



**REGULAR OPEN SPACE, ACTIVE  
TRANSPORTATION, AND SUSTAINABILITY  
COMMISSION MEETING AGENDA**

City Hall - Council Chambers  
4381 Broadway, Ste. 201, American Canyon

**April 5, 2023  
6:30 PM**

**Chair:** Tara McClinton-Horner

**Vice Chair:** Scott Artis

**Commissioners:** Barry Christian, Sean Hughes, Nance Matson

---

---

*The Open Space, Active Transportation, and Sustainability Commission and other public meetings will be conducted in person at City Hall, 4381 Broadway, Suite 201. This meeting is also available via Zoom Teleconferencing as a convenience for public participation. Should technical issues with Zoom occur, please select another viewing option, such as a live broadcast to residents on Napa Valley TV, on our website [here](#) and on YouTube [here](#).*

**PUBLIC PARTICIPATION**

**Oral comments, during the meeting:** Oral comments can be made in person during the meeting. A Zoom Webinar has been established for public comments made via zoom. To give your public comment via zoom, use the Register to Speak feature of eComments, connect via the below Zoom link and use the “raise your hand” tool, or call into the zoom meeting at 408-638-0968 and press \*9 to “raise your hand” when the item is called. To avoid confusion, all hands raised outside of Public Comment periods will be lowered.

**Written comments, via eComments:** Please submit written comments through the eComments link, located on the Meetings & Agendas page of our website [here](#). Comments will be available to council members in real time. eComments will remain open throughout the meeting. All comments received will be posted online and become part of the meeting record.

**Zoom Meeting Link:** [Click here](#)

**Webinar ID: 823 8150 8949 Passcode: 298265**

The above-identified measures exceed all legal requirements for participation in public comment, including those imposed by the Ralph M. Brown Act. For more information, please call the Office of the City Clerk at (707) 647-4369 or email [cityclerk@cityofamericancanyon.org](mailto:cityclerk@cityofamericancanyon.org).

**AGENDA MATERIALS:** Open Space, Active Transportation, and Sustainability Commission agenda materials are published 72 hours prior to the meeting and are available to the public via the City’s website at [www.cityofamericancanyon.org](http://www.cityofamericancanyon.org).

**AMERICANS WITH DISABILITIES ACT:** The Open Space, Active Transportation, and Sustainability Commission will provide materials in appropriate alternative formats to comply with the Americans with Disabilities Act. Please send a written request to City Clerk at 4381 Broadway, Suite 201, American Canyon, CA 94503 or by email to [cityclerk@cityofamericancanyon.org](mailto:cityclerk@cityofamericancanyon.org). Include your name, address, phone number and brief description of the requested materials, as well as your preferred alternative format or auxiliary aid, at least three calendar days before the meeting.

## 6:30 P.M. REGULAR MEETING

CALL TO ORDER

PLEDGE OF ALLEGIANCE

ROLL CALL

## PRESENTATIONS

### PUBLIC COMMENT - ITEMS NOT ON THE AGENDA

*This time is reserved for members of the public to address the Open Space, Active Transportation, and Sustainability Commission on items of interest that are not on the Agenda and are within the subject matter jurisdiction of the Open Space, Active Transportation, and Sustainability Commission. It is recommended that speakers limit their comments to 3 minutes each and it is requested that no comments be made during this period on items on the Agenda. Members of the public wishing to address the Open Space, Active Transportation, and Sustainability Commission on items on the Agenda should comment via email prior to the start of the meeting, or to verbally comment on the item during the meeting, click the “raise your hand” button if joining by computer, or press \*9 if joining by phone, when the item is called. The Open Space, Active Transportation, and Sustainability Commission is prohibited by law from taking any action on matters discussed that are not on the Agenda, and no adverse conclusions should be drawn if the Open Space, Active Transportation, and Sustainability Commission does not respond to public comment at this time. Speakers are asked to please speak clearly, and provide their name. Any handouts for distribution to the Open Space, Active Transportation, and Sustainability Commission must be emailed by 3:00 p.m. on meeting day.*

## AGENDA CHANGES

## CONSENT CALENDAR

1. **Meeting Minutes of March 1, 2023.**  
**Recommendation:** Approve the Meeting Minutes of March 1, 2023 OSATS Meeting.

## BUSINESS

2. **American Canyon 2022 Climate Action Plan - Interim Report**  
**Recommendation:** Receive and file a presentation from Vice-Mayor Washington and Council Member Joseph regarding the Ad-Hoc Climate Action Committee's draft Climate Action Plan - Interim Report

## MANAGEMENT AND STAFF REPORTS

## COMMISSIONER COMMENTS

## ADJOURNMENT

## CERTIFICATION

I, Liz Lozano, Administrative Technician for the City of American Canyon, do hereby declare that the foregoing Agenda of the Open Space, Active Transportation, and Sustainability Commission was posted in compliance with the Brown Act prior to the meeting date.

---

Liz Lozano, Administrative Technician

**City of American Canyon**  
**Open Space, Active Transportation, and Sustainability Commission**  
**4381 Broadway, Suite 201**

**March 1, 2023**

**ACTION MINUTES**

---

**CALL TO ORDER**

The meeting was called to order at 6:33p.m.

**PLEDGE OF ALLEGIANCE**

The Pledge of Allegiance was recited.

**ROLL CALL**

Roll Call was taken.

**ATTENDANCE**

OSATS Commissioners Present:

Vice Chair Scott Artis

Commissioner Barry Christian

Commissioner Tara McClinton-Horner

Commissioner Sean Hughes

OSATS Commissioners Excused:

Chair Nance Matson

**PRESENTATIONS**

Received a Presentation by Maintenance and Utilities Director, Felix Hernandez on the 2020 Urban Water Management Plan (UWMP) and the 2022 Drought Contingency Plan (DCP). The commissioners commented on the Presentation. There was no Public Comment on the Presentation.

**PUBLIC COMMENT**

Vice Chair Artis opened Public Comment.

**Written Public Comment Received:**

Dianna Meehan submitted a written Public Comment. (see attached).

**Oral Public Comment Received:**

Leon Garcia made a Public Comment.

Vice Chair Artis closed Public Comment.

**AGENDA CHANGES**

None

**CONSENT CALENDAR**

Approved the Consent Calendar that included Meeting Minutes for the December 7, 2022, OSAC Meeting; motioned by Commissioner Christian; seconded by Commissioner McClinton-Horner. Roll Call was taken; the motion passed unanimously.

**BUSINESS**

**1. Elect Chair and Vice-Chair for 2023.**

City Manager Holley introduced the Business Item for the election of the OSATS chair and vice chair for the calendar year 2023. The commissioners had a brief discussion.

**Action:** Commissioner Christian motioned to elect Commissioner Tara McClinton-Horner as the 2023 OSATS Chair and Vice Chair Artis as the 2023 OSATS Vice Chair, motion seconded by Commissioner Hughes. Roll Call was taken; the motion passed unanimously.

**2. Newell Open Space Trail and Parking Lot Conceptual Design.**

Public Works Engineer, Kristine Delos Santos and Public Works Director, Erica Ahmann Smithies provided an update on the 60% Improvement Plan for Newell Open Space Trail and Parking Lot. The commissioners asked questions about the project and offered feedback. Staff received the commissioner's feedback and plan to bring the item back to the OSATS Commission in the future for further review.

**Public Comment:**

Chair McClinton-Horner opened Public Comment.

**Written Public Comment Received:**

There was a written comment received by Kara Vernor (see attached).

**Oral Public Comment Received:**

No oral Public Comment received.

Chair McClinton-Horner closed Public Comment.

**MANAGEMENT AND STAFF REPORTS**

City Manager Holley provided an update on future OSATS meeting agenda items.

**COMMISSIONER COMMENTS**

The commissioners commented on items of interest.

**ADJOURNMENT**

The meeting was adjourned at 7:51p.m.

**CERTIFICATION**

---

Liz Lozano  
Administrative Technician

# Open Space, Active Transportation, and Sustainability Commission

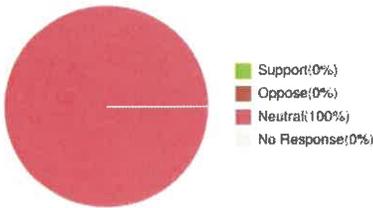
03-01-23 18:30

Agenda Name	Comments	Support	Oppose	Neutral
PUBLIC COMMENT - ITEMS NOT ON THE AGENDA	1	0	0	1
4.) Newell Open Space Trail and Parking Lot Conceptual Design.	1	0	0	1

## Sentiments for All Agenda Items

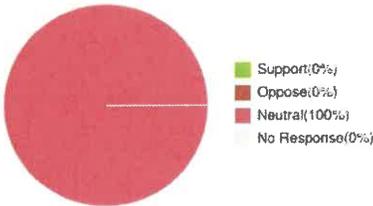
The following graphs display sentiments for comments that have location data. Only locations of users who have commented will be shown.

### Overall Sentiment



### Agenda Item: eComments for PUBLIC COMMENT - ITEMS NOT ON THE AGENDA

### Overall Sentiment



### Diana Meehan

Location:

Submitted At: 11:05am 02-27-23

NVTA is in progress with two countywide planning efforts that may be of interest to this group:

1. Accessible Transportation Needs Assessment: This effort will identify gaps in transportation services for seniors and individuals with disabilities countywide and propose solutions for managing the issues. There is a countywide survey open, which has been extended through March 17th. Information on the effort and a link to the survey, or downloadable copies in English, Spanish and Tagalog is on the NVTA website here:

<https://www.nvta.ca.gov/ATNA> A series of public workshops will be held in April. The plan process is expected to be complete by September.

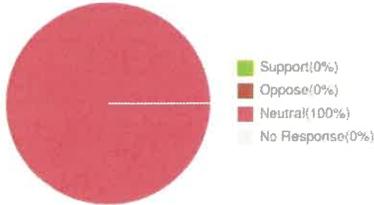
2. Napa Valley Vision Zero Plan: NVTA is also in progress with a countywide Vision Zero Planning effort. This Vision Zero plan seeks to reduce severe and fatal roadway injuries on Napa Valley roadways to Zero by 2030. The effort will complement Local Roadway Safety Plans (LRSPs) recently completed by the City of American Canyon, County of Napa and the City of Napa and will help upper valley jurisdictions meet new funding requirements for LRSPs. The plan will identify all High Injury Networks (HIN) and provide strategies and proven

countermeasures for reducing severe and fatal injuries on the HIN. NVTA is in progress of setting up a plan page on it's website, which is currently undergoing a complete update to a new platform. The Napa Valley Vision Zero page should be published by Mid-March. This planning effort is expected to be complete by November.

Staff, commission members and the general public may contact the project manager for additional information on these efforts: Diana Meehan [dmeehan@nvta.ca.gov](mailto:dmeehan@nvta.ca.gov)

**Agenda Item: eComments for 4.) Newell Open Space Trail and Parking Lot Conceptual Design.**

**Overall Sentiment**



**Diana Meehan**

Location:

Submitted At: 10:49am 02-27-23

I am unable to attend the meeting due to an NVTA standing meeting. Please consider the addition of secure bicycle parking at this location. Secure bike parking, similar to the e-lockers at the Park & Ride would be advantageous to users and decrease the need to drive to the trail head. E-lockers require no electricity or hard wiring for operation, can run off of solar and now have upgraded access controllers that allow users to use a smart phone for access. Thanks for considering. Diana Meehan, Senior Planner/Program Administrator NVTA



## **TITLE**

American Canyon 2022 Climate Action Plan - Interim Report

## **RECOMMENDATION**

Receive and file a presentation from Vice-Mayor Washington and Council Member Joseph regarding the Ad-Hoc Climate Action Committee's draft Climate Action Plan - Interim Report

## **CONTACT**

Pierre Washington, Vice-Mayor  
Mark Joseph, Council Member

## **BACKGROUND & ANALYSIS**

In 2022, the City Council adopted a Climate Emergency Resolution and appointed Vice-Mayor Washington and Council Member Joseph to lead American Canyon's Ad-Hoc Climate Action Committee's preparation of Climate Action Plan - Interim Report (Attachment 2). The Committee presented a draft of the Interim Report to Council last September.

In general, the Council now seeks to refer the on-going consideration of "sustainability issues" to the Commission. Of note, while this referral of sustainability issues to Commission is intended to formally conclude the work of the former ad-hoc Committee, community members are still free to gather on their own time to discuss related issues of importance.

The "hand-off" of sustainability issues will begin tonight with a presentation from Vice-Mayor Washington and Council Member Joseph regarding the 2022 Resolution and the draft Interim Report (Attachment 1). Importantly, the presentation recognizes American Canyon is already a sustainability leader - examples include:

- 2012 Energy Efficiency Climate Action Plan
- 2016 ILG Beacon Award
- 2017 CA Water Re-Use Award
- 2019 Green Building Code – Exceed 15%
- 2020 Citywide Energy Efficiency/Resiliency Project

- 2021 Gas Station Moratorium

In addition, a recent GHG Inventory (Attachment 4) estimates American Canyon's per capita GHG emission (7.9 Million Metric Tons) to be 15% less than the statewide average (9.1 Million Metric Tons) and 43% less than the national average (13.68 Million Metric Tons).

As a follow up to tonight's meeting, the Council requests the Commission solicit feedback from American Canyon residents and businesses on the draft Interim Report and the Climate Emergency Resolution. This solicitation is expected to occur over the next several months and staff requests the Commission opine on the types of engagement that might be successful in obtaining broad, community-wide input and support.

Of note, the Resolution identifies a goal of Net-Zero GHG emissions by 2030; however, to date there has been minimal input from American Canyon residents and businesses on this ideal. Ultimately, the Council wants to understand what level of GHG emission is acceptable to the community and more importantly, what actions the community is willing to take to achieve it.

Ultimately, staff will revise/update the document(s), and after providing the Commission a final opportunity for review & comment, present them to City Council for consideration. Simultaneously, the City will be participating in the Napa Countywide Climate Action Committee's efforts to undertake the preparation of a Regional Climate Action Plan over the next 12 to 24 months.

In addition to convening a broad community conversation in the coming months about acceptable GHG emission level in American Canyon, the Council is also interested in the Commission's recommendation for implementing 2 or 3 items identified in the draft Interim Report (ie. "low hanging fruit") in the short-term (ie. before finalization of the Interim Plan and/or the Regional Climate Action Plan)

Lastly, it should be noted the Council has authorized a change to one of its seven Strategic Plan Goal Areas. Currently, Goal Area #7 is known as "*Quality Services & Organizational Effectiveness: Deliver exemplary government services*". Prospectively, the Council has asked to revise this goal area to reflect "sustainability". Importantly, this updated goal area is meant to reflect both "environmental" and "fiscal" sustainability - in part, because these two ideals are interrelated.

## **COUNCIL PRIORITY PROGRAMS AND PROJECTS**

Organizational Effectiveness: "Deliver exemplary government services."

## **FISCAL IMPACT**

None

## **ENVIRONMENTAL REVIEW**

None

**ATTACHMENTS:**

[Attachment 1 - Presentation](#)

[Attachment 2 - Resolution 2022-07.pdf](#)

[Attachment 3 - Napa Regional GHG Forecast Memo](#)

[Attachment 4 - Napa Regional 2019 GHG Inventory Memo](#)

CITY OF  
AMERICAN  
CANYON



# Draft Climate Action Plan

(Presentation to the OSATS Commission, April 5, 2023)

# Introduction and Background

## **Council adopts Climate Emergency Resolution**

*(#2022-07, Feb. 1, 2022)*

1. Net Zero Climate Pollutants by 2030
2. Evaluate Planning and Policy decisions through the lens of this pledge; and
3. Established an Ad Hoc Climate Action Committee to develop an action plan



# Introduction and Background

## **Today's Objectives:**

1. Review the draft Climate Action Plan
2. Engage in a healthy discussion on the topic
3. Transfer the Climate Action role from the Ad Hoc Committee to OSATS Commission.



# Current Efforts

- Open Space Acquisition and Preservation
- 2012 Energy & Climate Action Plan (County first)
- 2016 ILG Beacon Award
- 2018 Green Bldg. Code—Exceed by 15%
- Active Transportation (SR2S, Vine Trail)
- Engie Project in 2021
- Gas Station Ban in 2022
- Part of the Countywide Climate Action Committee



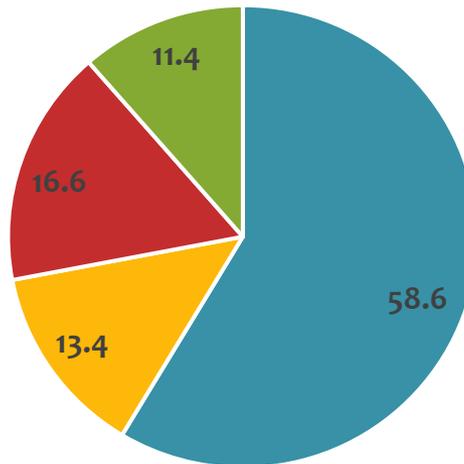
# Draft Climate Action Plan Overview

- **Guiding Principles:**
  - Data-driven/use a “***Dashboard***” of data elements to track progress
  - Emphasis on ***Public Awareness***/Education/Individual Actions and advocacy
  - ***Lead by Example***/Take Actions by the City and Community Leaders
- Four Target Areas and 34 specific actions



# Greenhouse Gas Inventory

American Canyon's GHG Emissions by Source (2022)



■ Transportation ■ Bldg Energy ■ Solid Waste ■ All Others



# Transportation

## Reduce Vehicle Miles Traveled (VMT)

1. Implement the City's Pedestrian/Bike Plan
2. Increase Biking/Walking to Schools
3. Support completion of the Napa Valley Vine Trail
4. Increase purchase & use of Bikes/e-bikes
5. Increase Public Transit Trips/Services
6. Track Local Employment by home city/zip code



# Transportation (cont'd.)

## **Increase share of Electric Vehicles/Equipment**

7. Track registered EV's in American Canyon
8. Require EV Chargers in new developments
9. Encourage EV Chargers in existing developments
10. Replace gas-powered equipment with electric
11. City leads by example (Enterprise Lease)



# Buildings

## Reduce GHG Emissions from Homes & Businesses

12. Increase Energy Efficiency audits in buildings
13. Reduce gas powered appliances in existing buildings
14. Discourage wood-burning stoves & fireplaces
15. Eliminate use of natural gas in new developments



# Buildings (cont'd.)

## **Increase the generation & use of renewable energy**

16. Increase the number of solar installations
17. Increase the percentage of “Deep Green” customers
18. Encourage battery backup for existing solar customers
19. Require new development to include batteries
20. Consider using the Solar App+ program



# Buildings (cont'd.)

## Other GHG Reductions in Buildings

21. Explore feasibility of Solar Farms
22. Explore feasibility of lower GHG concrete in buildings
23. Explore feasibility of “MicroGrids,” especially with a hydrogen generator backup (vs. diesel)



# Awareness & Lifestyle Changes

## Engage the public to reduce GHG emissions

24. Encourage residents to use the *Napa County Climate Challenge* app to reduce our carbon footprint
25. Support Climate Action events and programs (e.g. Earth Day, Electric Mobility)
26. Support development of the Eco-Center



# Other Efforts

## **Preserve & Enhance Carbon Sequestration Efforts**

- 27. Preserve existing Trees & Forests
- 28. Increase Tree Planting efforts (Miyawaki Forests)
- 29. Establish a Street Tree Canopy program
- 30. Explore enhancing our Wetlands carbon sequestration
- 31. Reduce food and organic wastes from our landfill
- 32. Reduce methane leaks





# Implementation & Administration

- **Management & Staffing:** High-level position, augmented with a volunteer support group
- **Financial:** Some baseline support needed, rely on grants and possible Climate Impact Fee. *Take advantage of new Federal/State funding*
- **Monitoring:** quarterly review of the Dashboard
- **Advocacy:** monitor Federal, State and Local actions
- **Marketing:** outreach to the community (schools, nonprofits, faith community, etc.) is key



# Time is of the Essence...

- Focus on one item at a time; get it ready for action and forward it to the Council as soon as it is ready.
- Triage the list of priorities (or add items that aren't part of the interim plan) pick the item with the biggest impact that isn't going to be addressed by some other agency.
- Generates the biggest savings sooner, and easier to digest than dealing with everything at the same time.



# Potential Key Recommendations

1. Develop the “dashboard” – monitor progress
2. Promote the *Napa County Climate Challenge*
3. Add a dedicated staff person to support Climate Action
4. Implement/update the City’s Bike Plan
5. Require Battery Backup in all new development & incentivize installations in existing
6. Promote Energy Efficiency Audits/Retrofits of existing buildings – Replace Gas appliances with Electric versions



# Potential Key Recommendations

7. Expand EV Charging Stations & require for all new development
8. Increase Carbon Sequestration (Trees & Wetlands)
9. Expand Solar Farms & Micro-grid feasibility (work with PGE)



CITY OF  
AMERICAN  
CANYON



Questions?

**RESOLUTION NO. 2022-07**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AMERICAN CANYON ADOPTING THE AD-HOC CLIMATE ACTION COMMITTEE'S RECOMMENDATION TO DECLARE A CLIMATE EMERGENCY**

**WHEREAS**, there is broad scientific consensus that climate change caused by human activity represents a growing danger to human health, safety, and economic prosperity, and the window of opportunity for long term climate preservation is rapidly closing; and

**WHEREAS**, 195 countries signed the "Paris Agreement" acknowledging the threat of climate change and urgent need to combat it, agreeing to keep global mean temperature "well below 2 degrees Celsius above pre-industrial levels" and to "pursue efforts to limit temperature increase to 1.5 degrees Celsius;" and

**WHEREAS**, the 2018 Intergovernmental Panel on Climate Change (IPCC) report, "Global Warming of 1.5 degrees Celsius," affirmed that "Limiting global warming to 1.5 degrees Celsius would require rapid, far-reaching and unprecedented changes in all aspects of society," and further projected the earth could reach and exceed this temperature threshold as soon as 2030, far earlier than previously anticipated; and

**WHEREAS**, the 2018 US government report, "Fourth National Climate Assessment," detailed the massive threat to the American economy posed by climate change and underscored the need for immediate climate emergency action at all levels of government; and

**WHEREAS**, California, Napa County and their residents, economy, and environment have already experienced dramatic adverse effects from climate change, including prolonged wildfire seasons, firestorms, rising temperatures, mudslides, severe droughts, property destruction, damage to infrastructure, and loss of life; and

**WHEREAS**, climate breakdown, while endangering all people, disproportionately impacts young and older residents and the most vulnerable, exacerbating existing social justice and other inequities; and

**WHEREAS**, today's children represent a particularly vulnerable group because increasing greenhouse gases and trapped heat will almost certainly have a profound negative impact throughout their lives, as well as the lives of future generations; and

**WHEREAS**, on June 18, 2019, the City Council issued a Proclamation to join with Napa County Jurisdictions dedicated to working together with community organizations, businesses, schools, and regional partners and jurisdictions to educate, mobilize, expand, and accelerate local, regional, and statewide support for comprehensive, immediate, and sustained action; and

**WHEREAS**, as used above, the term "Climate Emergency" does not refer to an "Emergency", a "Local Emergency", or a "State of Emergency" as defined in American Canyon Municipal Code Chapter 2.48 "Civil Defense and Disaster Relief, Article I "Organization of City for Emergency Response" and the City Council does not confer any emergency powers to the City Manager/Director of Emergency Services as it relates to this Proclamation.

**NOW, THEREFORE, BE IT RESOLVED**, that the City Council of the City of American Canyon hereby declares the following:

1. That a Climate Emergency exists, and that it threatens our city, state, country, and the planet;

2. That the City of American Canyon joins a growing list of communities committed to a goal of Net Zero Climate Pollution, measured in terms of net contribution to excess trapped heat, by or before 2030, and further commits to evaluate all planning and policy decisions through the lens of this pledge, and to implement both immediate and sustained actions in support of its achievement; and

3. That the City Council recognizing the need for full community participation and support, commits to providing leadership and services in working with community organizations, businesses, schools, and regional partners and jurisdictions to educate, mobilize, expand, and accelerate local, regional and statewide support for comprehensive, immediate, and sustained action to achieve its goal of net zero climate pollution by or before 2030; and

4. That the City Council will consider amendments to its General Plan and its 2012 Energy Efficiency/Climate Action Plan, consistent with its commitment to net zero climate pollution by or before 2030.

**BE IT FURTHER RESOLVED** that the City Council directs its Ad Hoc Climate Action Committee to complete the following:

1. Develop specific recommendations and measurable outcomes to achieve the goal of Net Zero Climate Pollutants by 2030 in the following areas:

- a. Transportation
- b. Buildings
- c. Renewable Energy and Storage
- d. Other Environmental issues, including but not limited to, water conservation, urban agriculture and food composting, and recycling
- e. Carbon Sequestration
- f. Public Awareness and Education regarding individual actions, including individual lifestyles and business operations
- g. Climate Resiliency Efforts

2. Work with City staff, stakeholders and community leaders and organizations and the public at large.

3. Identify funding sources and grant opportunities.

4. Present its findings and recommendations within six months.

**PASSED, APPROVED and ADOPTED** at a regularly scheduled meeting of the City Council of the City of American Canyon held on the 1<sup>st</sup> day of February, 2022, by the following vote:

AYES: Councilmembers Joseph, Oro, Washington, Vice Mayor Aboudamous, and Mayor Garcia  
NOES: None  
ABSTAIN: None  
ABSENT: None

DocuSigned by:  
*Leon Garcia*  
BA1BB3340BAC47C...  
Leon Garcia, Mayor

ATTEST:  
DocuSigned by:  
*Taresa Geilfuss*  
609347883BC94DC...  
Taresa Geilfuss, City Clerk

APPROVED AS TO FORM:  
DocuSigned by:  
*William Ross*  
285D50133D93421...  
William D. Ross, City Attorney

# Climate Action Interim Plan – City of American Canyon

## August 1, 2022

### **Introduction**

This report is the product of a City Council ad hoc committee (the Committee), consisting not only of two council members, but members of the public and stakeholders, all committed to “a goal of Net Zero Climate Pollution, measured in terms of net contribution to excess trapped heat, by or before 2030.” With adoption of a Climate Emergency Resolution on February 1, 2022 [Attachment 2], the City Council also created the Climate Action Ad Hoc Committee. This Committee has met regularly and now presents its preliminary findings and recommendations.

Even before this Committee, a Countywide Climate Action Committee (CAC) has met since 2019. It is an advisory body with representation from all jurisdictions in Napa County, including the same two Councilmembers representing the City on this Committee. It received several very informative and timely presentations on Climate Change topics and spearheaded a Countywide Greenhouse Gas (GHG) inventory, including an inventory of carbon dioxide and other long-lived gases, as well as the short-lived pollutant, methane. It is also considering the development of a Countywide Climate Action Plan. Such a regional approach would allow this Committee to focus on specific actions and programs, some of which would presumably be incorporated into the Countywide plan.

Given the fact that the GHG Inventory and a decision on a regional Climate Action Plan will occur *after* this Committee’s August 1 deadline, a summary of goals and projects are provided for now. After feedback is received from Council and the public, the Committee can proceed with more specific actions and details, such as timelines, resources and partnerships, and a more complete implementation plan. We would also coordinate our efforts with the more regional approach.

For now, this American Canyon Climate Action Plan focuses on four guiding principles:

- The plan should be data-driven, with a dashboard of key performance indicators and/or target completion dates.
- We need to “Lead by Example” (particularly the City itself) and consider the impacts on the Climate in all our actions, from procurement to disposal, including everyday activities.
- There should be an emphasis on public awareness and engagement, followed by individual actions and advocacy; and
- The Council should adopt, and staff implement, specific programs and activities.

### ***Data Driven***

There is a saying: “What gets measured, gets done.” In our research efforts we discovered there is a great deal of data that we can collect and monitor. We envision a dashboard of key indicators, such as the number of Solar Panel and battery storage installations, Electric Vehicle registrations, EV Charger installations, Gas appliances replaced with electric alternatives, energy efficiency audits and retrofits, etc. By tracking this data on a regular basis, we can monitor our effectiveness in reducing greenhouse gas emissions. We can also evaluate how effective we are in implementing the various programs and activities. The information can also be used to report to the public on our progress. Attached to this

report is a draft Dashboard [Attachment 1], that tracks ongoing metrics as well as one-time projects/studies. It will be refined during the next phase of this Action Plan.

Likewise, as the Emergency Resolution notes, the City needs to “evaluate all planning and policy decisions through the lens of this [Net Zero Climate Pollution] pledge.” As such, the Environmental Review portion of Council Agenda Staff Reports should consider the larger consequences of Climate Change when evaluating specific policy options for Council consideration.

### ***Lead by Example***

Addressing the impacts of Climate Change will be difficult in large part because it will mean making monumental changes in the way we live and do business. Fear of change—especially if we need to change too quickly—can become a powerful roadblock. Therefore, leading by example is critical. The City’s elected and appointed officials all need to recognize we must do our part to make changes. Even if our changes do not immediately appear to “move the needle” they are still important. For example, converting our fleet to electric, wherever possible, is an important step. Installing solar panels and battery storage units, and retrofitting City buildings, are additional examples. As individuals, we need to step up and make changes to our homes and travel modes. Other respected leaders in the community need to be encouraged to do the same.

### ***Encouraging Individual Actions***

One of the first major observations of the Committee was the realization that the biggest impact will occur if we can persuade our residents and businesses to make changes, since a substantial part of our climate footprint is from the energy use and transportation sectors at home and at work. A lot of people taking little steps will add up.

We learned about one online tool, for instance, currently known as Regeneration Napa, that offers three features: 1) the software can calculate your carbon footprint; 2) it offers a wide array of online resources and suggestions to reduce that footprint; and 3) it allows teams and other groups of individuals to “compete” with each other, to encourage greater participation. This program can be used to educate and motivate people to implement the changes we need to meet our long-term goals.

In addition, we want to work with community groups to promote climate actions at several events, such as Earth Day, in which we reach out to all segments of the community. We can develop small group sessions on healthy eating (plant-based diets, for example, are not only healthier but have a smaller impact on our environment), use of e-bikes and other ways of reducing vehicle miles traveled, or simple energy efficiency projects. Public and private advocacy are key to collective changes needed to implement emissions reduction policies at the speed and scale the science demands.

### ***Specific programs and activities***

Following is the Committee’s initial list of ideas for actions that can reduce the carbon footprint for this community. We have broken the items into several categories, such as transportation and buildings, and briefly outlined the programs consistent with those target areas. Once the full Council and public have had a chance to review this list and refine it, we will meet to include potential stakeholders and allies, discuss resources needed, and determine general timelines. Key metrics will also be identified,

whenever possible, so we can measure success. In effect, it is this list of programs/actions that will be used to track our progress and success.

With this summary in mind, we offer the following programs for Council consideration.

### **Target Area: Transportation**

#### ***Goal One: Reduce Vehicle Miles Traveled (VMT)***

1. ***Implement the City's 2019 Pedestrian/Bike Plan:*** The adopted plan, and any related amendments, should be a priority both for recreational and job opportunity purposes, as a means of reducing Vehicle Miles Traveled. Studies indicate most trips are less than 5 miles; this makes trips by bike (or e-bike) very competitive with vehicles, provided there are safe routes for bikers and pedestrians. Related to the physical aspects of the plan is the concept of traffic calming in general; that is, slowing vehicle speeds on local streets improves the safety of bikers and pedestrians to use our streets to bike/walk, while we build out our bike/ped network.
2. ***Increase Biking/Walking to Schools:*** Making it safer for children to walk or bike to school would reduce the number of vehicle miles traveled, particularly on local streets, and reduce idling emissions at school parking lots, which are harmful to both health and the climate. This would also require progress implementing the City's Bike/Pedestrian Plan. Further, as young children get comfortable walking/riding to school, it will hopefully spill over into their adult lives.
3. ***Support the completion of the Napa Valley Vine Trail:*** In addition to being an iconic recreational and visitor-serving amenity, the Vine Trail could also be used for employment and more functional purposes, particularly with the use of e-Bikes. It will connect all the Cities within the County when completed, thereby facilitating longer trips. Large portions of this Trail have already been completed or are under construction. American Canyon's portion is primarily driven by private development, with portions of the Trail built as a condition of approval. The City will eventually need to fund a "gap" project, connecting any remaining portions of the trail. Solano County is constructing the Trail from American Canyon to Vallejo, which will provide convenient access to ferries and buses to the larger Bay Area. Connections already exist (or under construction) connecting Napa City through Yountville, and St. Helena to Calistoga.
4. ***Increase the purchase and use of Bicycles and e-Bikes, and installation of supportive infrastructure:*** As noted above, many trips are five miles or less—this is a 10–15-minute bike ride. More local trips can convert to bike (or pedestrian) trips, especially if e-Bikes are considered. Electronic Bikes include a small electric motor which can be engaged as needed, either for climbing hills or if the rider wants a break from peddling. Because of this additional convenience, e-Bikes could easily make VMT reductions more appealing. Electric bikes are also far less expensive than Electric Vehicles, which could make them a viable alternative to a second vehicle altogether. And there are state programs available to support these efforts, as well as model programs in other Bay Area communities.
5. ***Increase the number of transit trips originating in American Canyon:*** Transit is a viable alternative for longer trips, particularly for residents who work throughout the Bay area. NVTa is doing a good job expanding express routes from American Canyon to BART or the Vallejo

Ferry, and more can be done. These lines have proven to be the most likely to grow in ridership. Increasing incentives for individuals to utilize such options will be important.

6. Track local employment by zip code: If the City modified its Business License application to require Employers to report both the number of employees and their residence by zip code, it would be easier to calculate employment related VMT. Hiring locally has several benefits, from increasing retail opportunities to improving a sense of community. In the context of Climate Action, the more locals working in town means less vehicle miles traveled, even if by vehicle. As noted above, a substantial number of these local trips could be converted to bike trips (or walking). This goal would necessarily require significant coordination within the City, especially in terms of housing availability and affordability.

**Goal Two: Increase the share of Electric Vehicles/equipment**

7. Monitor the number of Electric Vehicles registered in American Canyon: We should track how many new EV's are registered in American Canyon, as well as the overall total.
8. Require Electric Vehicle (EV) chargers as a condition of new development: Currently, American Canyon has relatively few EV Chargers. This number needs to increase significantly over the next few years. An amendment to the City's Zoning Ordinance should be adopted that would require EV Chargers as part of any new multi-family, retail, or commercial/industrial development. The specifics (for example, Level 2 chargers vs. Fast Chargers; number of stations/ports per site, etc.) would need to be refined, based on current industry standards. The City should also work with outside funding sources, such as MCE, PGE, and the Bay Area Air Quality Management District (BAAQMD), to ensure we can help reduce the capital investment. We also need to work with the private sector (Tesla, for example) to identify programs they may offer for businesses to expand their networks. These comments also apply for the next program area below.
9. Encourage installation of EV Chargers in existing developments: Since the City has less authority over existing developments, incentives and good working relationships need to be emphasized. Working with the Chamber of Commerce and outside funding groups, we need to promote retrofitting existing parking lots. A strong case can be made that these new charging stations could encourage more business. Financial incentives can help reduce the out-of-pocket expense, and service fees could be charged to provide a modest revenue stream.
10. Replace gas-powered equipment with electric powered: A variety of landscaping equipment can be converted from gas-powered to electric. The City should consider either a mandatory ban (similar to the Town of Yountville and others), a phasing-out of gas-powered equipment, or just encourage the conversion with cash incentives. At a minimum, the City should require its operations to only use electric equipment and that any of their contractors must have electric powered equipment. Looking beyond landscaping equipment, we could also work with our industrial businesses to convert to electric forklift trucks and other logistical equipment.
11. The City leads by example: The City has already committed to a more consistent vehicle replacement strategy—it needs to make EV conversion a priority. As noted above, it should accelerate the replacement of any gas-powered equipment in its operations and require any contractors we use to operate with electric-powered equipment. Lastly, although we have

installed solar panels on some of our buildings, we should explore expanding this program to most of our buildings, even if there is no immediate financial gain. With battery backup, it would still improve our carbon footprint and enhance our resilience in the case of emergencies.

### **Target Area: Buildings**

#### **Goal Three: Reduce Greenhouse Gas emissions from homes and businesses**

12. Increase the number of energy efficiency audits in existing residential and business areas: Although great strides have been made in new buildings, we still have a lot of older homes and businesses that could significantly reduce their GHG emissions by becoming more energy efficient. We need to work with PGE, MCE, and other groups to promote home audits, as well as in existing buildings. Rebates and other incentives need to be identified to ensure energy upgrades are cost-effective for property owners.
13. Reduce/eliminate gas powered appliances in existing homes/businesses: Water heaters, HVACs, clothes dryers, cooking stoves and other building appliances can now be converted to electric powered devices. We need to establish cash incentives to swap out gas powered devices, relying on PGE and other sources. We also need to promote the health aspects of reducing natural gas use inside buildings. In addition, consider the use of outdoor clothes lines as a low-tech alternative to a clothes dryer, whether gas or electric-powered.
14. Discourage, or ban outright, the use of wood-burning stoves and fireplaces: Most newer homes no longer include wood-burning fireplaces, so this is an issue for older homes. There are products on the market that electrically heats a room, but still provides the look of a wood-burning fireplace. As we encourage solar with battery backup, this conversion becomes even more cost-effective.
15. Eliminate natural gas for all new residential development and require new commercial and industrial uses to justify the use of natural gas: The so-called “all electric reach” building codes are likely to occur within the next few years; by acting earlier, we can avoid GHG emissions (and methane) in a more cost-effective manner. More and more jurisdictions are taking this action, and we can learn from their experiences. Allowing some discretion for non-residential uses may be necessary for bona fide business purposes.

#### **Goal Four: Increase the amount of renewable energy used, generated, or stored from homes and businesses**

16. Increase the number of solar installations: Often, it is financially beneficial to convert to solar, which should make it easier to sell—provided the customer understands this. Hence, we need to promote public awareness and education campaigns, as well as relying on private contractors. Trade shows hosted by the City is another method of increasing awareness of, and options for, solar.
17. Increase the percentage of “Deep Green” customers: Currently, very few customers opt for the 100% renewable energy, due to costs. Given that this added cost is quite modest, it could be addressed through local incentives. Customers with solar (and particularly with battery backup) should be able to upgrade with no real out-of-pocket cost (assuming their net energy is zero or less). This represents a relatively easy market segment to approach.

18. Encourage battery backup for existing solar customers: All existing solar customers without battery backup should be contacted about the benefits of battery backup. Quick building audits would be needed to verify if a battery can be installed and the relative cost.
19. Require all new construction to include battery backup: This would apply to residential and non-residential developments. Currently, State law requires new construction to be energy neutral, which generally means solar installation. But a battery is not required. Amending the City's building code to make that a requirement would assist in reducing peak energy demands, which is a major source of fossil fuel energy use by Energy Companies (and when renewable energy is at its lowest).
20. Consider using the Solar App+ program: This is an issue that has been discussed by the Countywide Climate Action Committee. There has been some pushback by our Building Officials, primarily due to the existing streamlined permitting processes already implemented. However, we should study the pros and cons of both approaches (particularly from the customer's perspective), as well as any financial incentives, before reaching a conclusion.
21. Explore the development of Solar Farms: Two viable options exist for this area. The first is a traditional solar farm at the abandoned landfill site. There may be some issues to be resolved, including landfill settling, working with an organization that is not motivated to act, and the economics of the project. A second option relates to our industrial park. Many existing industrial buildings at our Green Island Industrial Park may be suitable for solar panels. Although it may not be cost-effective for the building owner to install solar, it may be viable if MCE, the City, or some other group, "leased" the rooftops for a nominal fee and then installed solar and sold it to the Grid. Financing and legal arrangements would need to be worked out.
22. Explore the feasibility of requiring concrete with lower GHG emissions for all new construction: Particularly in our industrial park, the use of concrete is extensive. Concrete is also a major source of GHG emissions. Currently, there are several new techniques that generate a smaller carbon footprint. This issue should be studied in more detail, and include input from our industrial developers, to determine if the use of these new materials is cost-effective and viable.

### **Target Area: Public Awareness and Lifestyle Changes**

#### **Goal Five: Engage the Public in efforts to reduce Greenhouse Gas Emissions and Short-lived pollutants**

23. Encourage American Canyon residents to participate in the Napa County Climate Challenge: Formerly known as Regeneration Napa County, this app has three components: participants can develop their GHG profile and determine their overall carbon footprint; they can then look up a wide array of action items (from car purchases to lifestyle changes to solar installations) that can reduce that carbon footprint; and lastly, they can combine into groups and engage in healthy competition to see which groups can make the biggest impacts. The City should promote this program and work with local businesses to offer prizes and other inducements. Furthermore, the program's author has indicated a willingness to modify parts of the program—for example, can we make the program more appealing to students, since in many cases they are the best advocates for changing family behaviors. There are other online programs that we can promote, provided by [MCE](#) and [others](#).

24. Engage the community in programs and events that educate the public on Climate Change and personal actions individuals can take: There are many annual events and topics that support respect for our natural environment, from Earth Day to Healthy People/Healthy Planet, and even programs that highlight the latest in EV's and e-bikes. Several actions have co-benefits, such as the health benefits of a plant-based diet or more human-powered transit. Some bigger issues, such as keeping our population in check, could be discussed, even if we can only make a small impact. These efforts should be supported and encouraged in and around American Canyon. We should track the number of participants that attend and follow up with requests to join the Napa County Climate Challenge.
25. Support the development of the Eco-Center in American Canyon: Currently, the American Canyon Community Parks Foundation (ACCPF) is exploring the feasibility of converting the City's Corp Yard into an Eco-Center. This project could easily become the home base for environmental and climate action in American Canyon, if not the entire Napa Valley. Educational opportunities abound once this facility is up and running.

### **Target Area: Other Efforts**

#### **Goal Six: Preserve and enhance current levels of carbon sequestration and stocking:**

26. Wherever possible, preserve existing trees and forests: Consistent with the saying "Do no further harm", we should protect trees from removal to maintain and enhance the urban forest as a net carbon sink. Ways of avoiding tree removal should be considered in private and public improvement projects. A recent case in point is the Watson Ranch developer, who went to considerable expense to move and protect mature trees on his site. The City should also do the same when it comes to their capital improvements.
27. Increase tree planting on publicly owned properties in or around the City: Land owned by the City should be targeted for planting new trees. Although it will take decades before these trees make a big impact on carbon sequestration, they still need to be planted as soon as possible. Some areas include Newell Open Space Preserve, and land around Highway 29 at the south end of town.
28. Establish a Street Tree Canopy Program: Ensuring trees are planted along roadways provides shade to keep homes cooler, as well as aesthetics and cleaner air. Building Codes could be reviewed to ensure trees are required for new installations for residential and commercial development. Parkways or tree-lined medians could be encouraged as a means of increasing tree plantings. A potential opportunity site is Kimberly Drive, which is a wide street and could easily accommodate a tree-lined median.
29. Enhance the carbon sequestration of our Wetlands: Wetlands are very effective at sequestering carbon. A feasibility study should be conducted to accomplish two objectives: first, verify the estimated sequestration currently occurring in our Wetlands areas; and second, identify ways to expand/enhance the existing wetlands. Such expansion should also consider positive impacts on threatened species and recreational potentials.
30. Support efforts to reduce food and organic wastes from our landfill: The primary method is based on SB1383, in which 75% of food and organic wastes need to be diverted from our

landfill. Other steps to be taken would include zero waste events, and compostable food ware programs.

31. Reduce Methane leaks: Part of the GHG Inventory expected in the fall of 2022 will include methane leaks. We need to use that study to identify areas in American Canyon that have a high concentration of methane leaks. This could be residential areas, businesses or possibly the abandoned landfill, in which residual methane is being flared off. Because of the high climate potency of methane relative to carbon dioxide, especially in the short-term, these efforts should be given a priority to address.

**Goal Seven: Improve our Resiliency in the face of Climate Change**

32. Track development on our wetland edges for sea level rise: Current forecasts suggest we should be okay in the future, but such maps may be updated. Steps should be taken to avoid development too close to our wetland edges. Setbacks should be enhanced to ensure future safety to our community.
33. Develop our capacity to handle emergencies caused by Climate Change: As a community, we have been relatively fortunate compared to the rest of the Valley, in terms of wildland fires and power outages. Nonetheless, we need to include Climate Change impacts in all our Emergency Master plans, developed by the City, Fire District and Police Department.

**Implementation and Advocacy**

**Management:** The program should be based in the City Manager’s Office and be able to interact with all departments and the community. A volunteer-based support group should be established to assist in the implementation of this Plan, particularly as it relates to public outreach and engagement.

**Financial:** The City should provide a baseline level of financial support, above and beyond the Management staff support. Grants should be aggressively sought after, and a Climate Impact Fee, similar to our Zero Water Footprint fee, should be considered. In addition, there are a variety of databases and resources now available providing examples of ordinances and programs in other municipalities around the Bay Area, the state and country that can serve as models for our efforts, to avoid having to start from scratch.

**Monitoring:** Council and the public should receive quarterly updates on the progress of the above stated goals. The Information Dashboard that will be developed should be added to the City’s Website and updated at least monthly, based on the nature of the data inputs.

**Advocacy:** The Volunteer-based support group should monitor local, State and National actions relating to Climate Change and encourage the Council to support/oppose those actions, consistent with the Climate Action Plan.

**Marketing:** Outreach efforts have been discussed throughout this document, but we should also work to develop strong partners, including schools and students (in particular, we need to find Teacher Advocates); neighborhood groups (Neighborhood Watch, for example) and community groups such as the Moms Club or ACCPF. We can also sponsor an annual Video Contest in the schools and use the winning videos for marketing purposes.

Climate Action Dashboard--**DRAFT**

<u>Item</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2022</u>	<u>2027</u>
GHG Inventory – in Metric Tons	91,449*				
GHG Inventory—per capita	6.44*				
Short-lived Pollutants—in Metric Tons					
Short-lived Pollutants—per capita					

\* 2009 Draft Napa County Climate Action Plan

<u>Goal</u>	<u>Metric</u>	<u>Source</u>	<u>Frequency</u>	<u>Results</u>	<u>Date</u>
<b>Reduce Vehicle Miles Traveled (VMT)</b>					
	Ped/bike lanes built: this period/City total	City PW			
	E-Bike Rebates	City			
	Transit trips originating in American Canyon	NVTA			
	Local Hires/City Total	City Bus. Lic.			
<b>Increase Electric-powered Vehicles &amp; Equipment</b>					
	Electric Vehicle Car Registrations	DMV			
	EV Charging Stations Installed	City Planning			
	Battery-powered equipment rebates	City			
<b>Reduce GHG Emissions in Buildings and Homes</b>					
	Energy Audits Completed	City			
	Electric Appliance Rebates	City			
<b>Increase Renewal Energy</b>					
	Solar Installations	City Planning			
	Battery Backup Installations	City Planning			
	Deep Green Customers	MCE			
<b>Engage the Public</b>					
	Active “Climate Challenge” accounts	App			
	Active “Climate Challenge” teams	App			
	GHG Reduction (in Metric Tons)	App			
	Number of Climate Action events	City			
	Estimated Participants	City			
<b>Other Factors</b>					
	Tree Plantings	City			
	Organic Waste Diversion	Recology			
	Methane Leaks detected/fixed	City			

## PROJECT SUMMARY

<u>Project Description</u>	<u>Est. Start</u>	<u>Act. Start</u>	<u>Est. Finish</u>	<u>Act. Finish</u>	<u>Status</u>
EV Charging Ordinance					
All Electric Reach Code					
Electrified Yard Maintenance Equip. Ord.					
Climate Action Incentives Program					
Solar Farm Feasibility study					
Concrete Feasibility study					
Wetlands Enhancement study					
Tree Canopy Ordinance					
Climate Change/Emergency response					

**Status Codes:**

*Project on schedule*

*Minor delays/problems*

*Serious delays/problems*

*Project not approved/on hold*

**RESOLUTION NO. 2022-07****A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AMERICAN CANYON ADOPTING THE AD-HOC CLIMATE ACTION COMMITTEE'S RECOMMENDATION TO DECLARE A CLIMATE EMERGENCY**

**WHEREAS**, there is broad scientific consensus that climate change caused by human activity represents a growing danger to human health, safety, and economic prosperity, and the window of opportunity for long term climate preservation is rapidly closing; and

**WHEREAS**, 195 countries signed the "Paris Agreement" acknowledging the threat of climate change and urgent need to combat it, agreeing to keep global mean temperature "well below 2 degrees Celsius above pre-industrial levels" and to "pursue efforts to limit temperature increase to 1.5 degrees Celsius;" and

**WHEREAS**, the 2018 Intergovernmental Panel on Climate Change (IPCC) report, "Global Warming of 1.5 degrees Celsius," affirmed that "Limiting global warming to 1.5 degrees Celsius would require rapid, far-reaching and unprecedented changes in all aspects of society," and further projected the earth could reach and exceed this temperature threshold as soon as 2030, far earlier than previously anticipated; and

**WHEREAS**, the 2018 US government report, "Fourth National Climate Assessment," detailed the massive threat to the American economy posed by climate change and underscored the need for immediate climate emergency action at all levels of government; and

**WHEREAS**, California, Napa County and their residents, economy, and environment have already experienced dramatic adverse effects from climate change, including prolonged wildfire seasons, firestorms, rising temperatures, mudslides, severe droughts, property destruction, damage to infrastructure, and loss of life; and

**WHEREAS**, climate breakdown, while endangering all people, disproportionately impacts young and older residents and the most vulnerable, exacerbating existing social justice and other inequities; and

**WHEREAS**, today's children represent a particularly vulnerable group because increasing greenhouse gases and trapped heat will almost certainly have a profound negative impact throughout their lives, as well as the lives of future generations; and

**WHEREAS**, on June 18, 2019, the City Council issued a Proclamation to join with Napa County Jurisdictions dedicated to working together with community organizations, businesses, schools, and regional partners and jurisdictions to educate, mobilize, expand, and accelerate local, regional, and statewide support for comprehensive, immediate, and sustained action; and

**WHEREAS**, as used above, the term "Climate Emergency" does not refer to an "Emergency", a "Local Emergency", or a "State of Emergency" as defined in American Canyon Municipal Code Chapter 2.48 "Civil Defense and Disaster Relief, Article I "Organization of City for Emergency Response" and the City Council does not confer any emergency powers to the City Manager/Director of Emergency Services as it relates to this Proclamation.

**NOW, THEREFORE, BE IT RESOLVED**, that the City Council of the City of American Canyon hereby declares the following:

1. That a Climate Emergency exists, and that it threatens our city, state, country, and the planet;

2. That the City of American Canyon joins a growing list of communities committed to a goal of Net Zero Climate Pollution, measured in terms of net contribution to excess trapped heat, by or before 2030, and further commits to evaluate all planning and policy decisions through the lens of this pledge, and to implement both immediate and sustained actions in support of its achievement; and

3. That the City Council recognizing the need for full community participation and support, commits to providing leadership and services in working with community organizations, businesses, schools, and regional partners and jurisdictions to educate, mobilize, expand, and accelerate local, regional and statewide support for comprehensive, immediate, and sustained action to achieve its goal of net zero climate pollution by or before 2030; and

4. That the City Council will consider amendments to its General Plan and its 2012 Energy Efficiency/Climate Action Plan, consistent with its commitment to net zero climate pollution by or before 2030.

**BE IT FURTHER RESOLVED** that the City Council directs its Ad Hoc Climate Action Committee to complete the following:

1. Develop specific recommendations and measurable outcomes to achieve the goal of Net Zero Climate Pollutants by 2030 in the following areas:

- a. Transportation
- b. Buildings
- c. Renewable Energy and Storage
- d. Other Environmental issues, including but not limited to, water conservation, urban agriculture and food composting, and recycling
- e. Carbon Sequestration
- f. Public Awareness and Education regarding individual actions, including individual lifestyles and business operations
- g. Climate Resiliency Efforts

2. Work with City staff, stakeholders and community leaders and organizations and the public at large.

3. Identify funding sources and grant opportunities.

4. Present its findings and recommendations within six months.

**PASSED, APPROVED and ADOPTED** at a regularly scheduled meeting of the City Council of the City of American Canyon held on the 1<sup>st</sup> day of February, 2022, by the following vote:

AYES: Councilmembers Joseph, Oro, Washington, Vice Mayor Aboudamous, and Mayor Garcia  
NOES: None  
ABSTAIN: None  
ABSENT: None

DocuSigned by:  
*Leon Garcia*  
BA1BB3340BAC47C...  
Leon Garcia, Mayor

ATTEST:  
DocuSigned by:  
*Taresa Geilfuss*  
609347883BC94DC...  
Taresa Geilfuss, City Clerk

APPROVED AS TO FORM:  
DocuSigned by:  
*William Ross*  
285D50133D93421...  
William D. Ross, City Attorney

# Memo



455 Capitol Mall, Suite 300  
Sacramento, CA 95814  
916.444.7301

**Date:** November 21, 2022  
**To:** David Morrison and Deborah Elliott (County of Napa)  
**From:** Honey Walters and Brenda Hom (Ascent Environmental, Inc.)  
**Subject:** Final Napa County Regional Greenhouse Gas Forecast (2019 – 2030)

---

## 1 INTRODUCTION

This technical memorandum presents an estimated forecast of communitywide greenhouse gas (GHG) emissions for the Napa County region (region), including forecasts for each of the six jurisdictions: American Canyon, Calistoga, the City of Napa, St. Helena, Yountville, and the unincorporated areas of Napa County (Unincorporated County) under “business-as-usual” (BAU) and legislative-adjusted BAU scenarios for the year 2030. These forecasts are based on the results of the 2019 communitywide GHG emissions inventory, as well as associated methods, assumptions, emissions factors, and data sources used to develop the updated emissions inventory described in the Napa County Region 2019 Community Greenhouse Gas Inventory Update Summary memorandum that was delivered to the County of Napa (County) on June 7, 2022.

This forecast provides an estimate of future GHG levels based on a continuation of current trends in activity, while also accounting for Federal and State legislative actions to reduce emissions in the future. Such that regional departments and agencies may also choose to expand the scope of their individual documents to address climate adaptation, GHG emissions forecasts provide insights to the scale of regional and local reductions needed to achieve GHG emissions reduction targets. Regional activities could include an incorporation of information contained herein into a General Plan, Climate Action Plan, or other planning document.

### 1.1 ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of three parts:

- ▶ Section 1: Summary of Inventory Results presents an overview of the region’s 2019 GHG emissions inventories for each jurisdiction.
- ▶ Section 2: Communitywide GHG Emissions Forecasts summarizes the forecasted GHG emissions under BAU and legislative-adjusted BAU scenarios for 2030. The first scenario, called the BAU scenario, does not account for GHG emissions reductions resulting from laws and regulations adopted by local, regional, State, or federal agencies; it illustrates how much emissions would increase due to population and economic growth if no actions to reduce emissions were taken. The second scenario, a legislative-adjusted BAU scenario, shows emissions reductions from laws and regulations enacted by regional, State, and federal agencies; it does not reflect region’s actions to reduce GHG emissions. This section will also describe the data, methods, and assumptions used to quantify the forecasted emissions.
- ▶ Section 3: GHG Emissions Forecast by Jurisdiction summarizes the regional GHG emissions forecasts by each jurisdiction. This section presents the results for each jurisdiction only without additional detail related to the data, methods, and assumptions, except those that are unique to the jurisdiction.

## 2 SUMMARY OF INVENTORY RESULTS

### 2.1 2019 REGIONAL GHG INVENTORY RESULTS

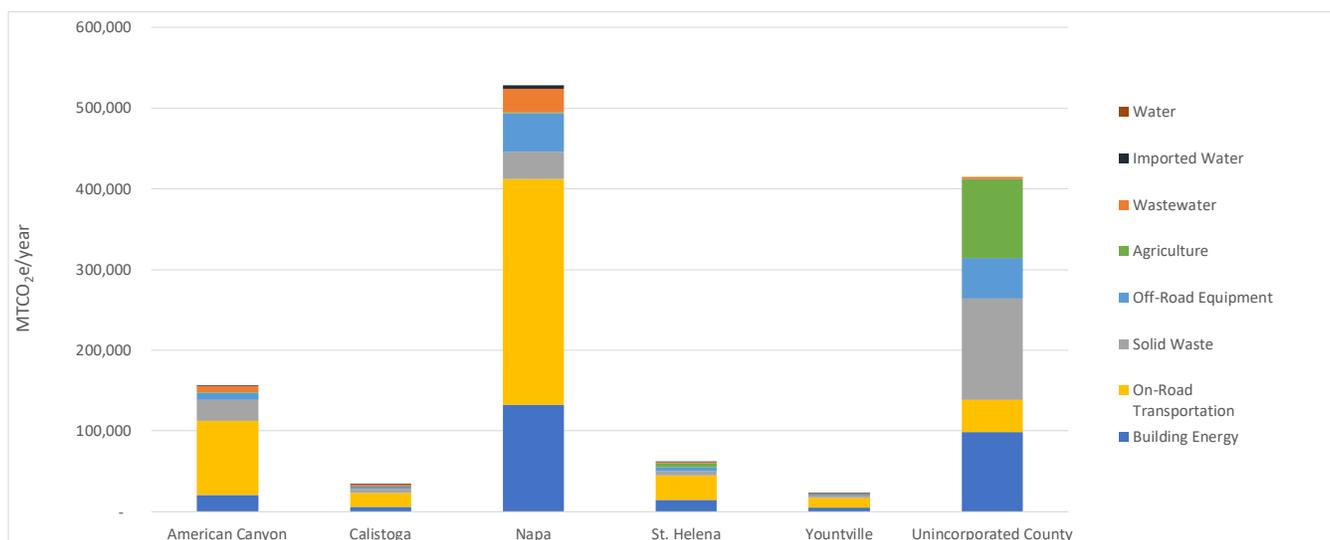
Based on the modeling conducted, regional communitywide sources generated 1.2 million metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) in 2019. Major emissions sectors for the region included on-road transportation, building energy use, and solid waste. Emissions tend to be proportional to the level of economic activity in a jurisdiction (e.g., agricultural activity in the Unincorporated County, job and population centers in the City of Napa). Table 1 and Figures 1 and 2 present the region’s 2019 GHG emissions inventory by jurisdiction and by sector.

**Table 1 2019 Napa County Regional Greenhouse Gas Inventory by Jurisdiction and Sector (MTCO<sub>2</sub>e/year)**

Emissions Sector	American Canyon	Calistoga	Napa	St. Helena	Yountville	Unincorporated County	Total
On-Road Transportation	91,830	17,184	280,533	30,661	12,404	40,063	472,677
Building Energy	20,964	6,249	132,077	14,296	5,062	98,596	277,244
Solid Waste	25,938	4,981	34,236	5,676	2,601	125,429	198,862
Off-Road Equipment	8,998	2,880	47,238	4,502	1,328	50,602	115,548
Agriculture	154	274	1,086	4,415	75	97,378	103,381
Wastewater	7,822	1,992	29,542	2,270	1,040	3,191	45,858
Imported Water	983	229	4,383	285	65	0	5,943
Total	156,690	33,789	529,095	62,105	22,576	415,259	1,219,513

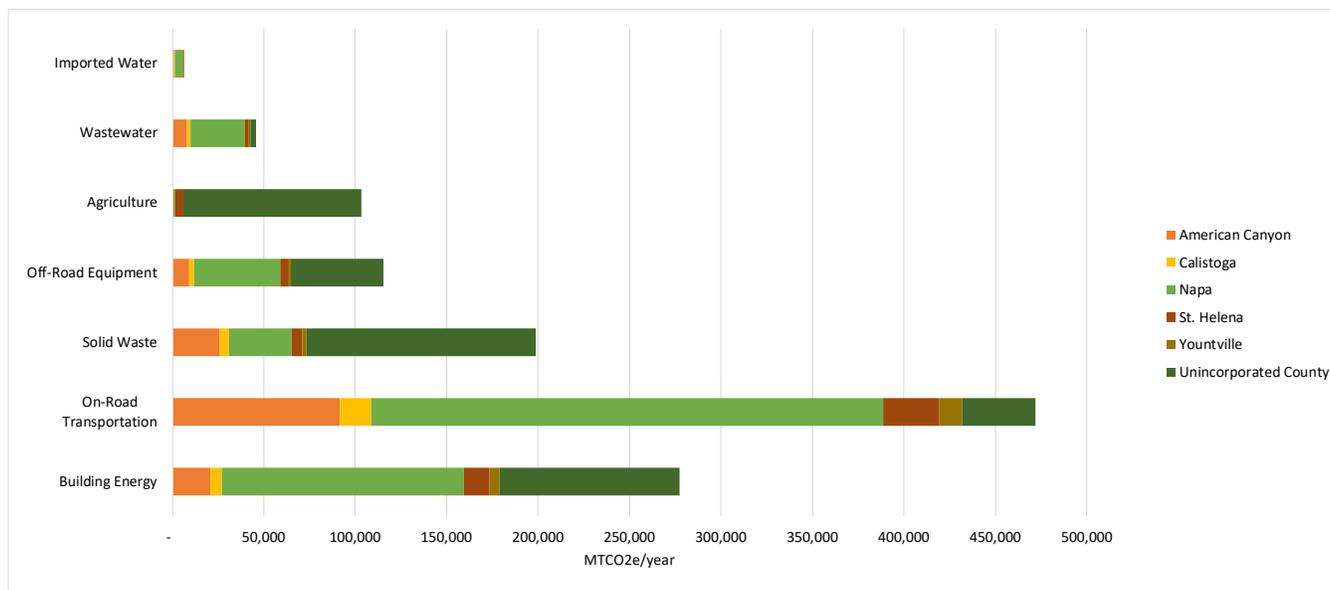
Notes: MTCO<sub>2</sub>e/year = metric tons of carbon dioxide equivalent per year.

Source: Prepared by Ascent Environmental in 2022.



Source: Prepared by Ascent Environmental in 2022.

Figure 1 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Jurisdiction and Sector (MTCO<sub>2</sub>e/year)



Source: Prepared by Ascent Environmental in 2022.

Figure 2 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Sector and Jurisdiction (MTCO<sub>2e</sub>/year)

### 3 COMMUNITYWIDE GREENHOUSE GAS EMISSIONS FORECAST

The following BAU GHG emissions forecasts provide an assessment of how emissions generated by community activities will change over time without further local, State, or federal action. In addition to accounting for the region’s growth under a BAU scenario, a legislative-adjusted BAU forecast was prepared, which includes adopted legislative and regulatory actions at the local, State, federal levels that would affect emissions without any additional action. These include regulatory requirements to increase vehicle fuel efficiency and increase renewable energy sources in local grid electricity portfolios. It is important to note that the legislative-adjusted BAU emissions forecasts only include emissions reductions associated with implementation of adopted federal, State, and local legislation and regulations and do not include goals established by executive orders or targets established by federal or State agencies. These forecasts provide the region with the information needed to focus efforts on emissions sectors and sources that have the greatest opportunities for GHG emissions reductions. The GHG emissions forecasts for 2030 are aligned with various legislative actions, as shown in Table 4, such as those supporting Senate Bill (SB) 32’s target to reduce statewide emissions to 40 percent below 1990 levels by 2030.

For most emissions sectors, except for agriculture and waste-in-place emissions, the regional growth associated with both forecast scenarios were based on demographic and vehicle miles traveled (VMT) projections from 2019 to 2030. Population and employment projections are based on data provided by the cities of American Canyon, Calistoga, the City of Napa, St. Helena, and Yountville along with the County for the unincorporated area using forecasts from the California Department of Finance and local General Planning documents. Additionally, service population, which is the sum of population and employment, was used as a growth factor for specific sectors and sub-sector (e.g., wastewater) whose activities depend on growth in both population as well as employment. Agricultural emissions were scaled by extrapolated trends in historical agricultural land cover in Napa County over the last decade, as tracked by the county’s crop reports (County of Napa 2021). Waste-in-place emissions were scaled by the decomposition of waste accumulated at each landfill within the region. All growth factors, except for those used for waste-in-place, were applied based on the percent change from 2019 activity levels for each target year. The applied growth rates for each sector are described in Section 4.

Throughout the region, population and employment are expected to increase by 18 and 17 percent, respectively, from 2019 to 2030. These growth factors were used to forecast emissions for most sectors. Annual VMT projections were

developed using the origin-destination method using data from MTC's VMT Data Portal, which uses data from Plan Bay Area 2040 as Plan Bay Area's 2050 VMT data are not readily available by jurisdiction at this time (August 31, 2022). Annual VMT in the region is projected to decrease by 22 percent from 2019 by 2030. VMT projections were used to scale emissions from the on-road transportation sector. Table 2 shows growth in population, employment, and annual VMT from 2019 to 2030. Refer to Table 18 for demographic and VMT forecasts by jurisdiction.

**Table 2 Napa County Regional Demographic and Vehicle Miles Traveled Forecasts**

Forecast Factor	2019	2030	Percent Change (2019-2030)
Population	139,608	164,666	18%
Households	48,908	63,178	29%
Employment	97,452	114,307	17%
Service Population <sup>1</sup>	237,060	278,973	18%
Annual VMT	1,015,777,139	1,115,308,807	-22%

Notes: VMT = vehicle miles traveled.

<sup>1</sup> Service population is equal to the sum of population and employment.

Sources: Cooper, pers. comm., 2022.; DOF 2021; Mitchem, pers. comm., 2022.; City of Napa, 2022: 2-21.; City of St. Helena, 2022: 2-78.; Shelton, pers. comm., 2022; County of Napa 2008.; U.S. Census Bureau, 2019; MTC VMT Data Portal.

Table 3 shows baseline emissions in 2019 and BAU emissions forecasts for 2030. Under the BAU forecast, regional emissions are anticipated to increase by 12 percent from 2019 to 2030.

**Table 3 Napa County Regional GHG Emissions Inventory and BAU Forecasts (MTCO<sub>2e</sub>)**

Sector	2019	2030	Percent Change	Difference
Agriculture	103,381	100,078	-3%	-3,303
Building Energy	277,244	331,361	20%	54,117
Imported Water	5,943	6,794	14%	851
Off-Road Equipment	115,548	140,634	22%	25,086
On-Road Transportation	472,677	505,141	7%	32,464
Solid Waste	198,862	224,520	13%	25,658
Wastewater	45,858	53,095	16%	7,237
Total	1,219,513	1,361,623	12%	142,109

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### 3.1 LEGISLATIVE-ADJUSTED EMISSIONS FORECASTS

Legislative-adjusted BAU emissions forecasts were prepared using the same BAU growth rates while also accounting for local, State, and federal laws and regulations that would affect regional emissions. These forecasts provide an understanding of future community emissions to inform the identification of emissions reduction measures developed to meet GHG targets. A summary of the legislative reductions applied is provided in Table 4.

**Table 4 Legislative Reductions Summary**

Source	Legislative Reduction	Description	Sectors Applied
Local	Marin Clean Energy Power Procurements	By 2023, MCE aims to procure 95 percent of energy from GHG-free sources (MCE 2021:7).	Building Energy
State	California's Building Energy Efficiency Standards (2019 Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC. Accounts for the energy efficiency gains associated with lighting, heating, cooling, ventilation, and water heating improvements, as well as onsite solar photovoltaic requirements for low-rise residential.	Building Energy
State	SB 100 (Renewables Portfolio Standard)	Requires California energy utilities to procure 60 percent of electricity from renewable sources by 2030 and 100 percent carbon-free electricity by 2045.	Building Energy
State	Advanced Clean Car Standards	Establishes GHG emission reduction standards for model years 2017-2025 that are more stringent than federal CAFE standards.	
State	Advanced Clean Cars II	Assumes that 100 percent of new light duty vehicles will either ZEV or PHEV by model year 2035. Requirements will start ramping up from a 35 percent requirement for the 2026 model year. (CARB 2022)	On-Road Vehicles
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Vehicles
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles and Equipment

Notes: CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; MCE = Marin Clean Energy; SB = Senate Bill; ZEV = zero emission vehicle; PHEV = plug-in hybrid electric vehicle.

Source: Ascent Environmental in 2022.

The region's legislative-adjusted BAU emissions would have a modest decrease compared to the BAU scenario, decreasing by approximately five percent between 2019 and 2030, as shown below in Table 5 and Figure 3. Figure 3 also shows the emissions trend that would occur without anticipated legislative reductions, accounting mainly for population, employment, and VMT changes (i.e., BAU emissions). Without the legislative reductions, emissions would be 17 percent higher in 2030. Emissions forecasts for each sector are discussed in detail in the following sections.

**Table 5 Napa County Regional GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2e</sub>)**

Sector	2019	2030	Percent Change	Difference
Agriculture	103,381	91,545	-11%	-11,836
Building Energy	277,244	286,444	3%	9,199
Imported Water	5,943	4,529	-24%	-1,414
Off-Road Equipment	115,548	130,620	13%	15,072
On-Road Transportation	472,677	367,326	-22%	-105,351
Solid Waste	198,862	224,520	13%	25,658
Wastewater	45,858	53,095	16%	7,237
Total	1,219,513	1,158,168	-5%	-61,345

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

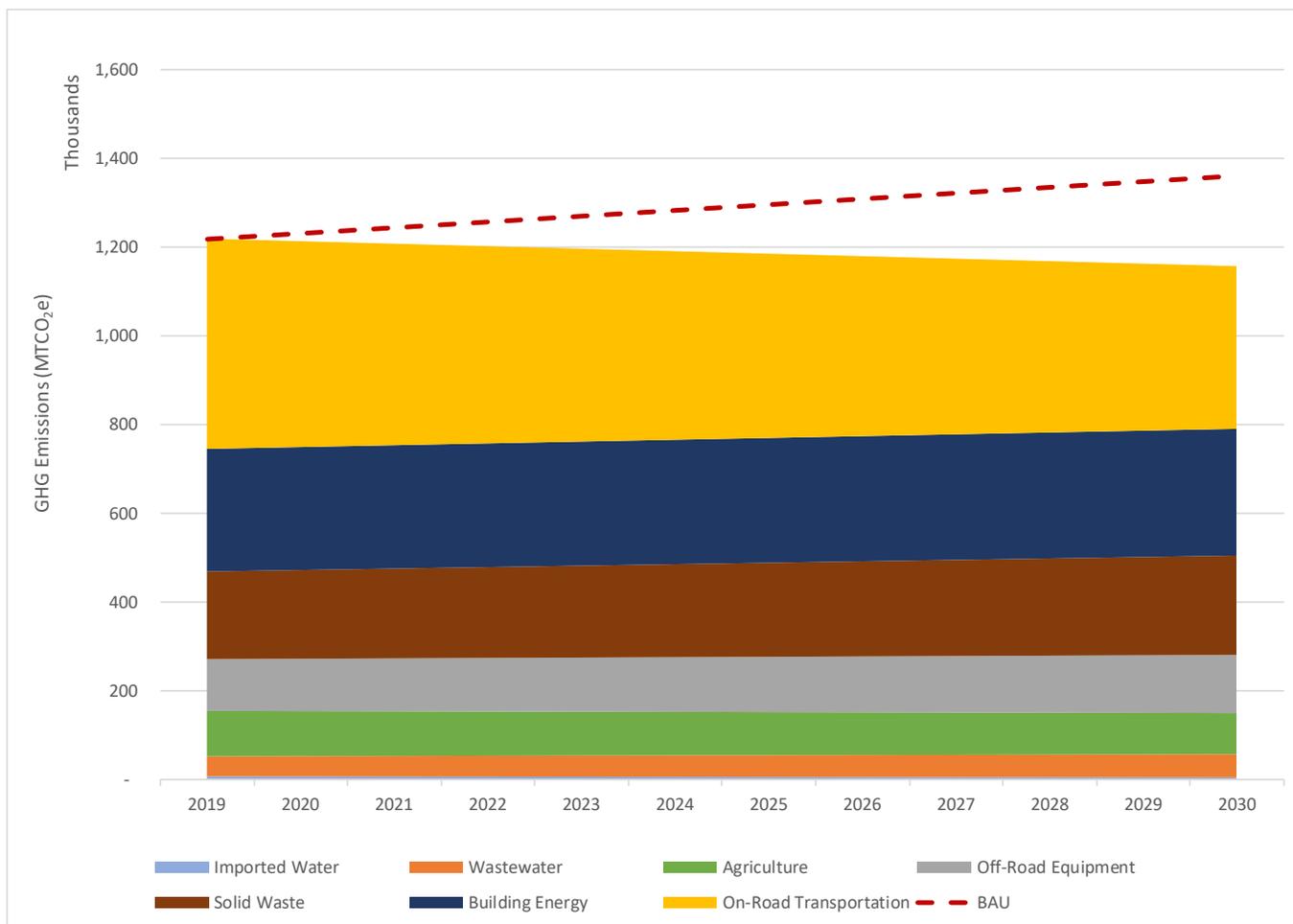


Figure 3 Napa County Regional GHG Emissions Forecasts

## 3.2 BUILDING ENERGY

### Building Energy Assumptions

Building energy emissions in the region result directly from onsite combustion of natural gas and indirectly from electricity consumption. Pacific Gas & Electric (PG&E) is the main electricity and natural gas provider in Northern California. Marin Clean Energy (MCE) is a community choice aggregation (CCA) program which provides renewable electricity options to several northern Bay Area counties, including Napa County. MCE customers are automatically enrolled in a default energy service option, Light Green, or they may elect either the Deep Green or Local Sol service options for an extra fee to increase to 100 percent renewable energy, or opt out of MCE altogether to maintain service with PG&E. Refer to the Inventory memorandum for detailed discussion of the assumptions used to estimate the 2019 building energy emissions.

### 2030 ELECTRICITY EMISSIONS FACTORS

PG&E’s carbon dioxide (CO<sub>2</sub>) emissions factor for 2030 was calculated by interpolating 2020 emission factors (160.05 pounds [lb] of CO<sub>2</sub>/megawatt-hour [MWh]) available from PG&E’s Power Content Label, available from the California Energy Commission (CEC), and a zero emissions factor for 2045 (CEC 2021). This latter assumption assumes that PG&E would achieve carbon neutrality (i.e., 100 percent GHG-free electricity) by 2045, per SB 100. Methane (CH<sub>4</sub>) and nitrous

oxide (N<sub>2</sub>O) emission factors were calculated in a similar way. However, because these factors were not available for PG&E, 2020 California-specific electricity emissions factors for CH<sub>4</sub> and N<sub>2</sub>O were obtained from the U.S. Environmental Protection Agency's (EPA's) Emissions & Generation Resource Integrated Database for the CAMX region (eGRID) (EPA 2021). Thus, the 2030 CH<sub>4</sub> and N<sub>2</sub>O emission factors were also interpolated between eGRID factors for 2020 and a zero emissions factor for 2045. In 2030, PG&E's average emissions factor is expected to be 97.5 lb CO<sub>2</sub>e/MWh.

MCE's 2030 emissions factor is based on MCE's plan to achieve a 95 percent GHG-free energy portfolio for its Light Green service option starting in 2023 and continuing through 2030, as reported in MCE's 2021 Impact Report (MCE 2021:7). The 2030 MCE Light Green emission factors were interpolated between 2019 reported factors and a zero-emission factor in 2045, per the carbon neutrality targets under SB 100 (MCE 2020). Based on this approach, in 2030, MCE's average emissions factor for the Light Green service option is expected to be 101.5 lb CO<sub>2</sub>e/MWh. Deep Green and Local Sol options are anticipated to continue to have a zero emissions factor through 2030.

To put the impact of PG&E and MCE emission factors into context, 85 percent of electricity use in the region are related to subscriptions to MCE's service options, as of 2019. Out of the residential electricity usage, 88 percent are subscribed to MCE. Of the non-residential electricity usage, 83 percent are subscribed to MCE (Herrick, pers. comm., 2022). This makes the overall regional emission factors more heavily weighed and dependent on changes to MCE's energy profile.

## 2030 NATURAL GAS EMISSIONS FACTORS

2030 natural gas emission factors would remain unchanged from 2019. These are based on emissions factors obtained from The Climate Registry's (TCR's) 2020 Default Emission Factors, which are estimated to be 5.3 kilograms of carbon dioxide per therm (kg CO<sub>2</sub>/therm) (TCR 2020). Emissions factors associated with natural gas combustion are not anticipated to change over time, as there are no legislative actions that would reduce the carbon intensity of natural gas. Refer to Table 10 of the previous inventory memorandum for further details.

## ENERGY EFFICIENCY

Energy intensity factors were adjusted to reflect increased stringency under California's Building Energy Efficiency Standards (California Code of Regulations Title 24 Part 6, hereafter referred to as "Title 24"). Title 24 standards apply to new construction. The 2019 Title 24 standards apply to projects constructed after January 1, 2020, and the next standards will apply after January 1, 2023. To estimate the energy efficiency from Title 24 requirements in new construction, an adjustment factor was calculated from the difference in the average energy use in residential and non-residential buildings between those built to 2019 Title 24 standards and those built to "historical" standards. Both energy efficiency rates (e.g., kilowatt hours (kWh) and therms per square foot (SF)) were estimated using the California Air Pollution Control Officers Association California Emissions Estimator Model (CalEEMod) Version 2020.4.0. In addition to accounting for Title 24 requirements by land use type, it also has estimates for energy usage rates by climate zone, and Napa County's climate zone (Zone 4) was selected for this analysis. This adjustment factor was then applied to the BAU growth in energy use, to determine the energy consumption and associated GHG emissions of future development with legislative adjustments.

## BUILDING ENERGY RESULTS

Emissions from future electricity and natural gas use were estimated by multiplying anticipated energy use by forecasted emissions factors. Future energy use was forecasted in two parts. First, energy use was scaled by population and employment growth factors detailed above. Second, energy emissions factors were adjusted to reflect current regulations and adopted targets. PG&E electricity emissions factors are assumed to decline linearly to 100 percent GHG-free electricity by 2045 based on RPS targets pursuant to SB 100. MCE's electricity emissions factors are also anticipated to decrease based on MCE's goal to be 95 percent GHG-free by 2023 for its Light Green service option (MCE 2021). The assumptions for future electricity emissions factors are described below. Table 6 summarizes the scaling factors and legislative reductions used to forecast building use by energy type.

**Table 6 Building Energy Emissions Forecast Methods by Energy Type**

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Scaled by population growth for residential building energy; scaled by employment growth for nonresidential building energy.	SB100 scheduled targets (i.e., 100 percent renewable by 2045) applied to PG&E's electricity emissions factors. MCE's 95% GHG-free target for Light Green was applied to MCE's Light Green electricity emissions factors. Deep Green/Local Sol factors remain at 100% GHG-free. Accounts for Title 24 energy efficiency gains in new construction based on the best available data for average building energy efficiency.
Natural Gas		

Notes: MCE = Marin Clean Energy; RPS = Renewables Portfolio Standard; PG&E = Pacific Gas & Electric.

Source: Ascent Environmental 2022.

## Residential Building Energy

Between 2019 and 2030, electricity and natural gas emissions from residential buildings would increase by approximately seven percent from 166,914 to 179,399 MTCO<sub>2e</sub> with legislative adjustments. Table 7 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the residential building energy sector by fuel type for 2030.

**Table 7 Regional Residential Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts (MTCO<sub>2e</sub>/ year)**

Fuel Type	2019	2030	Percent Change	Difference
Electricity	26,281	18,274	-30%	-8,007
Natural Gas	140,634	161,125	15%	20,492
Total	166,914	179,399	7%	12,485

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## Nonresidential Building Energy

Between 2019 and 2030, electricity and natural gas emissions from nonresidential buildings would decrease by approximately three percent from 110,330 to 107,044 MTCO<sub>2e</sub> with legislative adjustments, generally in line with anticipated overall employment growth of approximately 17 percent over the same time. Table 8 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions for the nonresidential building energy sector by fuel type for 2030.

**Table 8 Regional Nonresidential Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2e</sub>/ year)**

Fuel Type	2019	2030	Percent Change	Difference
Electricity	41,690	29,825	-28%	-11,865
Natural Gas	68,640	77,219	12%	8,580
Total	110,330	107,044	-3%	-3,285

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### 3.3 TRANSPORTATION

#### ON-ROAD TRANSPORTATION

Between 2019 and 2030, GHG emissions from on-road vehicles would decrease by approximately 22 percent from 472,677 to 367,326 MTCO<sub>2</sub>e, accounting for an increase in VMT of approximately 10 percent and future vehicle emissions factors modeled in California Air Resources Board's (CARB's) Emissions FACTor (EMFAC2021) model and adjusted for the latest vehicle regulations. VMT projections were developed using the origin-destination method and data from MTC's VMT Data Portal for 2030. With respect to the legislative adjustments included in this forecast, State and federal laws and regulations incorporated in the on-road transportation sector include the Pavley Clean Car Standards, Advanced Clean Car (ACC) Standards, the recently filed ACCII regulations, and fuel efficiency standards for medium- and heavy-duty vehicles. These policies, including those that are expected to increase the number of electric vehicles in the county in the future, are included in EMFAC2021's emissions factor estimates and forecasts. The Low Carbon Fuel Standard was excluded in EMFAC2021 forecasts because the emissions benefits originate from upstream fuel production and do not directly reduce vehicle tailpipe emissions that affect the city's GHG emissions forecasts. Table 9 summarizes the scaling factors and legislative reductions used to forecast on-road transportation emissions.

**Table 9 On-Road Transportation Emissions Forecast Methods**

Source	Forecast Methods	
	Growth Factor	Applied Legislative Reductions
On-Road Transportation	Scaled by VMT estimates provided by MTC.	EMFAC2021 forecasts vehicle fleet distributions by vehicle type and the emissions factors anticipated for each vehicle category based on both vehicle emissions testing and approved legislative reductions. EMFAC2021's forecasts incorporate the effects of the ACC Standards, federal CAFE standards, and fuel efficiency standards for medium- and heavy-duty vehicles, as well as truck and bus regulations. Legislative actions that are anticipated to impact the number of electric vehicles in the future are incorporated into the emissions factors obtained from EMFAC2021. Emission factors were further adjusted to account for the phasing in of ZEV/PHEV requirements under ACCII.

Notes: ACC = Advanced Clean Cars; CAFE = Corporate Average Fuel Economy; EMFAC2021 = California Air Resources Board's Emission FACTor 2021 model; MTC = Metropolitan Transportation Commission; ZEV = zero emission vehicle; PHEV = plug-in hybrid electric vehicle.

Source: Ascent Environmental 2022.

Table 10 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from on-road transportation for 2030.

**Table 10 Regional On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2</sub>e/ year)**

Source	2019	2030	Percent Change	Difference
Commercial	147,981	139,105	-6%	-8,876
Non-Commercial	298,693	252,656	-15%	-46,037
Total	446,673	391,761	-12%	-54,913

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

#### OFF-ROAD EQUIPMENT

Between 2019 and 2030, emissions associated with off-road vehicles and equipment used in the region would increase by 13 percent from 115,548 to 130,620 MTCO<sub>2</sub>e, with legislative adjustments applied and overall growth in various demographics. Emissions were obtained primarily from CARB's latest off-road emissions model, OFFROAD2021, as well as from CARB's OFFROAD2007 model. With respect to the legislative adjustments in the off-road vehicle sector, the

OFFROAD2021 was used, which incorporates regulatory actions such as reformulated fuels and more stringent emissions standards. However, some off-road vehicle and equipment sources that are included in the OFFROAD2007 model are excluded from OFFROAD2021. For these sectors, with the exception of entertainment equipment, emissions were obtained from OFFROAD2007. (Entertainment equipment emissions were excluded because OFFROAD2021 does not include forecasts for this source and the emissions from this source account for less than one percent of total offroad emissions.) In addition, OFFROAD2021 provides CO<sub>2</sub> emissions but does not provide emissions from CH<sub>4</sub> and N<sub>2</sub>O. Ratios of CH<sub>4</sub> and N<sub>2</sub>O to CO<sub>2</sub> reported in OFFROAD2007 were calculated and applied to CO<sub>2</sub> data from OFFROAD2021 to calculate CH<sub>4</sub> and N<sub>2</sub>O emissions, as recommended by CARB.

Napa County-level emissions from off-road vehicles and equipment were scaled using changes in city-specific demographic factors. Table 11 summarizes the scaling factors and legislative reductions used to forecast off-road vehicle and equipment emissions.

**Table 11 Off-Road Vehicles and Equipment Forecast Methods by Source**

Source	Forecast Methods	
	Growth Factor	Applied Legislative Reductions
Airport Ground Support	Population	OFFROAD2021 emissions factor considerations include EPA off-road compression-ignition engine standards implementation schedule.
Commercial Harbor Craft	Employment	
Construction and Mining	Service Population	
Industrial	Employment	
Lawn and Garden Equipment	Population	
Light Commercial Equipment	Employment	
Pleasure Craft	All assumed to occur in the Unincorporated County	
Portable Equipment	Employment	
Railyard Operations	Employment	
Recreational Equipment	Population	
Transport Refrigeration Units	Service Population	

Notes: EPA = U.S. Environmental Protection Agency; OFFROAD2021 = California Air Resources Board's OFFROAD2021 model. Excludes Entertainment equipment off-road sources, for which OFFROAD 2021 does not have forecasts.

Source: Ascent Environmental 2022.

Table 12 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the off-road vehicles and equipment sector for 2030.

**Table 12 Regional Off-Road Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change	Difference
Industrial	5,490	6,479	18%	989
Airport Ground Support	0	0	18%	0
Commercial Harbor Craft	140	166	18%	25
Construction and Mining	12,294	15,378	25%	3,085
Lawn and Garden Equipment	28,726	35,014	22%	6,288
Light Commercial Equipment	24,282	15,437	-36%	-8,845
Pleasure Craft	28,896	39,691	37%	10,796
Portable Equipment	10,088	11,911	18%	1,823
Railyard Operations	383	450	17%	66

Recreational Equipment	2,687	3,343	24%	656
Transport Refrigeration Units	2,561	2,751	7%	190
Total	115,548	130,620	13%	15,072

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### 3.4 AGRICULTURE

Between 2019 and 2030, emissions generated from agricultural activities in the region would decrease by approximately 11 percent from 103,381 to 91,545 MTCO<sub>2e</sub>, accounting for the change in historical agricultural land cover as reported in the County's historical agricultural crop reports. Livestock emissions were assumed to change in proportion to changes in rangeland and pastureland and were subsequently scaled by the extrapolated historical change in rangeland and pastureland as reported in the county's crop reports. Between 2009 and 2021, rangeland and pastureland acreage decreased by 32 percent. Based on this historical trend, rangeland and pastureland acreage, along with livestock emissions, are anticipated to decline by 38 percent from 2019 to 2030.

For other emissions (i.e., agricultural offroad equipment, fertilizer application, and irrigation pumps), these were assumed to change in proportion to the change in non-rangeland and pastureland (e.g., fruit and nut crops, hay, olives, vegetables). Although some of this activity may be associated with livestock operations, it is assumed that the majority of this activity is associated with non-livestock operations. Between 2009 and 2021, non-rangeland acreage increased by six percent. Based on this historical trend, non-rangeland acreage, along with non-livestock emissions, are anticipated to increase by four percent from 2019 to 2030.

These two agricultural acreage trends stand in contrast to the overall population growth of approximately 18 percent over the same time. The only legislative adjustment made in this sector is for the agricultural offroad equipment, which are subject to the same legislative adjustments as discussed in Section 4.2. The decrease in agricultural offroad emissions are primarily due to changes in equipment emission regulations and not due to growth. Table 13 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the agriculture sector for 2030.

**Table 13 Regional Agriculture GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2e</sub>/ year)**

Source	2019	2030	Percent Change	Difference
Agricultural Offroad	47,682	41,211	-14%	-6,471
Fertilizer Application	21,948	22,897	4%	949
Irrigation Pumps	15,417	16,084	4%	667
Livestock	18,334	11,354	-38%	-6,980
Total	103,381	91,545	-11%	-11,836

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### 3.5 SOLID WASTE

#### Waste Generation and Waste-in-Place

The ICLEI Community Protocol recommends that community GHG inventories include emissions from both solid waste facilities located in the community (i.e., "waste-in-place") and waste generated by the community (ICLEI 2019). Waste-in-

place CH<sub>4</sub> emissions from landfill gas (LFG) generated at solid waste facilities located within the unincorporated area accounted for approximately 58 percent of emissions from the solid waste sector in 2019. Between 2019 and 2030, waste generation emissions were scaled to 2030 levels based on change in population in the region.

Waste-in-place emissions were calculated based on the existing and future waste tonnages at two landfills located within the region: Clover Flat Landfill and American Canyon Landfill. Both landfills are located in the Unincorporated County. Open from 1966 to 1995, the American Canyon Landfill's methane emissions likely peaked around 1996, after its closure, and will continue to decline into the future through 2030 based the decay model available in CARB's Landfill Gas Tool and annual disposal tonnage reports from EPA (CARB 2021, EPA 2022). Clover Flat Landfill, on the other hand, is an active landfill that has been open since 1963 and plans to close in 2056. Assuming average annual disposal rates between 2010 and 2019 continue through 2056, waste-in-place emissions from Clover Flat will continue to rise through 2030 and likely peak around 2057, as modeled in the Landfill Gas Tool. Although emissions from the American Canyon Landfill are expected to decline by six percent, emissions from Clover Flat Landfill would be twice as high given its greater capacity and is also expected to increase by 17 percent.

Between 2019 and 2030, solid waste emissions generated from community activities in the region would increase by approximately 19 percent from 84,243 to 100,400 MTCO<sub>2e</sub> per year, accounting for overall population growth of approximately 18 percent over the same time. Solid waste generation emissions include CH<sub>4</sub> emissions from the decay of waste generated annually, which were scaled by population growth within the region between 2019 and 2030.

Total solid waste emissions, including both community-generated waste and waste-in-place emissions, would increase by 13 percent from 198,862 to 224,520 MTCO<sub>2e</sub> per year. Table 14 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2030.

**Table 14 Regional Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2e</sub>/ year)**

Source	2019	2030	Percent Change	Difference
Community-Generated Solid Waste	84,243	100,400	19%	16,157
Waste-in-Place Emissions	114,619	124,121	8%	9,502
<i>American Canyon Landfill</i>	<i>42,800</i>	<i>40,084</i>	<i>-6%</i>	<i>-2,715</i>
<i>Clover Flat Landfill</i>	<i>71,819</i>	<i>84,036</i>	<i>17%</i>	<i>12,217</i>
Total	198,862	224,520	13%	25,658

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 3.6 IMPORTED WATER

Between 2019 and 2030, imported water emissions generated from community activities in the region would be decrease by 24 percent from 5,943 to 4,529 MTCO<sub>2e</sub>. These emissions include upstream emissions from electricity generation use to extract, convey, treat, and distribute imported water to the region. For local water supply sources, the electricity usage associated with extracting, conveying, treating, and distributing water is captured in the building energy sector because these activities take place within the community. The reduction in emissions is largely attributed to improvements in the renewable portfolio in the state. Average electricity emissions factors were obtained for the state using EPA's eGRID database for the CAMX region. Electricity usage associated with water consumption is subject to RPS targets, pursuant to SB 100 requirements, which is expected to reach carbon neutrality (i.e., a zero emissions rate) by 2045. Based on these assumptions and the 2019 eGRID emission factors, the average GHG emissions factor is anticipated to decline by 33 percent between 2019 and 2030.

Table 15 summarizes the scaling factor and legislative reduction used to forecast water supply emissions.

**Table 15 Imported Water Forecast Methods and Legislative Reductions by Source**

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Imported Water	Scaled by population growth.	Assumes electricity use for extraction, conveyance, distribution, and treatment aligns with the trajectory toward the 2045 carbon-free electricity requirements under SB100.

Source: Ascent Environmental in 2022.

Table 16 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the water supply sector for 2030.

**Table 16 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change	Difference
Imported Water	5,943	4,529	-24%	-1,414

Notes: BAU = business-as-usual; MTCO<sub>2</sub>e/year = metric tons of carbon dioxide equivalent per year.

Source: Ascent Environmental in 2022.

### 3.7 WASTEWATER TREATMENT

Between 2019 and 2030, community wastewater emissions would increase by 16 percent from 45,858 to 53,095 MTCO<sub>2</sub>e. This change reflects an increase in wastewater generation resulting from population growth within the region of approximately 18 percent over the same time. Wastewater-related emissions are generated from centralized wastewater treatment plants (WWTPs) and septic systems for the region. Table 17 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from wastewater treatment sources for 2030.

**Table 17 Regional Wastewater Treatment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2</sub>e/ year)**

Source	2019	2030	Percent Change	Difference
Septic Systems	2,961	3,841	30%	880
Centralized WWTPs	42,897	49,254	15%	6,357
Total	45,858	53,095	16%	7,237

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent; WWTP = wastewater treatment plant.

Source Ascent Environmental 2022.

### 3.8 DISCUSSION

The community BAU emissions would increase by approximately 12 percent between 2019 and 2030, while legislative-adjusted BAU emissions would decrease five percent between 2019 and 2030. The overall reduction under the legislative-adjusted BAU forecast scenario, despite growth, is associated with reductions that would be achieved from several legislative actions, including:

- ▶ a greater renewable mix in PG&E's and State electricity supply (60 percent by 2030 and 100 percent by 2045);
- ▶ carbon-free electricity supplied by MCE;
- ▶ improved building energy efficiency through compliance with Title 24 standards;

- ▶ reductions in on-road vehicle emissions factors from State vehicle standards as forecasted in EMFAC2021 and anticipated under ACCII; and
- ▶ reductions in off-road vehicle and equipment emissions factors forecasted in OFFROAD2021.

Without future legislative actions and despite future growth, emissions would decline from 2019 through 2045. Going forward, new legislative actions that would affect emissions may be adopted by State and federal agencies; however, because information regarding these regulatory changes is currently unavailable or not final, emissions reductions from future potential legislative actions are not quantified in this memorandum. Where new State regulations or programs are imminent and reasonably foreseeable, they can be incorporated as complementary actions to locally based GHG reduction measures.

## 4 GREENHOUSE GAS EMISSIONS FORECAST BY JURISDICTION

Various demographic factors were used to estimate future activity levels for each emissions sector and are shown in Table 18. Demographic and VMT projections were used to inform the emissions forecasts for each jurisdiction.

**Table 18 Napa County Regional Community Demographic and Vehicle Miles Traveled Forecasts**

Forecast Factor	2019	Data Source	2030	Data Source	Percent Change
<b>American Canyon</b>					
Population	20,996	DOF 2021	26,829	Cooper, pers. comm., 2022	28%
Households	5,955	DOF 2021	7,811	Cooper, pers. comm., 2022	31%
Employment	6,200	Plan Bay Area 2040	8,642	Cooper, pers. comm., 2022	39%
Annual VMT	154,556,520	MTC 2015	176,281,057	MTC 2015	14%
<b>Calistoga</b>					
Population	5,348	Mitchem, pers. comm., 2022	5,508	Mitchem, pers. comm., 2022	3%
Households	2,413	Mitchem, pers. comm., 2022	2,511	Mitchem, pers. comm., 2022	4%
Employment	2,811	Mitchem, pers. comm., 2022	3,333	Mitchem, pers. comm., 2022	19%
Annual VMT	28,922,407	MTC 2015	32,650,803	MTC 2015	13%
<b>Napa</b>					
Population	79,300	Walker, pers. comm., 2022	88,676	Walker, pers. comm., 2022	12%
Households	30,700	Walker, pers. comm., 2022	34,786	Walker, pers. comm., 2022	13%
Employment	51,200	Walker, pers. comm., 2022	56,857	Walker, pers. comm., 2022	11%
Annual VMT	472,155,386	MTC 2015	518,294,070	MTC 2015	10%
<b>St. Helena</b>					
Population	6,094	DOF 2021	6,655	Derosa, pers. comm., 2022	9%
Households	2,420	Derosa, pers. comm., 2022	2,620	Derosa, pers. comm., 2022	8%
Employment	5,762	Derosa, pers. comm., 2022	5,820	Derosa, pers. comm., 2022	1%
Annual VMT	51,605,089	MTC 2015	60,774,785	MTC 2015	18%
<b>Yountville</b>					
Population	2,793	DOF 2021	3,385	Shelton, pers. comm., 2022	21%
Households	1,754	U.S. Census, 2020	2,126	Scaled by Population <sup>1</sup>	21%
Employment	1,100	Bureau of Labor Statistics	1,333	Scaled by Population <sup>1</sup>	21%

Forecast Factor	2019	Data Source	2030	Data Source	Percent Change
Annual VMT	20,876,900	MTC 2015	23,197,949	MTC 2015	11%
Unincorporated County					
Population	25,077	DOF 2021	33,613	County of Napa 2008	34%
Households	5,666	County of Napa 2008	13,325	County of Napa 2008	135%
Employment	30,379	County of Napa 2008	38,322	County of Napa 2008	26%
Annual VMT	67,429,161	MTC 2015	73,023,186	MTC 2015	8%
Total					
Population	139,608	Calculated	164,666	Calculated	18%
Households	48,908	Calculated	63,178	Calculated	29%
Employment	97,452	Calculated	114,307	Calculated	17%
Annual VMT	795,545,462	Calculated	884,221,850	Calculated	11%

Notes: VMT = vehicle miles traveled, MTC = Metropolitan Transportation Commission, DOF = Department of Finance

<sup>1</sup> Forecasts for these metrics were not readily available and were subsequently scaled in proportion to the relative growth in population.

Sources: Cooper, pers. comm., 2022.; DOF 2019; Mitchem, pers. comm., 2022.; City of Napa, 2022: 2-21.; City of St. Helena, 2022: 2-78.; Shelton, pers. comm., 2022; County of Napa 2008.; U.S. Census Bureau, 2019; MTC 2015.

## 4.1 AMERICAN CANYON

### Emissions Summary

Table 19 shows a summary of American Canyon's emissions inventory and legislative-adjusted forecast. American Canyon's emissions are anticipated to decrease by four percent between 2019 and 2030. As shown in Table 19, on-road transportation will continue to remain the target sector in American Canyon's inventory in the future although emissions will decrease by 21 percent based on VMT forecasts from MTC for American Canyon and vehicle emission standards (MTC 2015). Emissions from on-road transportation are also anticipated to have the greatest decrease between 2019 and 2030 across all sectors.

**Table 19 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: American Canyon (MTCO<sub>2e</sub>/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	154	132	-14%	-22
Building Energy	20,964	22,879	9%	1,915
Imported Water	983	871	-11%	-112
Off-Road Equipment	8,998	11,278	25%	2,280
On-Road Transportation	91,830	72,392	-21%	-19,439
Solid Waste	25,938	33,145	28%	7,206
Wastewater	7,822	10,202	30%	2,380
Total	156,690	150,898	-4%	-5,791

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, American Canyon's building energy-related emissions are anticipated to increase by 9 percent between 2019 and 2030.

**Table 20 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: American Canyon (MTCO<sub>2e</sub>/year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	2,811	2,109	-25%
Natural Gas	13,562	16,165	19%
Subtotal	16,373	18,274	12%
<b>Non-Residential</b>			
Electricity	4,117	3,981	-3%
Natural Gas	474	624	32%
Subtotal	4,591	4,605	0%
<b>Total</b>	<b>20,964</b>	<b>22,879</b>	<b>9%</b>

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

American Canyon's on-road transportation emissions are anticipated to decrease by 21 percent between 2019 and 2030, consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards, CARB's ZEV mandate, and other adopted regulations as discussed in Section 4.2, which reduce average vehicle GHG emissions per mile.

**Table 21 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: American Canyon (MTCO<sub>2e</sub>/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	33,801	27,485	-19%
Non-Commercial Trips	58,030	44,907	-23%
<b>Total</b>	<b>91,830</b>	<b>72,392</b>	<b>-21%</b>

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

American Canyon's off-road equipment emissions are anticipated to increase by 25 percent between 2019 and 2030, consistent with various growth forecasts (e.g., population, employment) that best match each off-road equipment category, as shown in Table 11. Additionally, legislative adjustments, such as emissions standards for off-road equipment, were also considered, via factors available in CARB's OFFROAD 2021 model. In particular, most sectors are anticipated to increase by 30-40 percent except for light commercial equipment, pleasure craft, airport ground support equipment, and transportation refrigeration units. There are no pleasure craft or airports within American Canyon.

**Table 22 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts, American Canyon (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Industrial	349	492	41%
Airport Ground Support	0	0	0%
Commercial Harbor Craft	9	13	41%
Construction and Mining	1,410	1,956	39%
Lawn and Garden Equipment	4,320	5,794	34%
Light Commercial Equipment	1,545	1,174	-24%
Pleasure Craft	0	0	0%
Portable Equipment	642	907	41%
Railyard Operations	24	34	39%
Recreational Equipment	404	558	38%
Transport Refrigeration Units	294	350	19%
Total	8,998	11,278	25%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## AGRICULTURE

As an incorporated city, American Canyon does not have a substantial presence of agricultural activity within its jurisdiction. Table 23 shows that the limited agricultural activities in the city (e.g., agricultural offroad equipment, use of fertilizers, and limited livestock presence) would decline between 2019 and 2030 by 10 percent, in proportion with regional trends in the reduction in agricultural acres over the last decade. Emissions from irrigation pumps were excluded as no irrigation pump permits were identified in American Canyon.

**Table 23. Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: American Canyon (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Agricultural Offroad Equipment	84	68	-18%
Fertilizer Application	38	38	-1%
Livestock	32	32	-1%
Total	154	138	-10%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

### Waste Generation

American Canyon generated approximately 68,259 tons of solid waste in 2019 which generated 25,938 MTCO<sub>2</sub>e in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both American Canyon's waste disposal and related emissions are anticipated to increase by 28 percent from 2019 to 2030, commensurate with population growth.

**Table 24 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: American Canyon (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Annual waste tonnage delivered from jurisdiction (tons)	68,529	87,567	28%
Solid Waste Generation Emissions (MTCO <sub>2</sub> e/year)	25,938	33,145	28%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## Waste-in-Place

American Canyon does not have any landfills located within its jurisdiction. Thus, there are no waste-in-place emissions attributable to this jurisdiction.

## IMPORTED WATER

American Canyon is anticipated to increase its usage of imported water by 30 percent by 2030 from 2019 levels, commensurate with population growth. However, emissions from imported water are expected to decline by 11 percent over the same period. This is due to the change in emissions factors associated with the electricity used for pumping imported water (i.e., from the state water project). The average California electricity emissions factors, available from EPA's eGRID database for the CAMX region, are anticipated to decline by 33 percent between 2019 and 2030. Emissions associated with locally sourced water are captured in the building energy sector.

**Table 25 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: American Canyon (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Imported Water Usage (MG/year)	661	862	30%
Imported Water Emissions (MTCO <sub>2</sub> e/year)	983	871	-11%

Notes: MG = million gallons; BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## WASTEWATER

American Canyon's emissions from wastewater are anticipated to increase by proportionally with service population. These emissions would primarily come from central wastewater treatment plants. There are no known septic systems operating within American Canyon.

**Table 26 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: American Canyon (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Population served by WWTP	27,196	35,471	30%
WWTP Process Emissions	7,822	10,202	30%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 4.2 CALISTOGA

### Emissions Summary

Table 27 shows a summary of Calistoga’s emissions inventory and legislative-adjusted forecast. Calistoga’s emissions are anticipated to decline by 13 percent between 2019 and 2030. As shown in Table 27, on-road transportation will continue to remain the target sector in Calistoga’s inventory in the future although emissions will decrease by 22 percent based on VMT forecasts from MTC for Calistoga (MTC 2015). Emissions from on-road transportation are also anticipated to have the greatest decrease between 2019 and 2030.

**Table 27 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Calistoga (MTCO<sub>2</sub>e/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	274	235	-14%	-39
Building Energy	6,249	5,404	-14%	-846
Imported Water	229	169	-28%	-64
Off-Road Equipment	2,880	2,825	-2%	-54
On-Road Transportation	17,184	13,408	-22%	-3,776
Solid Waste	4,981	5,130	3%	149
Wastewater	1,992	2,159	8%	167
Total	33,789	29,330	-13%	-4,459

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, Calistoga’s building energy-related emissions are anticipated to decline by 14 percent between 2019 and 2030.

**Table 28 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Calistoga (MTCO<sub>2</sub>e/ year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	957	567	-41%
Natural Gas	3,910	3,990	2%
Subtotal	4,866	4,557	-6%
<b>Non-Residential</b>			
Electricity	1,383	846	-39%
Natural Gas <sup>1</sup>	-	-	-
Subtotal	1,383	846	-39%
Total	6,249	5,404	-14%

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

<sup>1</sup> No data was reported for non-residential natural gas use, possibly due to the utility’s 15/15 rule.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

Calistoga's on-road transportation emissions are anticipated to decrease by 22 percent between 2019 and 2030, consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards, CARB's ZEV mandate, and other adopted regulations as discussed in Section 4.2, which reduce average vehicle GHG emissions per mile.

**Table 29 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga (MTCO<sub>2</sub>e/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	6,325	5,091	-20%
Non-Commercial Trips	10,859	8,318	-23%
Total	17,184	13,408	-22%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

Consistent with various growth forecasts (e.g., population, employment) that best match each off-road equipment category (refer to Table 11), Calistoga's off-road equipment emissions are anticipated to decrease by two percent between 2019 and 2030, as shown in Table 30 below. Additional legislative adjustments, such as emissions standards for off-road equipment, were also taken into account via factors available in CARB's OFFROAD 2021 model. Most sectors are anticipated to increase by 15-19 percent except for airport ground support, pleasure craft, equipment, and transportation refrigeration units. There are no pleasure craft or airports within Calistoga.

**Table 30 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Industrial	158	189	19%
Airport Ground Support	0	0	0%
Commercial Harbor Craft	4	5	19%
Construction and Mining	423	487	15%
Lawn and Garden Equipment	1,100	1,139	4%
Light Commercial Equipment	700	450	-36%
Pleasure Craft	0	0	0%
Portable Equipment	291	347	19%
Railyard Operations	11	13	19%
Recreational Equipment	103	107	4%
Transport Refrigeration Units	88	87	-1%
Total	2,880	2,825	-2%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## AGRICULTURE

Calistoga does not have a substantial presence of agricultural activity within its jurisdiction. Table 31 shows that the limited agricultural activities in the city (e.g., agricultural offroad equipment, use of fertilizers, and limited livestock

presence) would decline between 2019 and 2030 by 10 percent, in proportion with regional trends in the reduction in agricultural acres over the last decade. Emissions from irrigation pumps were excluded as no irrigation pump permits were identified in Calistoga.

**Table 31 Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Agricultural Offroad Equipment	148	121	-18%
Fertilizer Application	68	68	-1%
Livestock	57	56	-1%
Total	274	245	-10%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

### Waste Generation

Calistoga generated approximately 12,513 tons of solid waste in 2019 which generated 4,981 MTCO<sub>2</sub>e in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both Calistoga's waste disposal and related emissions are anticipated to increase by three percent from 2019 to 2030, commensurate with population growth.

**Table 32 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga**

Source	2019	2030	Percent Change
Solid Waste Generation Tonnage	12,513	12,887	3%
Solid Waste Generation Emissions	4,981	5,130	3%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### Waste-in-Place

Calistoga does not have any landfills located within its jurisdiction. Thus, there are no waste-in-place emissions attributable to this jurisdiction.

## IMPORTED WATER

Calistoga is anticipated to increase its usage of imported water by eight by 2030 from 2019 levels, commensurate with population growth. However, emissions from imported water are expected to decline by 26 percent over the same period. This is due to the change in emissions factors associated with the electricity used for pumping imported water (i.e., from the state water project). The average California electricity emissions factors, available from EPA's eGRID database for the CAMX region, are anticipated to decline by 33 percent between 2019 and 2030. Emissions associated with locally sourced water are captured in the building energy sector.

**Table 33 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Imported Water Usage (MG/year)	154	167	8%
Imported Water Emissions (MTCO <sub>2e</sub> /year)	229	169	-26%

Notes: MG = million gallons; BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## WASTEWATER

Calistoga's emissions from wastewater are anticipated to increase proportionally with service population. These emissions would primarily come from central wastewater treatment plants. There are no known septic systems operating within Calistoga.

**Table 34 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Calistoga (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Service population served by WWTP	8,159	8,841	8%
WWTP Process Emissions	1,992	2,159	8%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 4.3 CITY OF NAPA

### Emissions Summary

Table 35 shows a summary of the 2019 emissions inventory and legislative-adjusted forecast for the City of Napa. Napa's emissions are anticipated to decline by eleven percent between 2019 and 2030. As shown in Table 35, on-road transportation will remain the highest emitting sector in Napa's inventory in the future although emissions will decrease as future transportation emissions decline by 23 percent based on future vehicle emissions standards and VMT forecasts from MTC for Napa (MTC 2015). Emissions from imported water will also decrease 23 percent between 2019 and 2030, due to the greening of the state's electricity grid.

**Table 35 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Napa (MTCO<sub>2e</sub>/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	1,086	1,014	-7%	-71
Building Energy	132,077	132,417	<1%	340
Imported Water	4,383	3,321	-23%	-63,479
Off-Road Equipment	47,238	46,949	-1%	-289
On-Road Transportation	280,533	217,054	-23%	-63,479
Solid Waste	34,236	38,283	12%	4,048
Wastewater	29,542	32,945	12%	3,403
Total	529,095	471,984	-11%	-57,110

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, City of Napa's building energy-related emissions are anticipated to increase by less than one percent between 2019 and 2030.

**Table 36 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Napa (MTCO<sub>2e</sub>/ year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	12,703	8,168	-36%
Natural Gas	64,979	70,286	8%
Subtotal	77,682	78,454	1%
<b>Non-Residential</b>			
Electricity	13,881	9,833	-29%
Natural Gas	40,515	44,131	9%
Subtotal	54,396	53,964	-1%
<b>Total</b>	<b>132,077</b>	<b>132,417</b>	<b>&lt;1%</b>

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

Consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards per CARB's ZEV mandate, and other adopted regulations which can reduce average vehicle GHG emissions per mile Napa's on-road transportation emissions are anticipated to decrease by 23 percent between 2019 and 2030, see Table 37.

**Table 37 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2e</sub>/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	103,259	82,408	-20%
Non-Commercial Trips	177,275	134,646	-24%
<b>Total</b>	<b>280,533</b>	<b>217,054</b>	<b>-23%</b>

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

Table 38 displays inventory and legislative adjusted forecasts for off-road equipment for Napa. As shown in Table 37, Napa's off-road equipment emissions are anticipated to decrease by one percent between 2019 and 2030. Emissions generated from light commercial equipment are expected to decrease the most (40 percent) with consideration of future emission standards for off-road equipment from CARB's OFFROAD 2021 model. Most off-road equipment sources are anticipated to increase 11-16 percent except construction and mining equipment, recreational equipment, transportation refrigeration units, and light commercial equipment.

**Table 38 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Industrial	2,884	3,217	12%
Airport Ground Support	0	0	0%
Commercial Harbor Craft	74	82	11%
Construction and Mining	6,768	8,020	19%
Lawn and Garden Equipment	16,317	18,631	14%
Light Commercial Equipment	12,758	7,664	-40%
Pleasure Craft	0	0	0%
Portable Equipment	5,300	5,910	11%
Railyard Operations	201	224	11%
Recreational Equipment	1,526	1,766	16%
Transport Refrigeration Units	1,410	1,435	2%
Total	47,238	46,949	-1%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## AGRICULTURE

As an incorporated city, Napa does not have a substantial presence of agricultural activity within its jurisdiction. Table 39 shows that the limited agricultural activities in the city (e.g., agricultural offroad equipment, use of fertilizers, and limited livestock presence) would decline between 2019 and 2030 by six percent, in proportion with regional trends in the reduction in agricultural acres over the last decade. Emissions from irrigation pumps were excluded as no irrigation pump permits were identified in Napa.

**Table 39 Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Agricultural Offroad Equipment	346	283	-18%
Fertilizer Application	159	157	-1%
Irrigation Pumps	448	443	-1%
Livestock	133	132	-1%
Total	1,086	1,015	-6%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

### Waste Generation

The City of Napa generated approximately 50,755 tons of solid waste in 2019 which generated 34,236 MTCO<sub>2</sub>e in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both Napa's waste disposal and related emissions are anticipated to increase by 12 percent from 2019 to 2030, commensurate with population growth..

**Table 40 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Solid Waste Generation Tonnage	50,755	56,756	12%
Solid Waste Generation Emissions	34,236	38,283	12%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## Waste-in-Place

Napa does not have any landfills located within its jurisdiction. Thus, there are no waste-in-place emissions attributable to this jurisdiction.

## IMPORTED WATER

The City of Napa is anticipated to increase its usage of imported water by 12 percent by 2030 from 2019 levels, commensurate with population growth. However, emissions from imported water are expected to decline by 26 percent over the same period. This is due to the change in emissions factors associated with the electricity used for pumping imported water (i.e., from the state water project). The average California electricity emissions factors, available from EPA's eGRID database for the CAMX region, are anticipated to decline by 33 percent between 2019 and 2030. Emissions associated with locally sourced water are captured in the building energy sector.

**Table 41 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Imported Water Usage (MG/year)	2,948	3,288	12%
Imported Water Emissions (MTCO <sub>2</sub> e/year)	4,383	3,258	-26%

Notes: MG = million gallons; BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## WASTEWATER

Napa's emissions from wastewater are anticipated to increase proportionally with service population. These emissions would primarily come from central wastewater treatment plants. There are no known septic systems operating within Napa.

**Table 42 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Napa (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Service population served by WWTP	130,500	145,533	12%
WWTP Process Emissions	29,542	32,945	12%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 4.4 ST. HELENA

### Emissions Summary

Table 43 shows a summary of the 2019 emissions inventory and legislative-adjusted forecast for the City of St. Helena. St. Helena's emissions are anticipated to decrease by 11 percent between 2019 and 2030, largely due to the decrease in on-road transportation emissions. As shown in Table 43, although on-road transportation emissions are anticipated to decrease by 19 percent based on change in vehicle emissions standards and VMT forecasts St. Helena, this sector will remain the highest emitting sector in the city's inventory by 2030 (MTC 2015).

**Table 43 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: St. Helena (MTCO<sub>2e</sub>/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	4,415	4,273	-3%	-141
Building Energy	14,296	13,321	-7%	-975
Imported Water	285	200	-30%	-85
Off-Road Equipment	4,502	4,079	-9%	-423
On-Road Transportation	30,661	24,958	-19%	-5,704
Solid Waste	5,676	6,199	9%	523
Wastewater	2,270	2,389	5%	119
Total	62,105	55,421	-11%	-6,684

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, St. Helena's building energy-related emissions are anticipated to decrease by seven percent between 2019 and 2030.

**Table 44 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: St. Helena (MTCO<sub>2e</sub>/ year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	1,434	878	-39%
Natural Gas	5,684	6,046	6%
Subtotal	7,119	6,924	-3%
<b>Non-Residential</b>			
Electricity	2,122	1,300	-39%
Natural Gas	5,056	5,097	1%
Subtotal	7,177	6,397	-11%
Total	14,296	13,321	-7%

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

Consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards per CARB's ZEV mandate, and other adopted regulations which can reduce average vehicle GHG emissions per mile St. Helena's on-road transportation emissions are anticipated to decrease by 19 percent between 2019 and 2030, see Table 45.

**Table 45 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2e</sub>/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	11,286	9,476	-16%
Non-Commercial Trips	19,376	15,482	-20%
Total	30,661	24,958	-19%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

Table 46 displays inventory and legislative adjusted forecasts for off-road equipment for St. Helena. As shown in Table 46, St. Helena's off-road equipment emissions are anticipated to decrease by nine between 2019 and 2030. Emissions generated from light commercial equipment are expected to decrease the most (46 percent) with consideration of future emission standards for off-road equipment from CARB's OFFROAD 2021 model. Most off-road equipment sources are anticipated to increase by less than 10 percent except construction and mining, lawn and garden equipment, recreational equipment, transportation refrigeration units, and light commercial equipment.

**Table 46 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Industrial	325	329	1%
Airport Ground Support	0	0	0%
Commercial Harbor Craft	8	8	1%
Construction and Mining	615	687	12%
Lawn and Garden Equipment	1,254	1,392	11%
Light Commercial Equipment	1,436	782	-46%
Pleasure Craft	0	0	0%
Portable Equipment	596	603	1%
Railyard Operations	23	23	1%
Recreational Equipment	117	132	12%
Transport Refrigeration Units	128	123	-4%
Total	4,502	4,079	-9%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## AGRICULTURE

St. Helena does not have a substantial presence of agricultural activity within its jurisdiction. Table 47 shows that the limited agricultural activities in the city (e.g., agricultural offroad equipment, use of fertilizers, and limited livestock

presence) would decline by five percent between 2019 and 2030, in proportion with regional trends in the reduction in agricultural acres over the last decade.

**Table 47 Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Agricultural Offroad Equipment	971	796	-18%
Fertilizer Application	447	442	-1%
Irrigation Pumps	2,623	2,595	-1%
Livestock	373	370	-1%
Total	4,415	4,203	-5%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

### Waste Generation

St. Helena generated approximately 14,258 tons of solid waste in 2019 which generated 5,676 MTCO<sub>2</sub>e in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both St. Helena's waste disposal and related emissions are anticipated to increase by nine percent from 2019 to 2030, commensurate with population growth.

**Table 48 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Solid Waste Generation Tonnage	14,258	15,571	9%
Solid Waste Generation Emissions	5,676	6,199	9%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### Waste-in-Place

St. Helena does not have any landfills located within its jurisdiction. Thus, there are no waste-in-place emissions attributable to this jurisdiction.

## IMPORTED WATER

St. Helena is anticipated to increase its usage of imported water by five percent by 2030 from 2019 levels, commensurate with population growth. However, emissions from imported water are expected to decline by 29 percent over the same period. This is due to the change in emissions factors associated with the electricity used for pumping imported water (i.e., from the state water project). The average California electricity emissions factors, available from EPA's eGRID database for the CAMX region, are anticipated to decline by 33 percent between 2019 and 2030. Emissions associated with locally sourced water are captured in the building energy sector.

**Table 49 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Imported Water Usage (Gallons/year)	191	201	5%
Imported Water Emissions	285	203	-29%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## WASTEWATER

St. Helena's emissions from wastewater are anticipated to increase by proportionally with service population. These emissions would primarily come from central wastewater treatment plants. There are no known septic systems operating within St. Helena.

**Table 50 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: St. Helena (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Service population served by WWTP	11,856	12,475	5%
WWTP Process Emissions	2,270	2,389	5%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 4.5 YOUNTVILLE

### Emissions Summary

Table 51 shows a summary of the 2019 emissions inventory and legislative-adjusted forecast for the Town of Yountville. Yountville's emissions are anticipated to decline by 12 percent 2019 and 2030. As shown in Table 51, on-road transportation will remain the highest emitting sector in Yountville's inventory in the future although emissions are anticipated to decrease by 23 percent based on vehicle emissions standards and VMT forecasts for Yountville (MTC 2015).

**Table 51 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Yountville (MTCO<sub>2</sub>e/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	75	65	-14%	-11
Building Energy	5,062	4,386	-13%	-676
Imported Water	65	53	-18%	-12
Off-Road Equipment	1,328	1,501	13%	172
On-Road Transportation	12,404	9,526	-23%	-2,878
Solid Waste	2,601	3,153	21%	551
Wastewater	1,040	1,261	21%	221
Total	22,576	19,944	-12%	-2,632

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, Yountville's building energy-related emissions are anticipated to decrease by 13 percent between 2019 and 2030.

**Table 52 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Yountville (MTCO<sub>2</sub>e/ year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	507	347	-32%
Natural Gas	2,313	2,651	15%
Subtotal	2,819	2,998	6%
<b>Non-Residential</b>			
Electricity	2,242	1,387	-38%
Natural Gas <sup>1</sup>	-	-	-
Subtotal	2,242	1,387	-38%
<b>Total</b>	<b>5,062</b>	<b>4,386</b>	<b>-13%</b>

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

<sup>1</sup>No data was reported for non-residential natural gas use, possibly due to the utility's 15/15 rule.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

Consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards per CARB's ZEV mandate, and other adopted regulations which can reduce average vehicle GHG emissions per mile Yountville's on-road transportation emissions are anticipated to decrease by 23 percent between 2019 and 2030, see Table 53.

**Table 53 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2</sub>e/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	4,566	3,617	-21%
Non-Commercial Trips	7,838	5,910	-25%
<b>Total</b>	<b>12,404</b>	<b>9,526</b>	<b>-23%</b>

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

Table 54 displays inventory and legislative adjusted forecasts for off-road equipment for Yountville. As shown in Table 54, Yountville's off-road equipment emissions are anticipated to increase by 13 percent between 2019 and 2030. Most off-road equipment sources are anticipated to increase by 21-26 percent except construction and mining, recreational equipment, transportation refrigeration units, and light commercial equipment. Emissions generated from light commercial equipment are expected to decrease the most (46 percent) due to future emission standards for off-road equipment from CARB's OFFROAD 2021 model.

**Table 54 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Industrial	62	76	22%
Airport Ground Support	0	0	0%
Commercial Harbor Craft	2	2	22%
Construction and Mining	202	260	29%
Lawn and Garden Equipment	575	723	26%
Light Commercial Equipment	274	180	-34%
Pleasure Craft	0	0	0%
Portable Equipment	114	139	22%
Railyard Operations	4	5	21%
Recreational Equipment	54	69	29%
Transport Refrigeration Units	42	47	11%
Total	1,328	1,501	13%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## AGRICULTURE

Yountville does not have a substantial presence of agricultural activity within its jurisdiction. Table 55 shows that the limited agricultural activities in the town (e.g., agricultural offroad equipment, use of fertilizers, and limited livestock presence) would decline by 10 percent between 2019 and 2030, in proportion with regional trends in the reduction in agricultural acres over the last decade. Emissions from irrigation pumps were excluded as no irrigation pump permits were identified in Yountville.

**Table 55 Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Agricultural Offroad Equipment	41	33	-18%
Fertilizer Application	19	19	-1%
Livestock	16	16	-1%
Total	75	67	-10%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

### Waste Generation

Yountville generated approximately 6,535 tons of solid waste in 2019 which generated 2,601 MTCO<sub>2e</sub> in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both Yountville's waste disposal and related emissions are anticipated to increase by 21 percent from 2019 to 2030, commensurate with population growth.

**Table 56 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Solid Waste Generation Tonnage	6,535	7,920	21%
Solid Waste Generation Emissions	2,601	3,153	21%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## Waste-in-Place

The Town of Yountville does not have any landfills located within its jurisdiction. Thus, there are no waste-in-place emissions attributable to this jurisdiction.

## IMPORTED WATER

Yountville is anticipated to increase its usage of imported water by 21 percent by 2030 from 2019 levels, commensurate with population growth. However, emissions from imported water are expected to decline by 18 percent over the same period. This is due to the change in emissions factors associated with the electricity used for pumping imported water (i.e., from the state water project). The average California electricity emissions factors, available from EPA's eGRID database for the CAMX region, are anticipated to decline by 33 percent between 2019 and 2030. Emissions associated with locally sourced water are captured in the building energy sector.

**Table 57 Imported Water GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Imported Water Usage (Gallons/year)	43	53	21%
Imported Water Emissions	65	53	-18%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## WASTEWATER

Yountville's emissions from wastewater are anticipated to increase by proportionally with service population. These emissions would primarily come from central wastewater treatment plants. There are no known septic systems operating within Yountville.

**Table 58 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Yountville (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Service population served by WWTP	3,893	4,718	21%
WWTP Process Emissions	1,040	1,261	21%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent; WWTP = wastewater treatment plants

Source: Ascent Environmental 2022.

## 4.6 UNINCORPORATED NAPA COUNTY

### Emissions Summary

Table 59 shows a summary of the 2019 emissions inventory and legislative-adjusted forecast for the Unincorporated County. The Unincorporated County emissions are anticipated to increase by 4 percent between 2019 and 2030 based on demographic and employment forecasts from the County's General Plan estimates and legislative adjustments (County of Napa 2008). As shown in Table 59, solid waste will remain the highest emitting sector in the County's inventory. Emissions from On-Road Transportation are anticipated to have the greatest decrease between 2019 and 2030, with a 25 percent reduction. Note that the Unincorporated County does not import water from outside the county, thus imported water emissions are excluded in the summary below.

**Table 59 Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Sector	2019	2030	Percent Change	Difference
Agriculture	97,378	85,826	-12%	-11,552
Building Energy	98,596	108,037	10%	9,442
Off-Road Equipment	50,602	63,989	26%	13,387
On-Road Transportation	40,063	29,988	-25%	-10,076
Solid Waste	125,429	138,611	11%	13,181
Wastewater	3,191	4,140	30%	948
Total	618,058	684,869	11%	66,811

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### BUILDING ENERGY

Accounting for population and employment growth, changes in utility emission factors, and greater efficiencies in newer construction per Title 24 Building Energy Efficiency Standards, the Unincorporated County's building energy-related emissions are anticipated to increase by 10 percent between 2019 and 2030.

**Table 60 Building Energy GHG Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Energy Type	2019	2030	Percent Change
<b>Residential</b>			
Electricity	7,869	6,205	-21%
Natural Gas	50,186	61,987	24%
Subtotal	58,055	68,192	17%
<b>Non-Residential</b>			
Electricity	17,945	12,477	-30%
Natural Gas	22,596	27,368	21%
Subtotal	40,540	39,845	-2%
Total	98,596	108,037	10%

Notes: Totals may not sum due to rounding. BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## ON-ROAD TRANSPORTATION

Consistent with the VMT forecasts provided by MTC and anticipated improvement in vehicle emissions standards per CARB's ZEV mandate, and other adopted regulations which can reduce average vehicle GHG emissions per mile on-road transportation emissions in the county are anticipated to decrease by 25 percent between 2019 and 2030, see Table 61.

**Table 61 On-Road Transportation GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County MTCO<sub>2e</sub>/year)**

Trip Type	2019	2030	Percent Change
Commercial Trips	14,746	11,385	-23%
Non-Commercial Trips	25,317	18,602	-27%
Total	40,063	29,988	-25%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## OFF-ROAD EQUIPMENT

Table 62 displays inventory and legislative adjusted forecasts for off-road equipment for unincorporated Napa County. As shown in Table 61, off-road equipment emissions in the county are anticipated to increase by 26 percent between 2019 and 2030. Most off-road equipment sources are anticipated to increase by 26-38 percent except lawn and garden equipment, light commercial equipment, recreational equipment, and transportation refrigeration units. Emissions generated from light commercial equipment are expected to decrease the most (31 percent) due to future emission standards for off-road equipment (CARB 2021).

**Table 62 Off-Road Transportation Vehicles and Equipment GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County (MTCO<sub>2e</sub>/year)**

Source	2019	2030	Percent Change
Industrial	1,711	2,176	27%
Airport Ground Support	<1	<1	18% <sup>1</sup>
Commercial Harbor Craft	44	56	27%
Construction and Mining	2,876	3,967	38%
Lawn and Garden Equipment	5,160	7,336	42%
Light Commercial Equipment	7,569	5,187	-31%
Pleasure Craft	28,896	39,691	37%
Portable Equipment	3,145	4,005	27%
Railyard Operations	120	151	26%
Recreational Equipment	483	711	47%
Transport Refrigeration Units	599	710	18%
Total	50,602	63,989	26%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent.

<sup>1</sup> This represents a change from 163 to 192 grams of CO<sub>2e</sub> per year, per outputs from OFFROAD2021 and the region's population growth.

Source: Ascent Environmental 2022.

## AGRICULTURE

Most agricultural activity within the region takes places in the unincorporated county. Table 63 shows that agricultural activities in the county (e.g., agricultural offroad equipment, use of fertilizers, and livestock) would decline between 2019

and 2030 by 12 percent, in proportion with regional trends in the reduction in both rangeland and non-rangeland agricultural acres over the last decade. The greatest decline is anticipated in the livestock category (38 percent decrease), which is proportional to the anticipated decline in rangeland and pastureland acreage. Emissions from agricultural offroad equipment, although adjusted for growth in non-rangeland acreage, would have the next sharpest decline (14 percent decrease), primarily resulting from improvements in offroad emissions standards and requirements, as modeled in OFFROAD2021. Emissions from other agricultural sources (i.e., fertilizer application and irrigation pumps) are anticipated to increase by four percent, commensurate with historical trends of growth in non-rangeland agricultural land (e.g., fruit and nut crops, olives, hay, vegetables).

**Table 63 Agricultural GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Agricultural Offroad	46,092	39,837	-14%
Fertilizer Application	21,216	22,134	4%
Irrigation Pumps	12,347	12,880	4%
Livestock	17,723	10,975	-38%
Total	97,378	85,826	-12%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## SOLID WASTE

Solid waste emissions in the Unincorporated County are anticipated to increase by 11 percent from 2019 to 2030 from 125,428 to 138,611 MTCO<sub>2</sub>e/year, largely due to the expected increases in waste-in-place emissions at the two landfills located within the area.

### Waste Generation

Unincorporated Napa County generated approximately 28,105 tons of solid waste in 2019 which generated 10,810 MTCO<sub>2</sub>e in emissions. Solid waste generation is anticipated to grow proportionally to population growth. Given that waste generation emissions are proportional to amount of waste generated, both the Unincorporated County's waste disposal and related emissions are anticipated to increase by 34 percent from 2019 to 2030, commensurate with population growth.

**Table 64 Solid Waste GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Solid Waste Generation Tonnage	28,105	37,671	34%
Solid Waste Generation Emissions	10,810	14,490	34%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

### Waste-in-Place

Two major landfills are located within the Unincorporated County: Clover Flat Landfill and American Canyon Landfill. Table 65 shows that emissions from waste-in-place from both landfills are anticipated to increase by eight percent from 2019 to 2030. Section 3.5 describes the methodology used to quantify these forecasts.

**Table 65 Waste in Place GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
American Canyon Landfill	42,800	40,084	-6%
Clover Flat Landfill	71,819	84,036	17%
Total	114,619	124,121	8%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## IMPORTED WATER

Unincorporated Napa County did not utilize imported water in 2019, thus this sector was not further evaluated for 2030 forecasts.

## WASTEWATER

Emissions from wastewater are anticipated to increase proportionally with service population in the unincorporated county. These emissions would primarily come from septic systems as the majority of the population in the Unincorporated County resides in rural areas. A smaller proportion of the population are location near the incorporated cities and have access to central wastewater treatment plants.

**Table 66 Wastewater GHG Emissions Inventory and Legislative-Adjusted BAU Forecasts: Unincorporated County (MTCO<sub>2</sub>e/year)**

Source	2019	2030	Percent Change
Service population served by septic systems	24,459	31,797	30%
Service population served by WWTP	618	803	30%
Septic Process Emissions	2,961	3,841	30%
WWTP Process Emissions	230	299	30%
Total Emissions	3,191	4,140	30%

Notes: BAU = business-as-usual; GHG = greenhouse gas; MTCO<sub>2</sub>e = metric tons of carbon dioxide equivalent.

Source: Ascent Environmental 2022.

## 5 REFERENCES

- California Air Resources Board. 2021 (September). *Landfill Gas Tool*. Available: <https://ww2.arb.ca.gov/resources/documents/carbs-landfill-gas-tool>. Accessed August 31, 2022.
- . 2022. Proposed Advanced Clean Cars II Regulations: All New Passenger Vehicles Sold in California to be Zero Emissions by 2035. Available: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii>. Accessed November 21, 2022.
- CARB. See California Air Resources Board.
- California Department of Finance. 2021. E-4 Population Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark. Available: <https://dof.ca.gov/forecasting/demographics/estimates/>. Accessed June 7, 2022.
- California Energy Commission. 2021. 2020 POWER CONTENT LABEL Pacific Gas and Electric Company. Available: <https://www.energy.ca.gov/filebrowser/download/3882>. Accessed June 7, 2022.
- CEC. See California Energy Commission.
- City of Napa, 2022 (February). *Public Review Draft of 2040 General Plan*. Available: <https://napa2040.com/>. Accessed July 1, 2022.
- City of St. Helena, 2022 (June). *Public Review Draft 2023-2031 Housing Element*. Available: [https://sthelenahousing.com/images/docs/SHHEU\\_Housing\\_Element\\_2022\\_06\\_29\\_RLc\\_Web.pdf](https://sthelenahousing.com/images/docs/SHHEU_Housing_Element_2022_06_29_RLc_Web.pdf). Accessed July 5, 2022.
- Cooper, Brent. Community Development Director. American Canyon, CA. July 13, 2022 — email to Deborah Elliott of the County of Napa regarding Forecasting Data for 2019 and 2030.
- County of Napa. 2008 (June). Napa County General Plan. Available: <https://www.countyofnapa.org/DocumentCenter/View/3334/Napa-County-General-Plan---Complete-Document-PDF>. Accessed August 16, 2022.
- . 2021. Napa County Agricultural Crop Reports. Available: <https://www.countyofnapa.org/Archive.aspx?AMID=39>. Accessed September 14, 2022.
- CPUC. See California Public Utilities Commission
- Derosa, Maya. Planning and Building Director. St. Helena, CA. July 5, 2022 — email to Deborah Elliott of the County of Napa regarding Forecasting Data for 2019 and 2030.
- DOF. See California Department of Finance
- EPA. See U.S. Environmental Protection Agency.
- Herrick, Mariela. Community Development Manager. Marin Clean Energy. San Rafael, CA. January 12, 2022—email to Deborah Elliott of the County of Napa regarding the 2019 customer energy purchases by jurisdiction.
- ICLEI. See ICLEI – Local Governments for Sustainability.
- ICLEI – Local Governments for Sustainability. 2019. *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*. Version 1.2.
- Marin Clean Energy. 2020. MCE 2019 Emission Factor Certification Template, as provided by The Climate Registry. Available: [https://www.mcecleanenergy.org/wp-content/uploads/2020/11/MCE-2019-Emission-Factor-Certification-Template-CY\\_2019.pdf](https://www.mcecleanenergy.org/wp-content/uploads/2020/11/MCE-2019-Emission-Factor-Certification-Template-CY_2019.pdf). Accessed October 21, 2022.
- . 2021. 2021 Impact Report. Available: [MCE Media Kit and Resources for Press and Media Outlets \(mcecleanenergy.org\)](https://www.mcecleanenergy.org). Accessed August 25, 2022.

- Metropolitan Transportation Commission. 2015. Vehicle Miles Travelled Data Portal. Available: <http://capvmt.us-west-2.elasticbeanstalk.com/data>. Accessed June 7, 2022.
- MTC. See Metropolitan Transportation Commission.
- Mitchem, Jeff. Planning & Building Directory. Calistoga, CA. July 1, 2022 — email to Deborah Elliott of the County of Napa regarding Forecasting Data for 2019 and 2030.
- Shelton, Kirsty. Planning & Building Director. Yountville, CA. August 16, 2022 — email to Deborah Elliott of the County of Napa regarding Forecasting Data for 2019 and 2030.
- The Climate Registry. 2020. *2020 Default Emission Factor Document*. Available: <https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf>. Accessed August 5, 2022.
- Walker, Michael. Senior Planner – Advanced Planning. Napa, CA. July 14, 2022 — email to Deborah Elliott of the City of Napa regarding Forecasting Data for 2019 and 2030.
- U.S. Census Bureau, 2019. American Community Survey 2015-2019 Data Estimates. Available: <https://data.census.gov/cedsci/>. Accessed August 31, 2022.
- U.S. Environmental Protection Agency. 2021 (February). *Emissions & Generation Integrated Database (eGRID)*. Available: <https://www.epa.gov/egrid/download-data>. Accessed August 1, 2022.
- \_\_\_\_\_. 2022. EPA Facility Level Information on Greenhouse Gases Tool. Available: <http://ghgdata.epa.gov/ghgp/main.do>. Accessed June 7, 2022.

# Memo



455 Capitol Mall, Suite 300  
Sacramento, CA 95814  
916.444.7301

**Date:** November 21, 2022

**To:** David Morrison and Deborah Elliott (County of Napa)

**From:** Honey Walters and Brenda Hom (Ascent Environmental, Inc.)

**Subject:** Final Napa County Regional 2019 Community Greenhouse Gas Inventory Update Summary

---

## INTRODUCTION

This document includes a 2019 communitywide greenhouse gas (GHG) inventory update for the Napa County region (region), including the 2019 GHG inventories for each of the six jurisdictions: American Canyon, Calistoga, the City of Napa, St. Helena, Yountville, and the unincorporated areas of Napa County (Unincorporated County). GHG emissions are attributed to each jurisdiction based on whether the emissions occur within, or originate from activities in, their jurisdictional boundary. The update year of 2019 was selected because this was the latest year in which data were most complete and excludes data anomalies due to the COVID-19 pandemic starting in 2020, such as reduced transportation emissions from increase telecommuting. The 2019 regional GHG inventory is an update to the 2005 regional inventory that was performed in the 2009 *Napa Countywide Community Climate Action Framework* (Napa County Transportation & Planning Agency [NCTPA] 2009). This effort differs from the draft Napa County Climate Action Plan (Napa County CAP) completed in 2018, which focuses on activities and emissions from the Unincorporated County only (County of Napa 2018). Quantification of the 2019 regional GHG inventory update is based on the International Council for Local Environmental Initiatives (ICLEI) methodologies, specifically, the *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions* Version 1.2 (Community Protocol). In addition, to provide locally relevant emissions, additional protocols were used to refine certain sectors (e.g., agriculture, off-road equipment). Consistent with this protocol and past inventories, the community GHG inventories are divided into seven emissions sectors, or sources of emissions:

- ▶ Building Energy – Including electricity and natural gas consumption in residential and non-residential buildings.
- ▶ On-road transportation – Including on-road vehicles, such as passenger cars, trucks, and buses.
- ▶ Off-road equipment – Including off-road equipment, such as construction equipment, waterborne vessels, and lawn and garden equipment. Excludes agricultural equipment.
- ▶ Agriculture – Including livestock emission from enteric fermentation and manure management, off-road agricultural equipment, stationary diesel equipment (e.g., irrigation pumps), fertilizer and pesticide use, and residue burning.
- ▶ Solid waste – Including methane emissions from annual generation of solid waste and from waste accumulated in place at landfills inside the Napa region.
- ▶ Imported Water – Including water imported from outside of the Napa region.
- ▶ Wastewater – Including methane and nitrous oxide emissions from treatment of wastewater generated in the region.

The regional inventory update relies on the best available and most up-to-date data and calculation methodologies to provide a foundation upon which the County of Napa (County) can coordinate with the incorporated cities and town and other relevant stakeholders to plan and act to reduce regional GHG emissions. This approach differs somewhat from the approach used to develop the past inventories in the region. For example, the 2019 regional inventory includes water- and wastewater-related emissions, which were not included in the 2005 regional inventory. A comparison is provided for informational purposes only and uses an adjusted 2019 inventory, matching the basic assumptions and range of emissions sources of the 2005 inventory, to provide a direct comparison.

## ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of five parts:

- ▶ Section 1: Regional Inventory Boundary summarizes the scope of the inventory evaluated for the region.
- ▶ Section 2: Summary of Inventory Results by Sector summarizes the 2019 regional GHG emissions inventory and provides a comparison of 2019 emissions with past inventories from 2005 and 2014 by sector, including any differences in methodology and data.
- ▶ Section 3: Summary of Inventory Results by Jurisdiction summarizes the 2019 regional GHG emissions inventory by each jurisdiction, including insights into the reasons for any differences in methodology and data.
- ▶ Section 4: Comparison with the 2005 Regional Inventory compares the 2019 regional GHG emissions inventory to the 2005 regional inventory, adjusting for methodological differences.
- ▶ Section 5: Data, Methods, and Assumptions presents the methods and data used to develop the 2019 inventory. This includes details on what sources the inventory includes and excludes.

## REGIONAL INVENTORY BOUNDARY

The inventory aims to estimate GHG emissions from sources within the six jurisdictions in the region, namely American Canyon, Calistoga, Napa, Saint Helena, Yountville, and Unincorporated. This inventory quantifies three main GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Other GHGs, such as hydrofluorocarbons and other short-lived climate pollutants, will be addressed in a separate memorandum. The region's inventory only includes emissions generated from sources and activities occurring within the boundaries of each jurisdiction; it does not account for GHG emissions generated from activities occurring outside of the respective jurisdiction, as a given jurisdiction does not have operational control of or authority over those sources.

Additionally, the regional inventory does not account for embedded or lifecycle GHG emissions. The regional inventory evaluates emissions using the production-based approach; therefore, the regional inventory does not consider the upstream emissions generated by the consumption of goods and services within the community.

The GHG emissions sectors and sources included and excluded in the region's 2019 community inventory are presented in Table 1 below. Table 1 identifies the protocol that provided the methodology for estimating GHG emissions from each emissions source. Emissions sources that identify multiple protocols used a combination of data and methods from those protocols. Fertilizer application and off-road vehicles and equipment calculations used methods consistent with Intergovernmental Panel on Climate Change (IPCC) and the Community Protocol but substituted locally specific data obtained from the California Air Resources Board (CARB). A detailed description of how each sector was quantified is discussed in Section 4.

**Table 1 Summary of Sectors and Sources for the 2019 Napa County Regional GHG Inventory**

Sector	Included	Excluded	Protocol(s)
<b>Building Energy</b>			
<i>Electricity</i>	Emissions associated with all electricity consumed within each jurisdiction	None	ICLEI
<i>Natural Gas</i>	Emissions from natural gas consumed within each jurisdiction	Emissions from propane and natural gas stationary source engines due to lack of readily variable data.	ICLEI
<b>On-Road Transportation</b>			
<i>On-Road Transportation</i>	Emissions from 100 percent of trips within each jurisdiction (internal-internal) and 50 percent of trips starting or ending outside each jurisdiction (internal-external and external-internal)	Emissions from 100 percent of pass-through trips starting and ending outside each jurisdiction (external-external)	ICLEI/ RTAC
<b>Off-Road Equipment</b>			
<i>Off-Road Equipment</i>	Emissions from off-road equipment within each jurisdiction	Emissions associated with aircraft operations were not included because they are outside of the control of the jurisdictions within the region. Entertainment equipment (e.g., filming equipment) were excluded due to its exclusion in CARB's OFFROAD2021 model, despite being included in the previous OFFROAD2007 model.	ICLEI/ CARB
<b>Agriculture</b>			
<i>Livestock– Enteric Fermentation</i>	Emissions from enteric fermentation from livestock within each jurisdiction	None	ICLEI
<i>Livestock– Manure Management</i>	Emissions associated with manure management practices within each jurisdiction	None	ICLEI
<i>Fertilizer Application</i>	Emissions associated with fertilizer use within each jurisdiction	Emissions associated with pesticide use within each jurisdiction.	CARB/ IPCC
<i>Agricultural Off-Road Equipment</i>	Emissions from agricultural off-road vehicles and equipment within each jurisdiction	None	ICLEI/ CARB
<i>Agricultural Diesel Engines</i>	Emissions from diesel fuel use for stationary engines (e.g., irrigation pumps) within each jurisdiction	None	CARB
<i>Open Burning</i>	None	No emissions from open burning of agricultural vegetative matter were reported for this year. Emissions from wildfires and prescribed forest fires are excluded as they occur apart from any jurisdictional control. This sector was not included in the 2005 inventory. <sup>1</sup>	None
<i>Carbon storage and sequestration</i>	None at this time	Emissions reductions or additions associated with changes to carbon sequestration or carbon storage rates in the region. These will be addressed in a separate memorandum.	

Sector	Included	Excluded	Protocol(s)
<b>Solid Waste</b>			
<i>Community-Generated Solid Waste</i>	Emissions from all waste generated by each jurisdiction	Emissions from waste generated outside of each jurisdiction but disposed of within the jurisdiction.	ICLEI
<i>Waste-in-Place</i>	Emissions from waste accumulated at landfills within each jurisdiction.	Emissions from waste accumulated at landfills outside each jurisdiction.	ICLEI
<b>Wastewater Treatment</b>			
<i>Wastewater Treatment</i>	Emissions associated with wastewater generated by each jurisdiction (including treatment in onsite septic systems and at centralized WWTPs)	Emissions from wastewater generated outside of each jurisdiction but treated within each jurisdiction (including treatment at centralized WWTPs)	ICLEI
<b>Imported Water</b>			
<i>Imported Water</i>	Emissions associated with imported water from outside the region	Disaggregated water usage-related emissions associated with each jurisdiction. These are assumed to be included in the building energy sector.	ICLEI

Notes: GHG = greenhouse gas; CARB = California Air Resources Board; ICLEI = ICLEI – Local Governments for Sustainability; VMT = vehicle miles traveled; RTAC = Regional Targets Advisory Committee; IPCC = Intergovernmental Panel on Climate Change; WWTP = wastewater treatment plant.

<sup>1</sup> Emissions from open burning are typically quantified using permit data obtained from the local air pollution control district (i.e., air quality management district), which specify the number of acres permitted for open burning operations. Bay Area Quality Management District (BAAQMD) only reported data for prescribed forest or open space burning. BAAQMD did not report any agricultural burning in Napa County in 2019.

Source: Ascent Environmental 2022.

## SUMMARY OF INVENTORY RESULTS BY SECTOR

Based on the modeling conducted, the Napa County region generated approximately 1.2 million metric tons of carbon dioxide equivalents (MTCO<sub>2e</sub>) in 2019. As shown in Figure 1, the top two emissions sectors in 2019 included on-road transportation (39 percent) and building energy use (23 percent), which together accounted for 61 percent of emissions in the region. Other sectors, include solid waste (16 percent), off-road equipment (9 percent), agriculture (8 percent), wastewater (4 percent), and imported water (0.5 percent). Emissions associated with water pumping within the region could not easily be disaggregated from 2019 electricity usage reports and thus, are included in the building energy sector. Table 2 details the emissions results from the 2019 GHG inventory update for the Napa County region.

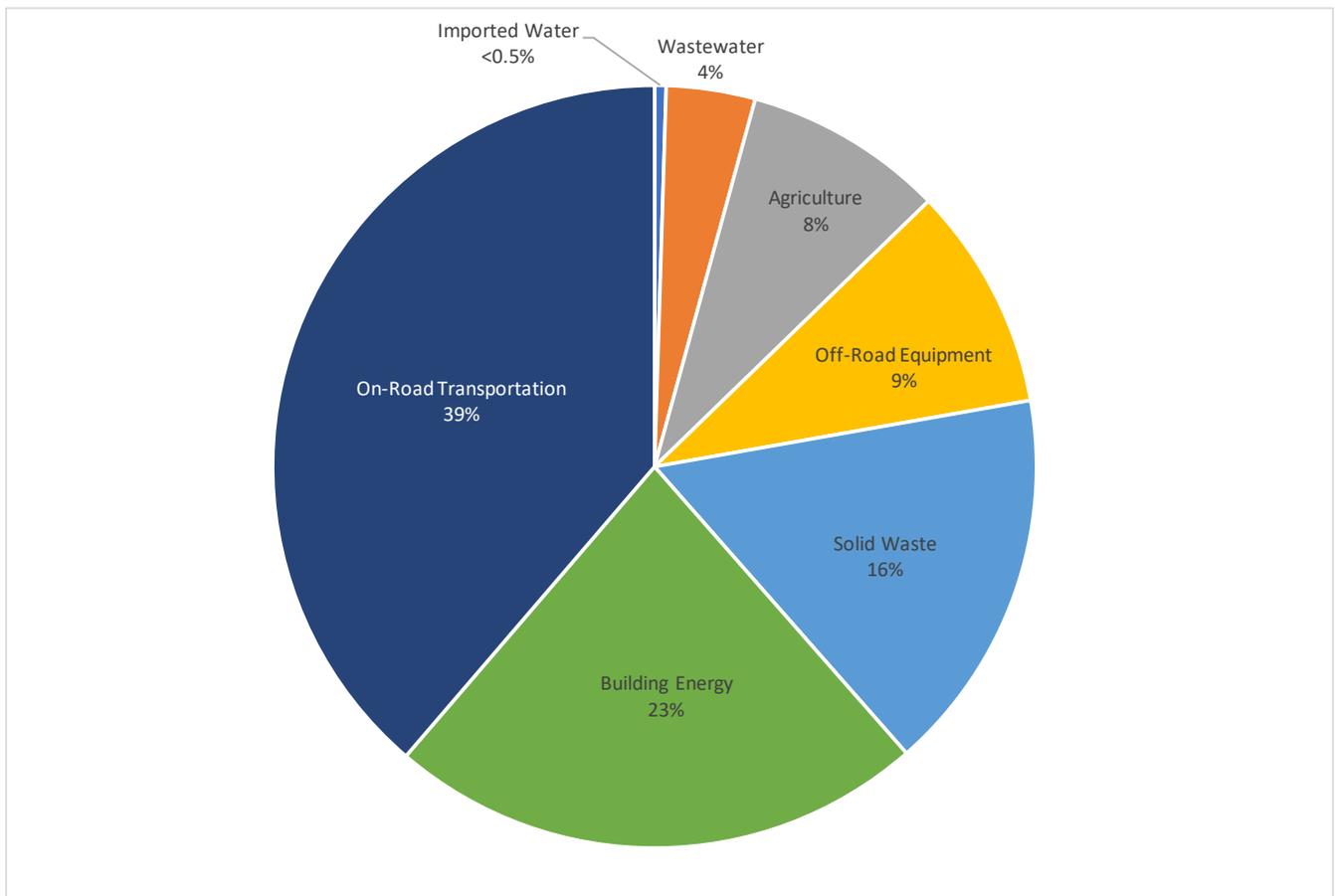
Attachment A presents the activity data used for each emissions sector. Emissions results by jurisdiction are addressed in Section 3. A comparison of emissions to the 2005 regional inventory is provided in Section 4. A detailed analysis of the background data and assumptions behind each individual sector is provided in Section 5.

**Table 2 2019 Napa County Regional Greenhouse Gas Inventory by Sector (MTCO<sub>2e</sub>/year)**

Emissions Sector	2019 (MTCO <sub>2e</sub> /year)	Percent of Total
On-Road Transportation	472,677	38.8%
Building Energy	277,244	22.7%
Solid Waste	198,862	16.3%
Off-Road Equipment	115,548	9.5%
Agriculture	103,381	8.5%
Wastewater	45,858	3.8%
Imported Water	5,943	0.5%
Total	1,219,513	100.0%

Notes: MTCO<sub>2e</sub>/year = metric tons of carbon dioxide equivalent per year.

Source: Prepared by Ascent Environmental in 2022.



Source: Prepared by Ascent Environmental in 2022.

**Figure 1 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Emissions Sector**

## SUMMARY OF INVENTORY RESULTS BY JURISDICTION

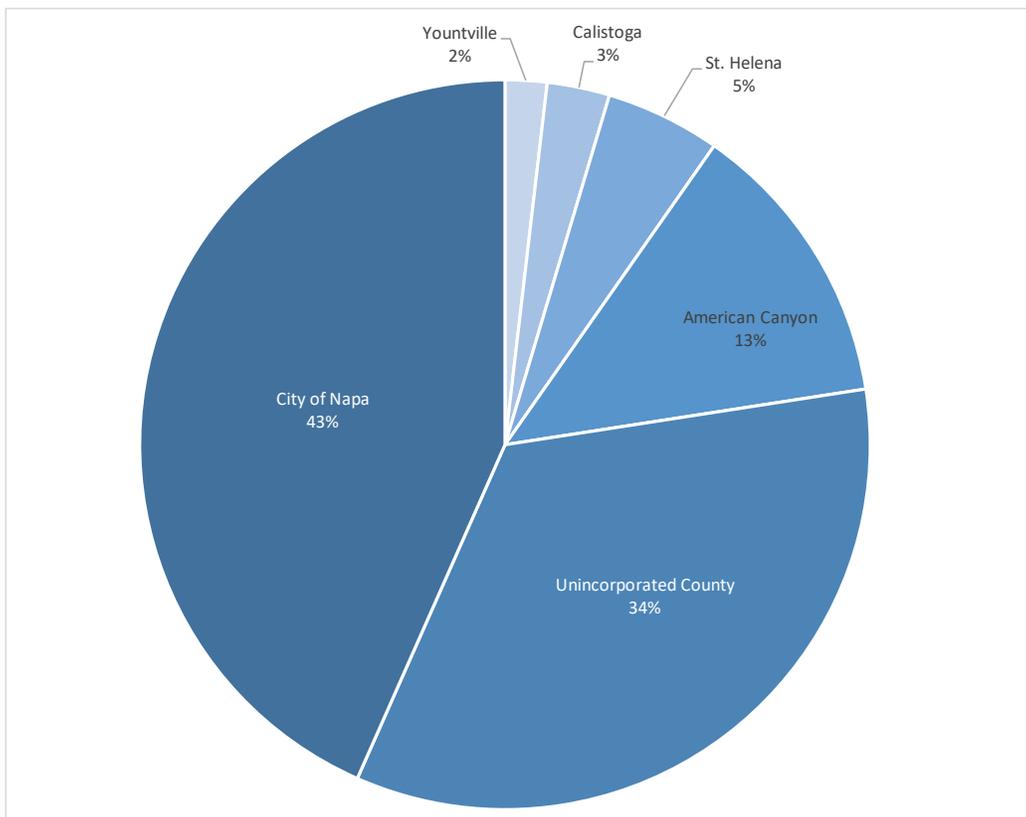
Across the six jurisdictions in the county, City of Napa accounted for 43 percent and the Unincorporated County accounted for 34 percent of emissions each in the region, for a total of 77 percent. American Canyon contributed 13 percent of the region’s emissions; and St. Helena, Calistoga, and Yountville accounted for the remaining 10 percent. These results are shown in Figure 2 and Table 3.

**Table 3** 2019 Napa County Regional Greenhouse Gas Inventory by Jurisdiction (MTCO<sub>2e</sub>/year)

Emissions Sector	2019 (MTCO <sub>2e</sub> /year)	Percent of Total
City of Napa	529,095	43%
Unincorporated County	415,259	34%
American Canyon	156,690	13%
St. Helena	62,105	5%
Calistoga	33,789	3%
Yountville	22,576	2%
Total	1,219,513	100.0%

Notes: MTCO<sub>2e</sub>/year = metric tons of carbon dioxide equivalent per year.

Source: Prepared by Ascent Environmental in 2022.



Source: Prepared by Ascent Environmental in 2022.

Figure 2 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Jurisdiction

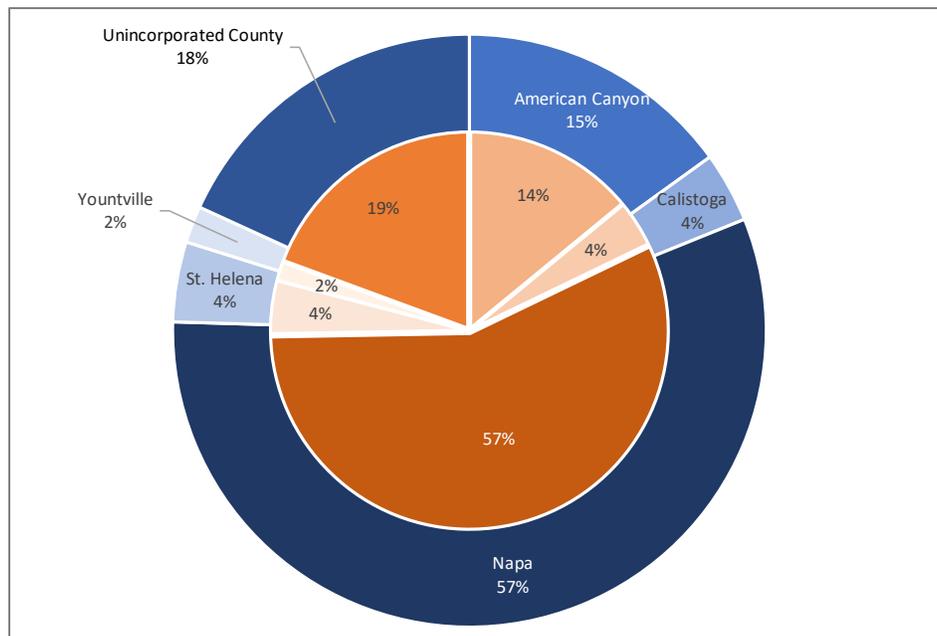
These results are consistent with the level of activity in each jurisdiction. Table 5 and Figures 4 and 6 show the breakdown of emissions by jurisdiction and emissions sector. Table 5 shows emissions normalized by population and employment. Figure 3 provides the population and employment by jurisdiction in 2019 to provide context.

**Table 5 2019 Napa County Regional Greenhouse Gas Inventory by Jurisdiction and Sector (MTCO<sub>2</sub>e/year)**

Emissions Sector	American Canyon	Calistoga	Napa	St. Helena	Yountville	Unincorporated County	Total
On-Road Transportation	91,830	17,184	280,533	30,661	12,404	40,063	472,677
Building Energy	20,964	6,249	132,077	14,296	5,062	98,596	277,244
Solid Waste	25,938	4,981	34,236	5,676	2,601	125,429	198,862
Off-Road Equipment	8,998	2,880	47,238	4,502	1,328	50,602	115,548
Agriculture	154	274	1,086	4,415	75	97,378	103,381
Wastewater	7,822	1,994	29,542	2,270	1,040	3,191	45,858
Imported Water	983	229	4,383	285	65	-	5,943
<b>Total</b>	<b>156,690</b>	<b>33,789</b>	<b>529,095</b>	<b>62,105</b>	<b>22,576</b>	<b>415,259</b>	<b>1,219,513</b>
Emissions per capita	7.5	6.3	6.7	10.2	8.1	16.6	8.7
Emissions per SP	5.8	4.1	4.1	5.2	5.8	7.5	5.1
Transportation Emissions per capita	1.0	1.2	1.7	2.3	1.8	3.9	2.0

Notes: MTCO<sub>2</sub>e/year = metric tons of carbon dioxide equivalent per year. SP = service population (population + jobs) (See Table 6).

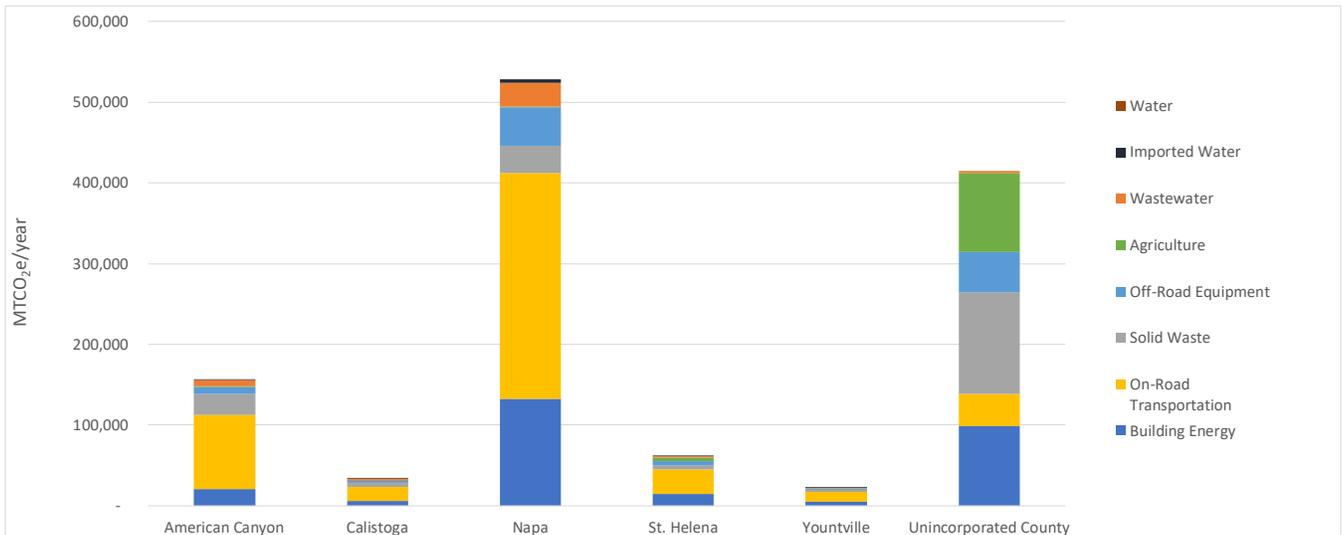
Source: Prepared by Ascent Environmental in 2022.



	American Canyon	Calistoga	Napa	St. Helena	Yountville	Unincorporated County	Total County
Jobs	10,000	2,700	40,500	3,100	1,100	13,800	71,200
Population	20,996	5,352	79,016	6,094	2,793	25,357	139,608

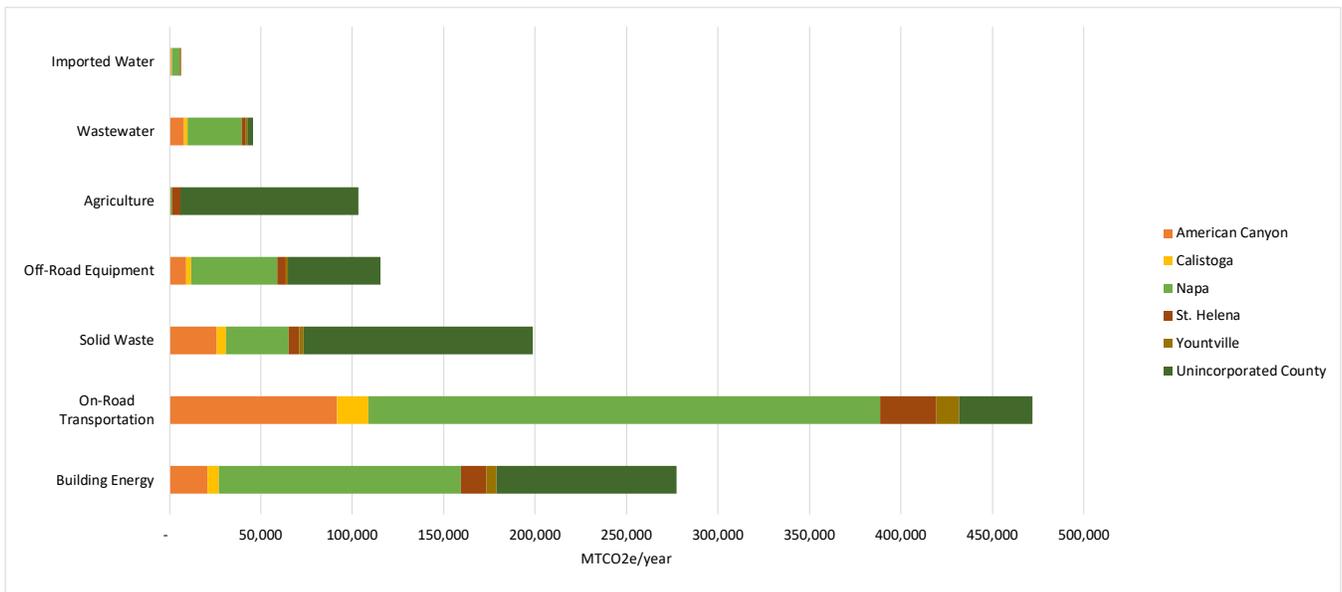
Source: Department of Finance (DOF) 2022, Employment Development Department (EDD) 2022.

Figure 3 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Jurisdiction



Source: Prepared by Ascent Environmental in 2022.

Figure 4 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Jurisdiction and Sector (MTCO<sub>2</sub>e/year)



Source: Prepared by Ascent Environmental in 2022.

Figure 5 2019 Napa County Regional Greenhouse Gas Emissions Inventory by Sector and Jurisdiction (MTCO<sub>2</sub>e/year)

As shown in Table 5 and Figure 4, emissions tend to be proportional to the level of economic activity in a jurisdiction (e.g., agricultural activity in the Unincorporated County, job and population centers in the City of Napa). For this reason, normalized emissions per capita and emissions per service population are also provided in Table 5, based on data available from Department of Finance (DOF) and the Employment Development Departments (EDD) and shown in Table 6. The region emitted 8.7 MTCO<sub>2</sub>e per capita per year in 2019. These normalized factors also show that Calistoga has the lowest GHG emissions per capita and per service population in the region (6.3 MTCO<sub>2</sub>e per capita); and St. Helena has the highest GHG emissions per capita and service population (10.2 MTCO<sub>2</sub>e per capita) out of the

incorporated jurisdictions. The Unincorporated County has the highest emissions per capita in the region (16.6 MTCO<sub>2</sub>e per capita), due mostly to the greater proportion of agricultural and industrial activity in that area against population.

## HIGHLIGHTS BY JURISDICTION

### Unincorporated County

The Unincorporated County emitted 415,259 MTCO<sub>2</sub>e in 2019 and has the highest emissions per capita (16.6 MTCO<sub>2</sub>e/person/year) in the region. This is likely due two major reasons. First, the solid waste sector is understandably high with two large landfills located within the area. Second, winemaking and other agricultural adjacent activities are prevalent throughout the Unincorporated County, as evidenced by the large proportion of building energy-related and agricultural emissions attributable to the area (47 percent, combined) despite having a smaller population (shown in Figure 5). Building energy, agriculture, and solid waste accounted for 77 percent of the Unincorporated County's emissions in 2019. Emissions from solid waste, building energy, and agriculture overshadow emissions from on-road transportation, which only accounted for 10 percent of the area's emissions. Thus, the presence of solid waste landfills and high levels of agricultural activity contribute to the Unincorporated County's high emissions.

### City of Napa

The City of Napa emitted higher emissions than the Unincorporated County in 2019 (529,095 MTCO<sub>2</sub>e/year) and has lower emissions-per-capita (6.7 MTCO<sub>2</sub>e/person/year). As the largest city in the region, the City of Napa is a major job and population center in the region, accounting for 57 percent of the jobs and population in the region in 2019, as shown in Figure 3. The City of Napa, thus, understandably accounts for the majority of the building energy and on-road transportation emissions in the region as jobs and population both generate vehicle trips through commuting and commerce. The city is also a major tourist destination with a prominent hospitality industry, further contributing to higher transportation and building emissions. The City of Napa accounted for 48 percent of regional building energy emissions and 59 percent of regional on-road transportation emissions. These two emissions sectors are also the largest sectors in the city's own inventory; building energy and on-road transportation accounted for 25 and 53 percent of the city's total emissions, respectively, for a total of 78 percent of the city's emissions in 2019, when rounded. As the population center, the City of Napa is also the largest emitter of wastewater emissions, accounting for 64 percent of total wastewater emissions.

### American Canyon

American Canyon was the next largest emitter in the region, emitting 156,690 MTCO<sub>2</sub>e/year in 2019 and with a slightly higher emissions-per-capita (7.5 MTCO<sub>2</sub>e/person/year). American Canyon is the second largest city in the region but is about a quarter of the size of the City of Napa. Even so, American Canyon makes up about 19 percent of total on-road transportation emissions in the region. On-road transportation is also the largest sector in the city, accounting for 59 percent of the city's emissions. This is possibly due to its location at the southern end of the county and subsequent proximity to other major job centers in the Bay Area, resulting in higher VMT associated with commuting.

### St. Helena

St. Helena emitted 62,105 MTCO<sub>2</sub>e/year in 2019, less than half of American Canyon's emissions in the same year. St. Helena accounted for 5 percent of the region's emissions. Despite this lower total emissions, St. Helena had the highest emissions-per-capita at 10.2 MTCO<sub>2</sub>e/person/year. This could possibly be due to St. Helena's status as a major tourist destination. On-road transportation accounted for 49 percent of emissions generated by the city. As shown in Table 5, St. Helena has the highest transportation-related emissions per capita in the region, over 40

percent higher than the City of Napa. St. Helena is also the third smallest city in the region, with a population of 6,094.

### Calistoga

Calistoga emitted 33,789 MTCO<sub>2</sub>e/year in 2019, nearly half of St. Helena's emission in the same year. Calistoga only accounted for 3 percent of the region's emissions. Calistoga also had relatively low emissions per capita at 6.3 MTCO<sub>2</sub>e/person/year despite it being the second smallest jurisdiction in the region with a population of 5,352. Its largest sectors were on-road transportation (51 percent) and building energy (19 percent), together accounting for 69 percent of the city's emissions.

### Yountville

Yountville emitted 22,576 MTCO<sub>2</sub>e/year in 2019 and only accounted for 2 percent of the region's emissions. Despite these low emissions, Yountville had the second highest emissions per capita at 8.1 MTCO<sub>2</sub>e/person/year despite it being the smallest jurisdiction in the region with a population of 2,793. Like St. Helena, Yountville is also a major tourist destination, and a high proportion of its emissions are from on-road transportation (55 percent), which are nearly two and a half times that of emissions from building energy (22 percent). Together, on-road transportation and building energy accounted for 77 percent of the city's emissions.

## COMPARISON WITH THE 2005 REGIONAL INVENTORY

The 2019 regional inventory updates a previous regional inventory conducted for the year 2005. However, due to differences in methodology and data sources, the following assumptions and data were adjusted to allow for a proper comparison between the two inventories. These adjustments are only to be considered for purposes of comparison with the 2005 inventory only. The formal results for the updated 2019 GHG inventory are presented in the previous three sections.

- ▶ The 2019 values were adjusted to the global warming potential (GWP) factors from IPCC's Second Assessment Report (SAR), consistent with the methodology used in the 2005 inventory (NCTPA 2009). This approach was necessary because the 2005 inventory did not make CH<sub>4</sub> and nitrous oxide (N<sub>2</sub>O) emissions available for adjustment with newer GWP factors from IPCC's Sixth Assessment Report (AR6) (IPCC 2021).
- ▶ 2019 on-road transportation activity was modified to use vehicle miles travelled (VMT) from the California Department of Transportation's (Caltrans) Highway Performance Monitoring System (HPMS), the same source used in the 2005 inventory (Caltrans 2020). In contrast, the main 2019 inventory update is based on the Regional Targets Advisory Committee (RTAC) method, which accounts for VMT generated by the jurisdiction and excludes pass-through trips. Caltrans roadway VMT estimates are generally much higher than the RTAC method. Regional VMT data by origin and destination were not readily available for 2005. (See Section 4).
- ▶ Only sectors that were present and verifiable in the 2005 inventory were included in the comparison.
  - The comparison excludes water and wastewater emissions sectors evaluated in the 2019 inventory, but which were not included in the 2005 inventory.
  - Additionally, agricultural emissions are excluded. Although both the 2005 and 2019 inventories include an agricultural sector, the 2005 inventory did not specify how the agricultural emissions were derived. Without knowing the specific sub-sectors that were incorporated in the 2005 agricultural sector, a proper comparison could not be made between the two years.
  - Off-road equipment were modeled in 2005 using a much less sophisticated model (OFFROAD2007) compared to the one used for the 2019 inventory (OFFROAD2021). The 2005 offroad inventory consisted of lawn and garden equipment, industrial, and commercial equipment. 2019 includes all offroad

equipment types in CARB's OFFROAD2021 model, except agriculture. It is possible that the 2005 inventory included fewer vehicle types and lower activity overall than the 2019 inventory, but that is uncertain. Thus, off-road equipment emissions were excluded from this comparison.

After accounting for these adjustments, Table 6 and Figure 6 show the 2005 baseline inventory alongside the 2019 inventory, for comparison purposes only. Between 2005 and 2019, countywide emissions decreased by 27 percent. This decrease in emissions between 2005 and 2014 is due to a combination of factors including, but not limited to:

- ▶ Increased population, jobs, and visitors affecting increased activity levels (e.g., building energy use, vehicle travel).
- ▶ Greater reductions in energy emission factors and improvements in building energy efficiency (e.g., less polluting vehicles, building renovations, more renewables in the electricity portfolio).
- ▶ Adjustments in calculation methodologies (e.g., models, equations, and emission factors).
- ▶ Differences in data sources between the two inventories, including any changes in the way energy data were aggregated for the region.

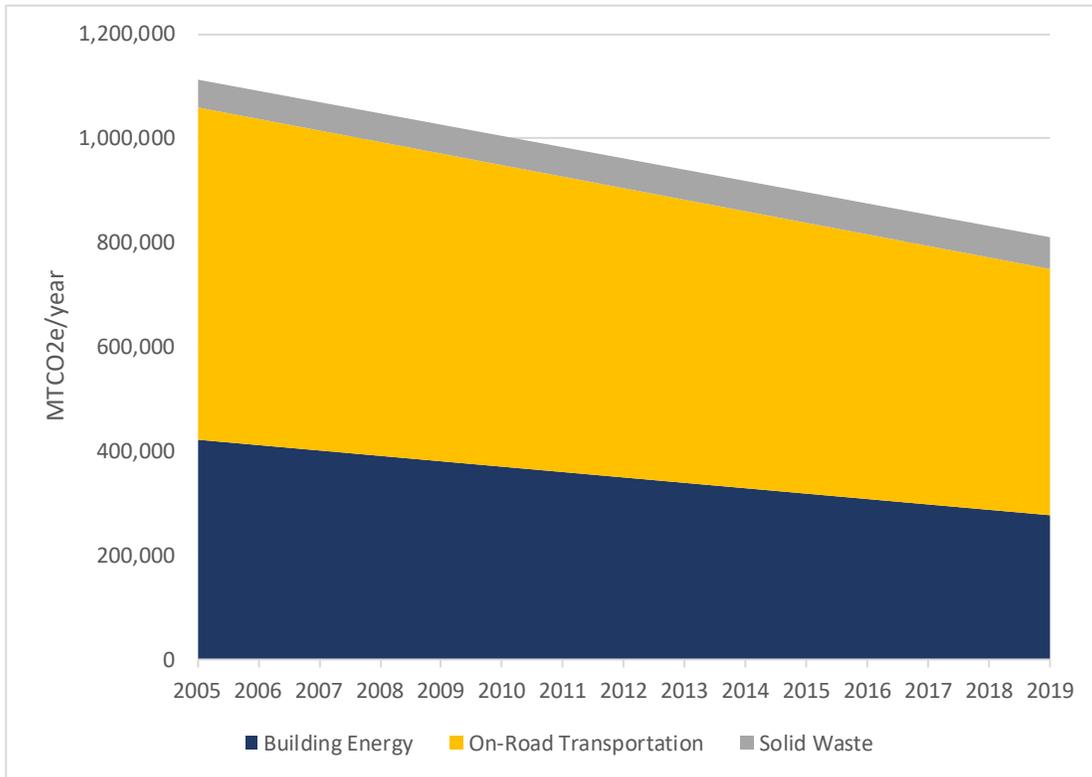
**Table 6 Comparison of Napa County 2005 and 2019 Regional Greenhouse Gas Inventories by Sector (for comparison only) (MTCO<sub>2</sub>e/year)**

Emissions Sector	2005	2019	Percent Change	Primary Differences <sup>1</sup>
Building Energy	423,011	277,126	-34%	Reduced usage of both electric and natural gas. Decreased emission factors.
On-Road Transportation	636,724	471,259	-26%	Increases in regional VMT reported in Caltrans's HPMS data. Decreased in emissions pursuant to vehicle emissions standards.
Solid Waste	54,209	63,409	17%	Increased accumulation of waste in landfills.
Total	1,113,944	811,794	-27%	

Notes: The 2005 inventory did not include water and wastewater sectors. Therefore, for comparison purposes, those sectors are excluded from this comparison table. CARB = California Air Resources Board, VMT = vehicle miles travelled, HPMS = Highway Performance Monitoring System, RTAC = Regional Targets Advisory Committee.

<sup>1</sup> After adjusting the 2019 inventory to use GWP factors from IPCC's Second Assessment Report and other calculation methods.

Source: Prepared by Ascent Environmental in 2022. NCTPA 2009.



Note: Graph based on 2005 and 2019 emissions inventories. Emissions based on GWP factors using IPCC’s Second Assessment Report. Emissions between 2005 and 2019 are interpolated. Excludes offroad, agriculture, water, and wastewater emissions. GWP = global warming potential, IPCC = Intergovernmental Panel on Climate Change.

Source: Prepared by Ascent Environmental in 2022.

Figure 6 Napa County Regional Greenhouse Gas Emissions Inventory from 2005 to 2019 (for comparison only)

As shown in Table 6 and Figure 6, the reductions in building energy and on-road transportation emissions together drive the overall reductions in emissions in the region. The on-road transportation sector continues to be the largest emissions sector in the region. These trends have been in contrast with population and job growth in the county. To provide context, between 2005 and 2019, the region’s population increased by 7 percent and jobs increased by 4 percent, according to the DOF and EDD (DOF 2012, 2021; EDD 2022). Although both population and emissions increased in the region, the average GHG emissions per capita and per service population also decreased by 32 percent with the contribution of the state’s renewable portfolio goals and expanded clean vehicle standards.

## DATA, METHODS, AND ASSUMPTIONS

The basic calculation for estimating GHG emissions involves two primary inputs: activity data and emissions factors. Activity data refer to the relevant measurement of a community’s activity resulting in emissions, and emissions factors represent the amount of a GHG emitted on a per unit of activity basis. Emissions factors are applied to activity data (i.e., the two values are multiplied together) to estimate GHG emissions. For example, in the residential energy sector, activity data of annual community electricity consumption in megawatt-hours (MWh) is multiplied by an emissions factor in pounds of GHG per MWh, which results in a pounds of GHG emissions value. This calculation-based methodology is used for estimating emissions from most sources in the region’s inventory.

In addition to including new GHG emissions sectors and sources, the 2019 inventory update includes several changes to the data sources and emission factors used, along with changes in methods. These differences were necessary in cases where the original data sources used in the 2005 inventory were no longer available or have been updated. New methods that provide more accurate emissions estimates are available for sectors such as the on-road vehicles and solid waste sectors. The general approach used to estimate the region's 2019 GHG inventory is consistent with the latest guidance from the Community Protocol (ICLEI 2019). The calculations relied on activity data provided by each jurisdiction, sector-specific sources of information, and GWP factors from AR6 (IPCC 2021).

An overview of activity data and emissions factors for each emissions source, along with data sources, is shown in Table 8. Detailed methods are described in the following sections.

**Table 8 2019 Napa County Regional GHG Inventory Summary of Activity Data and Emissions Factors**

Sector/Source	Input Type	Description and Data Sources
<b>Agriculture</b>		
<i>Livestock Management</i>	Activity data	Livestock population data from the County of Napa Agricultural Commissioner's Office's 2019 Crop Report
	Emissions factor	Livestock-specific emissions factors from CARB, IPCC, and EPA
<i>Fertilizer Application</i>	Activity data	Fertilizer application data from CDFA's Fertilizer Tonnage Report 2019
	Emissions factor	Fertilizer emissions factors from IPCC 2006
<i>Agricultural Equipment - Off-Road Equipment</i>	Activity data	Off-road vehicles and equipment activity data and emissions factors from CARB's OFFROAD2021 model
	Emissions factor	
<i>Agricultural Equipment – Diesel Engines</i>	Activity data	Diesel-powered agricultural stationary engines (e.g., irrigation pumps) from BAAQMD permit data.
	Emissions factor	Napa County region-specific average emissions factor from CARB
<b>On-Road Transportation</b>		
<i>On-Road Transportation</i>	Activity data	Passenger VMT data from MTC's Regional Travel Demand Model via the VMT Data Portal. Commercial VMT from ratio of passenger to commercial VMT in CARB's EMFAC2021 model.
	Emissions factor	Napa County-specific emissions factors from CARB's EMFAC2021 model.
<b>Building Energy</b>		
<i>Electricity</i>	Activity data	Electricity consumption data from PG&E and MCE
	Emissions factor	MCE 2021 Impact Report
<i>Natural Gas</i>	Activity data	Natural gas consumption data from PG&E
	Emissions factor	Average emissions factors from TCR
<b>Solid Waste</b>		
<i>Community-Generated Solid Waste</i>	Activity data	Waste and ADC disposal data from the California Department of Resources Recycling and Recovery
	Emissions factor	Mixed municipal solid waste emissions factor from EPA
<i>Waste-in-Place</i>	Emissions Data	Direct methane and nitrous oxide fugitive emissions reports from in-boundary landfills from EPA.
<b>Off-Road Vehicles and Equipment</b>		
<i>Off-Road Vehicles and Equipment</i>	Emissions Data	County-level off-road vehicles and equipment emissions data from CARB's OFFROAD2021 model

Sector/Source	Input Type	Description and Data Sources
Wastewater Treatment		
Wastewater Treatment	Activity data	Population data in the region and population served by septic tanks
	Emissions factor	Emissions factors based on population-based factors for centralized wastewater treatment and septic systems from ICLEI
Water Supply		
Water Supply	Activity data	Water consumption data by source from each jurisdiction
	Emissions factor	Energy intensity factors from 2015 CPUC Water/Energy Cost-Effectiveness Analysis.

Notes: MTC = Metropolitan Transportation Commission; CARB = California Air Resources Board; CEC = California Energy Commission; CPUC = California Public Utilities Commission; EPA = U.S. Environmental Protection Agency; ICLEI = ICLEI – Local Governments for Sustainability; IPCC = Intergovernmental Panel on Climate Change; District; PG&E = Pacific Gas and Electric Company; MCE = Marin Clean Energy; TCR = The Climate Registry; VMT = vehicle miles traveled; ADC = alternative daily cover; BAAQMD = Bay Area Air Quality Management District.

Source: Ascent Environmental 2022.

Additionally, demographic data related to population, jobs, and housing in the unincorporated County were obtained from DOF and EDD (DOF 2021, EDD 2022).

## Global Warming Potentials

GHG emissions other than CO<sub>2</sub> generally have a stronger insulating effect and thus, a greater ability to warm the Earth's atmosphere through the greenhouse effect. This effect is measured in terms of a pollutant's GWP factor. CO<sub>2</sub> has a GWP factor of one while all other GHGs have GWP factors measured in multiples of one relative to the GWP of CO<sub>2</sub>. This conversion of non-CO<sub>2</sub> gases to one unit enables the reporting of all emissions in terms of carbon dioxide equivalent (CO<sub>2</sub>e), which allows for the consideration of all gases in comparable terms and makes it easier to communicate how various sources and types of GHG emissions contribute to climate change. The standard unit for reporting emissions is MTCO<sub>2</sub>e.

Consistent with the best available science, these inventories use GWP factors published in the Sixth Assessment Report from IPCC, where CH<sub>4</sub> and nitrous oxide (N<sub>2</sub>O) have GWP factors of 27.9 and 273, respectively (IPCC 2021). These values represent the GWP of GHG on a 100-year time horizon. This means that CH<sub>4</sub> is approximately 28 times stronger than CO<sub>2</sub> and N<sub>2</sub>O is 273 times stronger than CO<sub>2</sub> in their potential to warm Earth's atmosphere over the course of 100 years. In comparison, the SAR, used in the development of the 2005 inventory, reported GWP's of 21 and 310 for CH<sub>4</sub> and N<sub>2</sub>O, respectively. The use of 100-year GWP values is consistent with CARB methods and reflects the long-term planning horizon of the CAP.

## BUILDING ENERGY SECTOR

Based on GHG emissions modeling conducted, residential and non-residential building energy use in 2019 resulted in 277,244 MTCO<sub>2</sub>e in 2019. This sector comprised approximately 23 percent of the region's emissions, resulting in the largest emissions sector in the inventory. These emissions were a result of electricity and natural gas energy use at buildings and facilities. The building energy sector consumed 926,661 megawatt-hours (MWh) of electricity and 39 million therms of natural gas. This estimate includes a negative credit for electricity consumption from electric vehicle charging to avoid double-counting with the on-road vehicle sector.

Marin Clean Energy (MCE), a community choice aggregation (CCA) program that offers additional renewable electricity options to northern Bay Area counties, began enrollment of customers in the region in 2015. Through automatic enrollment, customers are allowed to either increase their renewable mix for an additional fee or opt out of the program. Those opting out would have, by default, PG&E's resource mix (MCE 2015). In 2019, 85 percent of

electricity use in the region was purchased from MCE, with 5 percent purchased from MCE's Deep Green option (Herrick, pers. comm., 2022). In this year, MCE customers had a 60 percent renewable mix and 90 percent GHG-free mix offered through their Light Green option and a 100 percent renewable mix through their Deep Green and Local Sol options (MCE 2022, MCE 2020a). According to MCE's Emissions Factor Certification report, Light Green power was estimated to have an emissions factor of 197 lb CO<sub>2</sub>e/MWh (MCE 2020b). Combined with the 5 percent of customer purchased with Deep Green, the average MCE 2019 emissions factor was 187 lb CO<sub>2</sub>e/MWh.

In 2019, 15 percent of electricity use in the region was purchased from PG&E. PG&E supplied its customers electricity with a renewable mix of 28.5 percent, with 1.5 percent from geothermal sources (which generate some GHGs) (CEC 2020). 2019 was an anomalous year for PG&E in that the utility reported that the remaining 71.5 percent of electricity supplied in that year were from GHG-free sources, consisting of large hydroelectric and nuclear sources, for a total of 99 percent GHG-free sources for PG&E in 2019 (CEC 2020). For context, in 2018 and 2020, 15 to 16 percent of PG&E's electricity was generated from natural gas (CEC 2019, 2021). Based on the distribution of participation in MCE in the region in 2019, 99.5 percent of the region's electricity use was generated with GHG-free sources, resulting in a regional average emission factor of 21 lb CO<sub>2</sub>e/MWh. This analysis is detailed in Table 9.

PG&E supplied all the natural gas used in the region in 2019. Due to the lower emissions from electricity consumption, GHG emissions from the use of natural gas accounted for approximately 75 percent of total emissions from the building energy sector. Approximately 40 percent of building natural gas emissions were from non-residential customers, contributing a total of 110,330 MTCO<sub>2</sub>e in 2019. Residential buildings generated 166,914 MTCO<sub>2</sub>e, or approximately 60 percent of total building natural gas emissions.

Table 10 presents emission factors used to quantify emissions from electricity and natural gas use. Tables 11 and 12 presents building electricity and natural gas use and associated emissions by jurisdiction, respectively.

**Table 9 2019 Napa County Regional Utility Participation (Percent of Electricity Use per Jurisdiction)**

Jurisdiction	PG&E		MCE Light Green		MCE Deep Green	
	Electricity Use (MWh)	Percent of Electricity Use	Electricity Use (MWh)	Percent of Electricity Use	Electricity Use (MWh)	Percent of Electricity Use
American Canyon	26,616	25.6%	74,747	71.9%	2,582	2.5%
Calistoga	1,939	6.9%	25,980	92.7%	112	0.4%
Napa	64,494	17.4%	290,725	78.4%	15,462	4.2%
St. Helena	6,457	10.7%	39,121	65.1%	14,516	24.2%
Yountville	1,137	2.7%	30,644	74.0%	9,625	23.2%
Unincorporated County	37,411	11.6%	284,955	88.4%	138	0.0%
Total	138,054	14.9%	746,172	80.5%	42,435	4.6%

Notes: PG&E = Pacific Gas and Electric, MCE = Marin Clean Energy.

Source: Data provided by Ascent Environmental in 2022.

**Table 10 2019 Napa County Regional GHG Inventory: Building Energy Emission Factors**

Emission Factor	Unit	Source
Electricity – PG&E (99% GHG-Free)		
18.7	lb CO <sub>2</sub> /MWh	TCR 2020
3.1	lb CH <sub>4</sub> /GWh	eGrid 2019 (EPA 2021)
0.4	lb N <sub>2</sub> O/GWh	eGrid 2019 (EPA 2021)
20.7	lb CO <sub>2</sub> e/MWh	Calculated

Emission Factor	Unit	Source
Electricity – MCE Light Green (90% GHG-Free <sup>1</sup> )		
197	lb CO <sub>2</sub> e/MWh	MCE 2020b
Electricity – MCE Deep Green (100% GHG- Free)		
0.0	lb CO <sub>2</sub> /MWh	MCE 2022
0.0	lb CH <sub>4</sub> /GWh	MCE 2022
0.0	lb N <sub>2</sub> O/GWh	MCE 2022
0.0	lb CO <sub>2</sub> e/MWh	Calculated
Natural Gas		
5.31	kg CO <sub>2</sub> /therm	TCR 2020
0.47	g CH <sub>4</sub> /therm	TCR 2020
0.01	g N <sub>2</sub> O/therm	TCR 2020
5.32	kg CO <sub>2</sub> e/therm	Calculated

Notes: CH<sub>4</sub> = methane; CO<sub>2</sub> = carbon dioxide; eGrid = Emissions & Generation Resource Integrated Database; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; GWh = gigawatt-hours; kg = kilograms; lb = pounds; MT = metric tons; MWh = megawatt-hours; N<sub>2</sub>O = nitrous oxide; PG&E = Pacific Gas and Electric; MCE= Marin Clean Energy; TCR = The Climate Registry.

Source: CEC 2020, MCE 2020b, MCE 2022, EPA 2021, TCR 2020; data compiled by Ascent Environmental 2022.

**Table 11 2019 Napa County Regional GHG Inventory: Building Electricity Use and GHG Emissions by Jurisdiction**

Jurisdiction	Electricity Use (MWh/yr)			GHG Emissions (MTCO <sub>2</sub> e/yr)		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
American Canyon	35,398	68,547	103,945	2,811	4,117	6,929
Calistoga	12,053	15,979	28,032	957	1,383	2,340
Napa	159,409	211,272	370,681	12,703	13,881	26,583
St. Helena	18,667	41,427	60,094	1,434	2,122	3,556
Yountville	6,472	34,934	41,406	507	2,242	2,749
Unincorporated County	98,777	223,726	322,503	7,869	17,945	25,814
Total	330,776	595,885	926,661	26,281	41,690	67,971

Notes: Totals in columns may not add due to rounding. PG&E provided electricity use for 2019 by zip codes. These data were apportioned to each jurisdiction by the relative population in each zip code. MCE provided electricity use directly by jurisdiction.

MWh = megawatt-hours; MT = metric tons; CO<sub>2</sub> = carbon dioxide; CH<sub>4</sub> = methane; N<sub>2</sub>O = nitrous oxide; CO<sub>2</sub>e = carbon dioxide equivalent; PG&E=Pacific Gas and Electric; MCE= Marin Clean Energy.

Source: Data provided by Ascent Environmental in 2022 based on data provided by MCE and PG&E.

**Table 12 2019 Napa County Regional GHG Inventory: Building Natural Gas Use and GHG Emissions by Jurisdiction**

Jurisdiction	Natural Gas Use (therms/yr)			GHG Emissions (MTCO <sub>2</sub> e/yr)		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
American Canyon	2,548,344	89,005	2,637,350	13,562	474	14,036
Calistoga <sup>1</sup>	734,642	0	734,642	3,910	0	3,910
Napa	12,209,856	7,612,956	19,822,812	64,979	40,515	105,494
St. Helena	1,068,123	949,954	2,018,077	5,684	5,056	10,740
Yountville <sup>1</sup>	434,563	0	434,563	2,313	0	2,313
Unincorporated County	9,430,232	4,245,848	13,676,080	50,186	22,596	72,782
Total	26,425,761	12,897,764	39,323,524	140,634	68,640	209,274

Notes: Totals in columns may not add due to rounding. PG&E provided natural gas use for 2019 by zip code. These data were apportioned to each jurisdiction by the relative population in each zip code.

<sup>1</sup>No data was reported for non-residential natural gas use, possibly due to the utility's 15/15 rule.

MT = metric tons; CO<sub>2</sub> = carbon dioxide; CH<sub>4</sub> = methane; N<sub>2</sub>O = nitrous oxide; CO<sub>2</sub>e = carbon dioxide equivalent; PG&E=Pacific Gas and Electric.

Source: Data provided by Ascent Environmental in 2022 based on data provided by PG&E and TCR.

## WASTEWATER GENERATION

Based on modeling conducted, wastewater generation in 2019 resulted in emissions of approximately 45,858 MTCO<sub>2</sub>e, or 3 percent of total emissions, primarily from fugitive CH<sub>4</sub>. All wastewater generated within each jurisdiction is treated in a number of methods: (1) conveyed to other wastewater treatment facilities in the region through sewer systems or (2) treated on-site via a septic tank system.

This sector accounts for the CH<sub>4</sub> and N<sub>2</sub>O emissions from wastewater treatment processes. Wastewater treatment facilities are located wholly within the region and not exported outside of the area. Thus, the electricity use at those facilities is captured in the building energy sector and is excluded from the wastewater sector. These emissions are summarized in Table 13.

**Table 13 2019 Napa County Regional Wastewater Methane Emissions by Source**

Wastewater Treatment Process Emissions					
Wastewater Source	Population Served	MTCO <sub>2</sub> /yr	MTCH <sub>4</sub> /yr	MTN <sub>2</sub> O/yr	MTCO <sub>2</sub> e/yr
Septic	24,459	0	106	0	2,961
WWTP	230,299	0	1,533	0	42,897
<i>Total</i>	<i>254,757</i>	<i>0</i>	<i>1,639</i>	<i>0</i>	<i>45,858</i>

Notes: Totals may not add due to rounding. MG = million gallons; MT = metric tons; CH<sub>4</sub> = methane; CO<sub>2</sub>e = carbon dioxide equivalent, MGD = million gallons per day.

Source: Data provided by Ascent Environmental in 2022.

## Domestic Wastewater

Domestic wastewater CH<sub>4</sub> emissions were based on average population-generated wastewater rates from:

- ▶ equations WW.11 (alt) for septic systems and WW.6 (alt) and WW.8 for sewer systems from the Community Protocol;
- ▶ the County's estimate of the percent of the population that are serviced by sewer connections and septic connections; and
- ▶ the 2019 population estimates for each jurisdiction, available from the California Department of Finance.

Across all jurisdictions, it is estimated that approximately 90 percent of the region's population is served by centralized wastewater treatment facilities and while the other 10 is served by on-site septic tanks for wastewater treatment. Table WW.15.1 from the Community Protocol shows that California's average wastewater generation factor is 100 gallons per day per capita (ICLEI 2019). Using this factor, the region is estimated to have generated 9.3 billion gallons of wastewater in 2019.

## IMPORTED WATER

Based on modeling conducted, water imports into the region accounted for 5,943 MTCO<sub>2</sub>e in 2019, less than one percent of the region's 2019 GHG inventory. These resulted from GHG emissions from electricity generation required to deliver and treat water outside the region. Water conveyance within the region is assumed to be accounted for under the electricity usage reports from MCE and PG&E. Each of the six jurisdictions in the region provided total water volume deliveries to their jurisdiction in 2019 broken out by water source and type of water (e.g., recycled, potable). Water conveyance and treatment energy rates per gallon vary by water source and type. These factors were available from a 2015 Water-Energy Cost Effectiveness Analysis released by the California Public Utilities Commission (CPUC) (CPUC 2015). Water conveyed from the State Water Project (SWP) in the San Francisco Bay water region requires 926 kWh per acre feet, which is between 2 and 90 times more energy than water sourced from local surface water, depending on the local source (e.g., groundwater, local deliveries) (CPUC 2015). Based on data collected, all the water imported to the region was sourced from the SWP and resulted in the usage of approximately 28.8 GWh outside of the region in 2019. Average eGRID CAMX emission factors were applied to this usage to get total emissions from imported water use. Results are shown below in Table 14 and 15 below.

**Table 14 2019 Napa County Regional Imported Water and Energy Use by Jurisdiction**

Jurisdiction	State Water Project (MG/year)	MWh/Year
American Canyon	661	4,759
Calistoga	154	1,109
Napa	2,948	21,224
St. Helena	191	1,378
Yountville	43	313
Unincorporated County	0	0
Total	3,998	28,783

Notes: MG = million gallons, MWh = megawatt hours

Source: Data compiled by Ascent Environmental in 2022.

## SOLID WASTE

Based on modeling conducted, the solid waste sector was responsible for approximately 198,862 MTCO<sub>2</sub>e, or 16 percent of the region's 2019 GHG inventory. The Community Protocol recommends that community GHG inventories include emissions from both solid waste facilities located in the community (i.e., "waste-in-place") and waste generated by the community. Waste-in-place CH<sub>4</sub> emissions from landfill gas (LFG) generated at solid waste facilities located within the region accounted for 114,619 MTCO<sub>2</sub>e, or 57 percent of emissions from the solid waste sector. CH<sub>4</sub> emissions from decay of waste generated annually by residences and businesses in the region accounted for 84,243 MTCO<sub>2</sub>e, or 42 percent of emissions from the solid waste sector. Table 15 summarizes emissions from the solid waste sector.

LFG is a mix of gases, primarily composed of CH<sub>4</sub>, generated from decomposing organic waste and waste chemical reactions and evaporation in landfills. If a landfill has an impermeable membrane that covers a portion or all of the landfill (i.e., cover-and-capture), it can harvest the LFG and prevent CH<sub>4</sub> emissions from being released into the atmosphere. Once captured, a landfill can either convert the CH<sub>4</sub> to CO<sub>2</sub> through flaring or use it as a fuel for other energy-related applications. For the two landfills in the region, LFG generation and flaring rates for 2019 were available from EPA's Facility-Level Information on Greenhouse Gases (FLIGHT) database (EPA 2022). Any CO<sub>2</sub> emissions from flaring were not counted toward the region's inventory because the IPCC considers any CO<sub>2</sub> emissions from flaring or fugitive emissions to be of biogenic origin and not significant to overall solid waste emissions (IPCC 2006).

**Table 15 2019 Napa County Regional GHG Inventory: Solid Waste Generation Emissions by Jurisdiction**

Jurisdiction	Waste Generation			Waste-in-Place		MTCO <sub>2</sub> e
	Annual Waste Tonnage	Annual ADC Tonnage	MTCH <sub>4</sub>	MTCH <sub>4</sub>	MTN <sub>2</sub> O	
American Canyon	68,529	657	930	0	0	25,938
Calistoga	12,519	1,092	179	0	0	4,981
Napa	50,755	41,501	1,227	0	0	34,236
St. Helena	14,254	1,243	203	0	0	5,675
Yountville	6,533	570	93	0	0	2,601
Unincorporated County	28,105	761	4,495	4,108	<1	125,429
Total	180,695	45,824	7,127	4,108	<1	198,862

Notes: ADC = Alternative Daily Cover,  $MTCH_4$  = metric tons of methane,  $MTN_2O$  = metric tons of nitrous oxide,  $MTCO_{2e}$  = metric tons of carbon dioxide equivalent.

Source: Data provided by Ascent Environmental 2022 based on data from EPA 2022.

## Waste in Place

The only landfills located within the region are the American Canyon Sanitary Landfill (ACSL) and the Clover Flat Landfill near Calistoga, both located in the Unincorporated County. While Clover Flat is open and currently accepting waste, ASCL closed in 1995 and currently has an active LFG collection system. According to FLIGHT, in 2019, the American Canyon landfill generated 2,574  $MTCH_4$  in fugitive  $CH_4$  emissions from accumulated waste at the landfill in 2019 (EPA 2022). Clover Flat also has an active LFG collection system but does not anticipate closure of the landfill until 2053. In 2019, Clover Flat generated 1,534  $MTCH_4$  in fugitive  $CH_4$  emissions (EPA 2022).  $CH_4$  emissions from closed landfills generally decrease overtime due to the gradual reduction in organic decomposition.

## Waste Generation

For emissions related to annual solid-waste generation from the community in the region,  $CH_4$  emissions are also generated from organic decomposition. The release of  $CH_4$  emissions from community-generated waste depends on which landfill the waste is disposed at as the LFG management systems differ.

## ON-ROAD VEHICLES

Based on modeling conducted, on-road vehicle usage in the region resulted in 472,677  $MTCO_{2e}$  in 2019, or 39 percent of the County's inventory. On-road vehicle emissions are primarily the result of exhaust from the combustion of gasoline, diesel, and natural gas fuels, based on average 2019 fleet-wide emission factors for Napa County available from EMFAC2021. On-road passenger vehicle activity was based on the annual VMT associated with trips that begin or end in the region. Origin and destination-based daily VMT data by jurisdiction were obtained from average weekday VMT from MTC's VMT Data Portal and (MTC 2015, Brazil pers. comm., 2022). It was assumed that vehicle trips included 100 percent of vehicle trips that both originate from and end in the unincorporated area (i.e., fully internal trips), 50 percent of trips that either end in or depart from the unincorporated area (i.e., internal-external or external-internal trips), and zero percent of vehicle trips that are simply passing through the area (i.e., external-external, or "pass-through," trips). This passenger vehicle trip accounting method is consistent with the method recommended to CARB in 2010 by the RTAC (established through the Sustainable Communities and Climate Protection Act of 2008 [Senate Bill 375]).

MTC provided passenger vehicle VMT only. To estimate VMT from commercial vehicles (e.g., medium and heavy duty trucks), EMFAC2021 was used to calculate a ratio between passenger VMT and non-passenger VMT. Direct VMT and emissions from EMFAC are not typically used in GHG inventories as they are based on odometer data rather than the RTAC method. The calculated passenger-non-passenger ratio was then applied to the VMT from MTC to estimate non-passenger VMT.

Table 16 shows total annual VMT by vehicle fuel type and associated emissions estimates for the region.

**Table 16** 2019 Napa County Regional GHG Inventory: On-Road Vehicle Fleet Activity and Emissions by Jurisdiction

Jurisdiction	VMT/yr	MTCO <sub>2</sub> /yr	MTCH <sub>4</sub> /yr	MTN <sub>2</sub> O/yr	MTCO <sub>2e</sub> /yr
American Canyon	197,342,562	89,970	5	6	91,830
Calistoga	36,929,027	16,836	1	1	17,184
Napa	602,862,651	274,850	15	19	280,533
St. Helena	65,890,979	30,040	2	2	30,661
Yountville	26,656,274	12,153	1	1	12,404
Unincorporated County	86,095,646	39,252	2	3	40,063
Total	1,015,777,139	463,100	26	32	472,677

Notes: VMT = vehicle miles traveled; kWh = kilowatt-hour; MT = metric tons; CO<sub>2</sub> = carbon dioxide; CH<sub>4</sub> = methane; N<sub>2</sub>O = nitrous oxide; CO<sub>2e</sub> = carbon dioxide equivalent.

Source: MTC 2022, Brazil, pers. comm., 2022; data compiled by Ascent Environmental 2022.

MTC provided vehicle travel information for the region based on their regional travel demand model under Plan Bay Area 2040. MTC provided average daily weekday VMT estimates in 2019. These were multiplied by annualization factors recommended by MTC (353.29 days per year for all jurisdictions except the City of Napa, which uses 340.84 days per year) to estimate annual VMT to account for lower VMT during weekends, holidays, and summer periods (Brazil, pers. comm., 2022). Emissions from electricity use in electric vehicles were assumed to be included in the building energy inventory.

## OFF-ROAD VEHICLES

Based on modeling conducted, off-road vehicles operating in the region emitted approximately 115,548 MTCO<sub>2e</sub> in 2019, or 9 percent of the region's 2019 inventory. These emissions were the result of fuel combustion in off-road vehicles and equipment used in construction, industry, and recreation and were available from CARB's OFFROAD2021 model. Unfortunately, the OFFROAD2021 model only provides emissions detail at the State, air basin, or county level. Napa County emissions data from OFFROAD2021 were apportioned to each jurisdiction area using custom scaling factors depending on the off-road equipment type, as shown in Table 18. For example, due to the likely correlation between commercial activity and employment, each jurisdiction's portion of emissions from light commercial equipment in the County is assumed to be proportional to the number of jobs in the region as compared to the County as a whole. On the other hand, emissions from pleasure craft are assumed to occur entirely within the County because the majority of navigable waterways in the County are located in the unincorporated area. Further details on how OFFROAD emissions from each fleet type were scaled to the unincorporated area are discussed below. Note that, although reported by the OFFROAD model, emissions from agricultural equipment included separately in the agriculture sector and are excluded from the off-road vehicles sector.

Emissions from locomotives (e.g., Napa Valley Wine Train) are not included in the OFFROAD model and were also excluded from the regional inventory at this time. The estimated annual emissions and scaling factors were used to apportion the offroad emissions to each jurisdiction are presented in Table 17 below by fleet type.

**Table 17 2019 Napa County Regional GHG Inventory: Off-Road Emissions by Fleet Type**

Off-Road Fleet Type	MTCO <sub>2</sub> /yr	MTCH <sub>4</sub> /yr	MTN <sub>2</sub> O/yr	MTCO <sub>2</sub> e/yr	Percent	Jurisdiction: Countywide Scaling Method
Airport Ground Support	<1	<1	<1	<1	0%	All assumed to occur in the Unincorporated County
Commercial Harbor Craft	135	<1	<1	140	0%	Employment
Construction and Mining	12,250	1	<1	12,294	11%	Service Population
Industrial	5,366	2	<1	5,490	5%	Employment
Lawn and Garden Equipment	23,608	35	15	28,726	25%	Population
Light Commercial Equipment	23,132	6	4	24,282	21%	Employment
Pleasure Craft	26,792	19	6	28,896	25%	All assumed to occur in the Unincorporated County
Portable Equipment	9,721	3	1	10,088	9%	Employment
Railyard Operations	383	<1	0	383	0%	Employment
Recreational Equipment	1,904	5	2	2,687	2%	Population
Transport Refrigeration Units	2,551	<1	<1	2,561	2%	Service Population
Total	105,841	71	28	115,548	100%	

Notes: MT = metric tons; CO<sub>2</sub> = carbon dioxide; CH<sub>4</sub> = CH<sub>4</sub>; N<sub>2</sub>O = nitrous oxide; CO<sub>2</sub>e = carbon dioxide equivalent; GHG = greenhouse gas.

Source: Data provided by Ascent Environmental in 2022, based on modeling from OFFROAD2021.

All commercial and industrial off-road emissions were scaled from countywide estimates by the unincorporated percentage of jobs in 2019. Emissions related to lawn and garden and recreational equipment were scaled by population. Countywide emissions from pleasure craft and airport ground support were assumed to entirely occur in the unincorporated areas.

## AGRICULTURE

Based on modeling conducted, emissions from the agriculture sector accounted for approximately 103,381 MTCO<sub>2</sub>e from agricultural activity such as off-road equipment, diesel-powered agricultural engines (e.g., irrigation pumps), and stationary equipment, direct emissions from livestock, and fertilizer use. This sector accounted for 8 percent of regional emissions. Fuel combustion in off-road farm equipment and fertilizer application made up 46 percent and 21 percent of total emissions from the sector, respectively. Other emissions estimated for this sector were from fertilizer use, lime application, and diesel-powered agricultural engines (e.g., irrigation pumps). These emissions are summarized in Table 18 below.

**Table 18 2019 Napa County Regional GHG Inventory: Agriculture Emissions by Source**

Source	MTCO <sub>2</sub> /yr	MTCH <sub>4</sub> /yr	MTN <sub>2</sub> O/yr	MTCO <sub>2</sub> e/yr	Percent
Agricultural Equipment	130	0	0	47,682	46%
Fertilizer Application	452	-	79	21,948	21%
Diesel Engines	15,417	-	-	15,417	15%
Livestock	-	650	1	18,334	18%
Total	15,999	650	80	103,381	100%

Notes: MT = metric tons; CO<sub>2</sub> = carbon dioxide; CH<sub>4</sub> = CH<sub>4</sub>; N<sub>2</sub>O = nitrous oxide; CO<sub>2</sub>e = carbon dioxide equivalent; GHG = greenhouse gas.

<sup>1</sup> Pesticide application emissions were less than 0.5 MT.

Source: Data compiled by Ascent Environmental in 2022.

GHG emissions associated with farming equipment were obtained from CARB's OFFROAD2021 model. Farming equipment emissions reported for Napa County are assumed to occur entirely within the region. GHG emissions from fertilizers primarily result from their nitrogen content and the application of urea and lime. Data regarding tonnage of nitrogen and lime were obtained from CDFA's *2019 Fertilizer Tonnage Report* (CDFA 2020). Based on this report, 1,718 tons of nitrogen and 1,132 tons of lime were sold in Napa County in 2019. These amounts were used to estimate GHG emissions. These values include a small percentage of non-farm fertilizer sales which were included to allow for complete accounting of fertilizer use as an emissions source in the region. Emissions factors and quantification methods for GHG emissions associated with fertilizer application were obtained from IPCC (IPCC 2006). Using IPCC's methodologies, approximately 21,994 MTCO<sub>2</sub>e were emitted from fertilizer application in 2019. A detailed breakdown of fertilizer emissions by type is shown in Table 19.

**Table 19 2019 Agricultural Fertilizer Application Emissions in Napa County**

Material	Material (Tons)	CO <sub>2</sub> e Emissions (MTCO <sub>2</sub> e/year)
Nitrogen	1,718	21,496
Liming Materials	1,132	452
Total	2,850	21,948

Notes: CO<sub>2</sub>e = carbon dioxide equivalent. Non-farm fertilizer use was excluded. See the Attachment A for more details.

Source: CFDA 2019, Data modeled by Ascent Environmental in 2022.

According to BAAQMD, there were 131 diesel engines with valid permits in 2019 (Henderson, pers. comm., 2022). These engines are primarily remote irrigation or defrosting equipment which either pump or spray water for their respective purposes. To estimate their emissions, emission factors were quantified from a CARB diesel irrigation report, which estimated that, in 2006, there were 147 diesel irrigation pumps operating in Napa County which emitted an average of 28.4 tons of CO<sub>2</sub> per day, or 0.193 tons of CO<sub>2</sub> per day per pump (CARB 2006). Although this reference is 16 years old, CARB has not released more recent descriptions of their methodology in quantifying this sector. Applying this rate to the total number of permitted diesel engines in the county and multiplying it by 365 days per year resulted in an estimate of 15,417 MTCO<sub>2</sub> from the operation of diesel irrigation pumps in 2019.

With respect to livestock emissions, CH<sub>4</sub> and nitrous oxide emissions are released through enteric fermentation (a type of digestion process) and exposure of manure produced by these animals. The 2019 Napa County Crop Report provided estimates of total heads of cattle, calves, goats, and sheep and lambs in the county. All livestock-generated GHG emissions were estimated using population-based emission factors and quantification methods identical to those by CARB in the statewide 2019 GHG inventory.

With the exception of agricultural diesel engines, all sources of agricultural emissions were apportioned to each jurisdiction based on relative proportion of agricultural acres in the region. These acres are presented in Table 20. Agricultural diesel engines were scaled to each jurisdiction based on the engine permit location data provided by BAAQMD.

**Table 20 Agricultural Acres by Jurisdiction**

Jurisdiction	Agricultural Acres
American Canyon	95
Calistoga	168
Napa	392
St. Helena	1,100
Yountville	46
Unincorporated County	52,213
Total	54,014

Source: Malito, pers. comm., 2022.

## REFERENCES

- Brazil, Harold. Metropolitan Transportation Commission. Planner. San Francisco, CA. April 12, 2022—Email to Brenda Hom of Ascent Environmental regarding the annualization factors for the VMT Data Portal.
- California Air Resources Board. 2006 (August). Appendix D Emission Inventory Methodology Agricultural Irrigation Pumps – Diesel. Available: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/agen06/append.pdf>. Accessed June 7, 2022.
- . 2021a (July). *Latest state Greenhouse Gas Inventory shows emissions continue to drop below 2020 target*. July 28, 2021. Available: <https://ww2.arb.ca.gov/news/latest-state-greenhouse-gas-inventory-shows-emissions-continue-drop-below-2020-target>. Accessed June 7, 2022.
- . 2021b. *California Greenhouse Gas Emissions for 2000 to 2019 Trends of Emissions and Other Indicators*. Available: [https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000\\_2019\\_ghg\\_inventory\\_trends\\_20220516.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000_2019_ghg_inventory_trends_20220516.pdf). Accessed June 7, 2022.
- CARB. See California Air Resources Board.
- California Department of Food and Agriculture. 2020. *Fertilizing Materials Tonnage Report: January – June 2019*. Available: [http://www.cdffa.ca.gov/is/ffldrs/pdfs/2019\\_Tonnage.pdf](http://www.cdffa.ca.gov/is/ffldrs/pdfs/2019_Tonnage.pdf). Accessed October 13, 2020.
- California Department of Finance. 2012. E-4 Population Estimates for Cities, Counties, and the State, 2001-2010, with 2000 & 2010 Census Counts. Available: [https://dof.ca.gov/wp-content/uploads/Forecasting/Demographics/Documents/E4\\_2000-2010\\_Report\\_Final\\_EOC\\_000.xlsx](https://dof.ca.gov/wp-content/uploads/Forecasting/Demographics/Documents/E4_2000-2010_Report_Final_EOC_000.xlsx). Accessed June 7, 2022.
- . 2021. E-4 Population Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark. Available: <https://dof.ca.gov/forecasting/demographics/estimates/>. Accessed June 7, 2022.
- California Department of Transportation. 2020 (December). *California Public Road Data. Statistical Information Derived from the Highway Performance Monitoring System*. Available: <https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system>. Accessed: June 7, 2022.
- California Energy Commission. 2019. 2018 POWER CONTENT LABEL Pacific Gas and Electric Company. Available: [https://www.energy.ca.gov/sites/default/files/2020-01/2018\\_PCL\\_PG\\_and\\_E.pdf](https://www.energy.ca.gov/sites/default/files/2020-01/2018_PCL_PG_and_E.pdf). Accessed June 7, 2022.
- . 2020. 2019 POWER CONTENT LABEL Pacific Gas and Electric Company. Available: <https://www.energy.ca.gov/filebrowser/download/3245>. Accessed June 7, 2022.
- . 2021. 2020 POWER CONTENT LABEL Pacific Gas and Electric Company. Available: <https://www.energy.ca.gov/filebrowser/download/3882>. Accessed June 7, 2022.
- California Public Utilities Commission. 2015 (April). *Water/Energy Cost-Effectiveness Analysis*.
- Caltrans. See California Department of Transportation.
- CDFA. See California Department of Food and Agriculture.
- CEC. See California Energy Commission.
- County of Napa. 2018 (July). *Revised Draft Climate Action Plan*. Available: <https://www.countyofnapa.org/DocumentCenter/View/9247/Revised-Draft-CAP-PDF?bidId=>. Accessed June 7, 2022.
- CPUC. See California Public Utilities Commission

DOF. See California Department of Finance

EDD. See Employment Development Department

Employment Development Department. 2022. California Labor Market Information. Available: <https://www.labormarketinfo.edd.ca.gov/file/lfhist/19aasub.xls>. Accessed June 7, 2022.

EPA. See U.S. Environmental Protection Agency.

Herrick, Mariela. Community Development Manager. Marin Clean Energy. San Rafael, CA. January 12, 2022—email to Deborah Elliott of the County of Napa regarding the 2019 customer energy purchases by jurisdiction.

Henderson, Rochele. Public Records Officer. Bay Area Air Quality Management District. San Francisco, CA. April 14, 2022—email to Brenda Hom of Ascent Environmental with list of agricultural engine permits in Napa County.

ICLEI. See ICLEI – Local Governments for Sustainability.

IPCC. See Intergovernmental Panel on Climate Change.

ICLEI – Local Governments for Sustainability. 2019. *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*. Version 1.2.

Intergovernmental Panel on Climate Change. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use*. Available: [https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4\\_Volume4/V4\\_11\\_Ch11\\_N2O&CO2.pdf](https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_11_Ch11_N2O&CO2.pdf). Accessed August 24, 2021.

———. 2021 (August). *Climate Change 2021: The Physical Science Basis. Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity - Supplementary Material*. Available: [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Full\\_Report.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf). Accessed August 18, 2021.

Malito, Toosdi. Assistant Agricultural Commissioner/Sealer. County of Napa. Napa, CA. May 18, 2022—email to Deborah Elliott of the County of Napa with agricultural acres by jurisdiction in Napa County.

Marin Clean Energy. 2015. Opt Out to Choose PG&E Service. Available: <http://mcecleanenergy.org/opt-out/>. Accessed January 26, 2016.

———. 2020a. MCE 2019 Power Content Label. Available: <https://www.mcecleanenergy.org/wp-content/uploads/2020/10/MCE-2019-Power-Content-Label.pdf>. Accessed August 31, 2022.

———. 2020b. MCE 2019 Emission Factor Certification Template, as provided by The Climate Registry. Available: [https://www.mcecleanenergy.org/wp-content/uploads/2020/11/MCE-2019-Emission-Factor-Certification-Template-CY\\_2019.pdf](https://www.mcecleanenergy.org/wp-content/uploads/2020/11/MCE-2019-Emission-Factor-Certification-Template-CY_2019.pdf). Accessed October 21, 2022.

———. 2022. Light Green 60% Renewable. Available: <https://www.mcecleanenergy.org/60-renewable/>. Accessed June 7, 2022.

Metropolitan Transportation Commission. 2015. Vehicle Miles Travelled Data Portal. Available: <http://capvmt.us-west-2.elasticbeanstalk.com/data>. Accessed June 7, 2022.

Napa County Transportation & Planning Agency. 2009 (December). *Napa Countywide Community Climate Action Framework*. Available: [https://www.napawatersheds.org/managed\\_files/Document/4269/Draft\\_napa\\_climate.pdf](https://www.napawatersheds.org/managed_files/Document/4269/Draft_napa_climate.pdf). Accessed June 7, 2022.

NCTPA. See Napa County Transportation & Planning Agency

The Climate Registry. 2020. *2020 Default Emission Factor Document*. Available:

<https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf>. Accessed August 5, 2022.

U.S. Environmental Protection Agency. 2021 (February). *Emissions & Generation Integrated Database (eGRID)*.

Available: <https://www.epa.gov/egrid/download-data>. Accessed August 1, 2022.

\_\_\_\_\_. 2022. EPA Facility Level Information on Greenhouse Gases Tool. Available:

<http://ghgdata.epa.gov/ghgp/main.do>. Accessed June 7, 2022.

# Attachment A

---

**Table A-1 2019 Napa County Regional GHG Inventory – Base Activity Data**

Emissions Sector	Sub-Sector	Unit	American Canyon	Calistoga	Napa	St. Helena	Yountville	Unincorporated County	Total
Building Energy	Residential	kWh	35,398,348	12,052,911	159,409,155	18,666,598	6,471,730	98,777,212	330,775,954
		therm	2,548,344	734,642	12,209,856	1,068,123	434,563	9,430,232	26,425,761
	Non-Residential	kWh	68,546,637	15,978,620	211,271,867	41,427,420	34,934,080	223,726,266	595,884,890
		therm	89,005	-	7,612,956	949,954	-	4,245,848	12,897,764
On-Road Transportation	Countywide	VMT	197,342,562	36,929,027	602,862,651	65,890,979	26,656,274	86,095,646	1,015,777,139
Solid Waste	Waste Generation	Tons of Waste	68,529	12,519	50,755	14,254	6,533	28,105	180,695
	Waste Generation	Tons of ADC	657	1,092	41,501	1,243	570	761	45,824
	Waste-in-Place (Clover Flat Landfill)	Reported Annual Methane (MTCH <sub>4</sub> )	0	0	0	0	0	2,574	2,574
	Waste-in-Place (American Canyon Landfill)	Reported Annual Methane (MTCH <sub>4</sub> )	0	0	0	0	0	1,534	1,534
Off-Road Equipment	See Note 1								
Agriculture	Agricultural Offroad	See Note 1							
	Fertilizer Application	tons of lime	2	4	8	23	1	1,094	1,132
		tons of nitrogen	3	5	12	35	1	1,661	1,718
	Diesel Engines	No. of engines	0	0	7	41	0	193	241
	Livestock	Calves	4	8	18	52	2	2,461	2,546
		Cattle	10	18	42	117	5	5,558	5,750
		Goats	0	1	1	4	0	193	200
Sheep and Lambs		3	5	12	35	1	1,643	1,700	
Wastewater	Centralized WWTP	Population Served	20,996	5,348	79,300	6,094	2,793	618	115,149
	Septic Tanks	Population Served	0	0	0	0	0	24,459	24,459
Imported Water	State Water Project	MG/year	661	154	2,948	191	43	0	3,998

Note: kWh = kilowatt hours, VMT = vehicle miles travelled, ADC = alternative daily cover, MTCH<sub>4</sub> = metric tons of methane, WWTP = wastewater treatment plant, MG = million gallons.

<sup>1</sup>Off-road emissions were directly obtained from CARB's OFFROAD 2021 model and apportioned to each jurisdiction.

Source: Ascent Environmental 2022.