be updated when final approval is made by PNNL.

# REFERENCES

- <sup>1</sup>U.S. Environmental Protection Agency (EPA) *Overview of Greenhouse Gases Website*: <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>.
- <sup>2</sup>IPCC. 2023. *Climate Change 2023: Synthesis Report*. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115, doi: 10.59327/IPCC/AR6-9789291691647.
- <sup>3</sup>Greenhouse Gas Protocol. 2022. *GHG Protocol for Cities*. <https://ghgprotocol.org/ghg-protocol-cities>.
- <sup>4</sup>Environmental Protection Agency (EPA). 2024. *EPA Emissions Factors*. <https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf>.
- <sup>5</sup>Velthof, G.L., Kuikman, P.J. & Oenema, O. 2023. *Nitrous oxide emission from animal manures applied to soil under controlled conditions*. *Biol Fertil Soils* 37, 221–230. doi:10.1007/s00374-003-0589-2.
- <sup>6</sup>Barrett, T., M. 2014. *Storage and flux of carbon in live trees, snags, and logs in the Chugach and Tongass national forests*. General Technical Report. PNW-GTR-889. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. <https://research.fs.usda.gov/treesearch/45431>.
- <sup>7</sup>Environmental Protection Agency (EPA). 2024. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022* EPA 430R-24004. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022>.
- <sup>8</sup>International Marine Organization. 2020. *Fourth Greenhouse Gas Study*. <https://www.wcdn.imo.org/localresources/en/OurWork/Environment/Documents/Fourth%20IMO%20GHG%20Study%202020%20%20Full%20report%20and%20annexes.pdf>.
- <sup>9</sup>U.S. Army Corps of Engineers (USACE). 2022. *5-Year Cargo Report: Sitka Harbor*. <https://ndc.ops.usace.army.mil/wcsc/webpub/#/report-landing/year/2021/region/4/location/4808>.
- <sup>10</sup>Alaska Housing Finance Corporation. 2017. *Alaska Housing Assessment: Sitka Borough*. [https://www.ahfc.us/application/files/1215/1510/4582/Final\\_-\\_Sitka\\_Borough\\_Summary.pdf](https://www.ahfc.us/application/files/1215/1510/4582/Final_-_Sitka_Borough_Summary.pdf).
- <sup>11</sup>U.S. Energy Information Administration (EIA). 2023. *Heating U.S. commercial buildings is most energy intensive in cold climates*. <https://www.eia.gov/todayinenergy/detail.php?id=60301#:~:text=U.S.%20commercial%20buildings%20in%20cold,heating%20in%20each%20climate%20zone>.
- <sup>12</sup>Residential Energy Consumption Survey (RECS). 2020. *Dashboard Website*: [https://experience.arcgis.com/experience/cbf6875974554a74823232f84f563253?src=%E2%80%B9%20Consumption%20%20%20%20Residential%20Energy%20Consumption%20Survey%20\(RECS\)-b1](https://experience.arcgis.com/experience/cbf6875974554a74823232f84f563253?src=%E2%80%B9%20Consumption%20%20%20%20Residential%20Energy%20Consumption%20Survey%20(RECS)-b1).
- <sup>13</sup>City and Borough of Sitka. 2022. *Short-term Tourism End-of-Season Survey*.
- <sup>14</sup>Alaska Department of Transportation Traffic (USDOT) *Analysis and Data Application Website*: <https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp>.
- <sup>15</sup>U.S. Department of Energy (DOE). *Alternative Fuels Data Center Website*: <https://afdc.energy.gov/data/10310>.
- <sup>16</sup>State of Alaska Commercial Fisheries Entry Commission (CFEC) *Public Search Application Website*: <https://www.cfec.state.ak.us/plook/#permits>.
- <sup>17</sup>Kemp, C., 2018. *Vessel Energy Analysis Tool (VEAT)*. <https://kempyenergetics.com/white-paper/white-paper-example-1/>.
- <sup>18</sup>Federal Greenhouse Gas Accounting and Reporting Guidance, Council on Environmental Quality, 2016: [https://www.sustainability.gov/pdfs/federal\\_ghg%20accounting\\_reporting\\_guidance.pdf](https://www.sustainability.gov/pdfs/federal_ghg%20accounting_reporting_guidance.pdf).
- <sup>19</sup>Bureau of Transportation Statistics. *TransStats: Sitka Rocky Gutierrez (SIT) Website*: [https://www.transtats.bts.gov/airports.asp?20=E&Nv42146=fVg&Nv42146\\_anzr=fv6xn,%20NX:%20fv6xn%20e1pxB%20T76vr44rC&pn44vr4=SNPgf](https://www.transtats.bts.gov/airports.asp?20=E&Nv42146=fVg&Nv42146_anzr=fv6xn,%20NX:%20fv6xn%20e1pxB%20T76vr44rC&pn44vr4=SNPgf).
- <sup>20</sup>Texas A&M Transportation Institute, *A modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001–2014*. 2017. <https://nationalwaterwaysfoundation.org/file/31/final%20tti%20report%202001-2014%20approved.pdf>.
- <sup>21</sup>United States Army Corps of Engineers (USACE). 2018. *Commodity codes (Waterborne Commerce of the United States) Cross Reference*. USACE Digital Library, RN 735-17c.
- <sup>22</sup>Bureau of Transportation Statistics. *TransStats: Revenue Passenger-miles Sitka Rocky Gutierrez (SIT) Website*: <https://www.transtats.bts.gov/Data/Elements.aspx?Qn6n=H>.
- <sup>23</sup>F. Murena, L. Mocerino, F. Quaranta, and D. Toscano. 2018. *Impact on air quality of cruise ship emissions in Naples, Italy*. *Atmospheric Environment*, Volume 187, pages 70–83, ISSN 1352-2310. [doi.org/10.1016/j.atmosenv.2018.05.056](https://doi.org/10.1016/j.atmosenv.2018.05.056).

## APPENDIX B

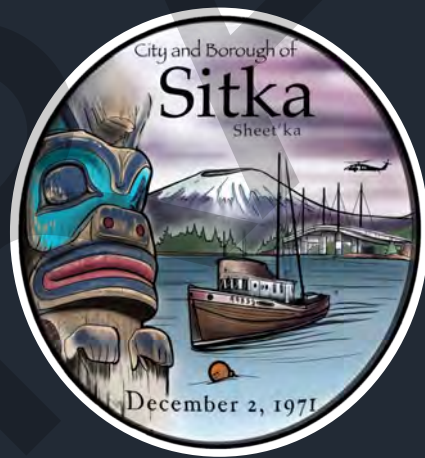
### Vehicle Weight Classes & Categories

Gross Vehicle Weight Rating (GVWR) (lbs)	Federal Highway Administration		US Census Bureau
	Vehicle Class	GVWR Category	VIUS Classes
> 6,000	Class 1: < 6,000 lbs	Light Duty < 10,000 lbs	Light Duty < 10,000 lbs
10,000	Class 2: 6,001 – 10,000 lbs		
14,000	Class 3: 10,001 – 14,000 lbs		
16,000	Class 4: 14,001 – 16,000 lbs	Medium Duty 10,001 – 26,000 lbs	Medium Duty 10,001 – 19,500 lbs
19,500	Class 5: 16,001 – 19,500 lbs		
26,000	Class 6: 19,501 – 26,000 lbs		
33,000	Class 7: 26,001 – 33,000 lbs	Heavy Duty > 26,001 lbs	Heavy Duty > 26,001 lbs
> 33,000	Class 8: > 33,001 lbs		

Gross Vehicle Weight Rating (GVWR) (lbs)	EPA Emissions Classification			
	Heavy Duty Vehicle and Engines			Light Duty Vehicles
	H.D. Trucks	H.D. Engines	General Trucks	Passenger Vehicles
< 6,000	Light Duty Truck 1 & 2 < 6,000 lbs	Light Light Duty Trucks < 6,000 lbs	Light Duty Trucks < 8,500 lbs	Light Duty Vehicle < 8,500 lbs
8,500	Light Duty Truck 3 & 4 6,001 – 8,500 lbs	Heavy Light Duty Trucks 6,001 – 8,500 lbs		
10,000	Heavy Duty Vehicle 2b 8,501 – 10,000 lbs	Light Heavy Duty Engines 8,501 – 19,500 lbs	Heavy Duty Vehicle Heavy Duty Engine > 8,500 lbs	Medium Duty Passenger Vehicle 8,501 – 10,000 lbs
14,000	Heavy Duty Vehicle 3 10,001 – 14,000 lbs			
16,000	Heavy Duty Vehicle 4 14,001 – 16,000 lbs			
19,500	Heavy Duty Vehicle 5 16,001 – 19,500 lbs			
26,000	Heavy Duty Vehicle 6 19,501 – 26,000 lbs			

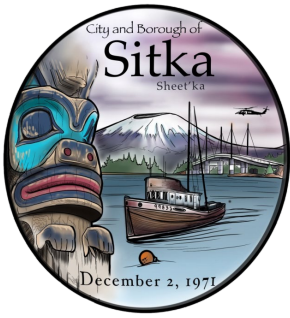
Gross Vehicle Weight Rating (GVWR) (lbs)	EPA Emissions Classification			
	Heavy Duty Vehicle and Engines			Light Duty Vehicles
	H.D. Trucks	H.D. Engines	General Trucks	Passenger Vehicles
33,000	Heavy Duty Vehicle 7 26,001 – 33,000 lbs	Medium Heavy Duty Engines 19,501 – 33,000 lbs		
60,000	Heavy Duty Vehicle 8a 33,001 – 60,000 lbs	Heavy Heavy Duty Engines Urban Bus > 33,001 lbs		
> 60,000	Heavy Duty Vehicle 8b > 60,001 lbs			

These charts illustrate the vehicle weight classes and categories used by the Federal Highway Administration (FHWA), the U.S. Census Bureau, and the U.S. Environmental Protection Agency (EPA). The vehicle weight classes are defined by FHWA and are used consistently throughout the industry. These classes, 1-8, are based on gross vehicle weight rating (GVWR), the maximum weight of the vehicle, as specified by the manufacturer. GVWR includes total vehicle weight plus fluids, passengers, and cargo. FHWA categorizes vehicles as Light Duty (Class 1-2), Medium Duty (Class 3-6), and Heavy Duty (Class 7-8). EPA defines vehicle categories, also by GVWR, for the purposes of emissions and fuel economy certification. EPA classifies vehicles as Light Duty (GVWR < 8,500 lb) or Heavy Duty (GVWR > 8,501 lb). Within the Heavy-Duty class, there is a Medium Heavy Duty Diesel Engine class for engine-only certification, but no Medium-Duty Vehicle class. The September 2011 U.S. Department of Transportation (DOT)/EPA rulemaking on [Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles](#) uses categories and weights for Heavy-Duty Vehicle Classes 2b through 8, similar to the FHWA weight classes.



# CITY AND BOROUGH OF SITKA


**Mission:** *To provide public services for Sitka that support a livable community for all.*



# CITY AND BOROUGH OF SITKA

A COAST GUARD CITY

## MEMORANDUM

**To:** Sustainability Commission Members  
**From:** Bri Gabel, Sustainability Coordinator   
**Date:** December 22, 2025  
**Subject:** Discussion/Direction/Decision on 2026-2027 Work Plan

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### **Background**

On March 11<sup>th</sup>, 2025, the [Assembly unanimously approved](#) the [2025-2026 Sustainability Commission Work Plan](#) and included goals. These goals are:

#### **1. Support Sustainable Municipal Operations**

- a. Update the Municipal Greenhouse Gas (GHG) Emissions Inventory and analyze progress.
- b. Identify sustainability metrics for municipal operations that align with CBS's Strategic Plan.
- c. Develop recommendations and necessary actions to reduce municipal emissions, such as continued support for electrification of the municipal fleet via advisory group.
- d. Integrate sustainability metrics into existing and near future CBS projects.

#### **2. Explore Regional Approach to Sustainability**

#### **3. Collaborating with City Staff on Strategic Management of Municipal Solid Waste**

- a. Develop the Solid Waste Advisory Group Charter and MSW Strategy

**Update:** CBS was awarded a Waste-to-Energy Technical Assistance (TA) for State, Local, and Tribal Governments from the National Laboratory of the Rockies (NLR, previously known as the National Renewable Energy Laboratory, NREL). This small (~40 hours of TA) has been scoped to include:

1. Review and comparison of other waste stream analysis with recommended waste composition assumptions for Sitka and notes on fish waste.
2. An evaluation to increase operational efficiency and maximize waste diversion from landfills, drawing on examples and best practices from similar facilities nationwide with suggestions to enhance MSW services.

This technical memo is anticipated some time in Q1 of 2026.

- b. Facilitate Public Engagement in the Southeast Alaska Solid Waste Authority Regional Planning Project

#### **4. Supporting and Finalize the Sitka Community Renewable Energy Strategy**

**Update:** The updated 2023 Sitka Greenhouse Gas Emissions Inventory was released December 16<sup>th</sup> and is open for public comment until January 25<sup>th</sup>. Staff is working with the technical team to have a public review version of the final SCRES document in March.

**Proposed Timeline** *(Adjusted from June)*

<b>Sustainability Commission Work Plan</b>	Jan	Feb	Mar	Apr	May	Jun
<ul style="list-style-type: none"> <li>• Preliminary discussion on 2026-27 goals</li> <li>• Suggest inclusions/updates for annual report</li> </ul>	R					
<ul style="list-style-type: none"> <li>• Work Session on 2025-26 Goal 2</li> <li>• Working draft of annual report</li> <li>• Draft 2026-27 goals</li> </ul>		WS				
<ul style="list-style-type: none"> <li>• Work Session on 2025-26 Goal 1 and 4</li> <li>• Working draft of annual report</li> <li>• Refine 2026-27 goals</li> </ul>			WS			
<ul style="list-style-type: none"> <li>• Approve 2026-27 Goals</li> <li>• Approve 2026-27 Work Plan</li> </ul>				R		
<ul style="list-style-type: none"> <li>• Present to 2026-27 Work Plan to Assembly</li> </ul>						

**Sitka Community Renewable Energy Strategy**

<ul style="list-style-type: none"> <li>• GHG Emissions Inventory finalized</li> </ul>						
<ul style="list-style-type: none"> <li>• Commissioner feedback on draft SCRES document</li> </ul>			WS			
<ul style="list-style-type: none"> <li>• Public comment and engagement</li> </ul>						
<ul style="list-style-type: none"> <li>• Sustainability Commission/Assembly joint Work Session</li> </ul>						
<ul style="list-style-type: none"> <li>• Approve the SCRES final document</li> </ul>				R		
<ul style="list-style-type: none"> <li>• Assembly adoption of SCRES</li> </ul>						

**Recommendation**

This item is intended to allow Commissioners to coordinate the next steps to begin working towards the approved goals and begin developing/updating goals for the 2026-2027. Review the proposed timeline and advise staff on any changes. No motion is required but can be made if necessary.