Draft 2045 Climate Action Plan
Comment Letters Received
Agencies

1. California Department of Fish and Wildlife
2. City of Santa Clarita
3. Los Angeles County Sanitation Districts
4. Metro
5. Ventura County Air Pollution Control District

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
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(858) 467-4201
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

Via Electronic Mail Only

June 30, 2022

Thuy Hua
Los Angeles County Department of Regional Planning
320 W. Temple St. 13th Floor
Los Angeles, CA 90012
THua@planning.lacounty.gov

Subject: Draft Program Environmental Impact Report for the Los Angeles County 2045 Climate Action Plan, SCH #2021120568, Los Angeles County Department of Regional Planning, Los Angeles County

Dear Ms. Hua:

The California Department of Fish and Wildlife (CDFW) has reviewed a Draft Program Environmental Impact Report (DEIR) from the Los Angeles County Department of Regional Planning (DRP) for the Los Angeles County 2045 Climate Action Plan (Project). CDFW appreciates the opportunity to provide comments regarding aspects of the Project that could affect fish and wildlife resources and be subject to CDFW's regulatory authority under the Fish and Game Code.

CDFW's Role

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State [Fish & G. Code, §§ 711.7, subdivision (a) & 1802; Pub. Resources Code, § 21070; California Environmental Quality Act (CEQA) Guidelines, § 15386, subdivision (a)]. CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (Id., § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect State fish and wildlife resources.

CDFW is also submitting comments as a Responsible Agency under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code, including lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 *et seq*.). Likewise, to the extent implementation of the Project as proposed may result in "take", as defined by State law, of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 *et seq.*), or CESA-listed rare plant pursuant to the Native Plant Protection Act (NPPA; Fish & G. Code, § 1900 *et seq.*), CDFW recommends the Project proponent obtain appropriate authorization under the Fish and Game Code.

Project Description and Summary

Objective: The Project proposes to amend the Los Angeles County (County) General Plan to replace the Unincorporated Los Angeles County Community Climate Action Plan 2020 with the Draft 2045 Climate Action Plan (Draft 2045 CAP). The Draft 2045 CAP would be a policy document intended to reduce unincorporated County-wide greenhouse gas (GHG) emissions. The Draft 2045 CAP identifies measures to effectively meet GHG emissions reduction targets for 2030 and 2035 that are consistent with the State's targets and executive orders. The Draft 2045 CAP also includes an aspirational GHG emissions reduction goal of carbon neutrality by 2045. The Draft 2045 CAP also furthers the vision and goals of the OurCounty Sustainability Plan.

The Draft 2045 CAP is organized around 10 primary strategies to achieve the estimated reduction in GHG emission. Additional implementing actions, including new ordinances, policies, resolutions, programs, incentives, and outreach and education activities, would achieve the estimated reduction in GHG emissions.

- Strategy 1: Decarbonize the energy supply
- Strategy 2: Increase densities and diversity of land uses near transit
- Strategy 3: Reduce single-occupancy vehicle trips
- Strategy 4: Institutionalize low-carbon transportation
- Strategy 5: Decarbonize buildings
- Strategy 6: Improve efficiency of existing building energy use
- Strategy 7: Conserve water
- Strategy 8: Minimize waste and recover energy and materials from the waste stream
- Strategy 9: Conserve forests and working lands
- Strategy 10: Sequester carbon and implement sustainable agriculture

Implementation of the Draft 2045 CAP would occur over three phases, which take advantage of easier short-term actions to meet the 2030 target and then build up to more complex solutions as the 2035 target and 2045 aspirational goal approach.

- Phase 1: Short-Term Actions (2023-2025) - Short-term actions that are high-priority with large emissions reductions to lay the foundation for longer term actions.
- Phase 2: Mid-Term Actions (2025-2035) - Actions needed to achieve the 2030 or 2035 GHG emissions reduction targets that may need additional time, funding, or new technology to implement.
- Phase 3: Longer Term Actions (2035-2045) - Actions focused on helping the County reach its 2045 GHG emissions reduction aspirational goal that may need substantial time, funding, or new technology to implement.

The Draft 2045 CAP would serve as the overarching implementation plan through the 2035 target year and is expected to be updated every five years to reflect new advances and technologies in GHG emissions reduction strategies.

Location: Implementation of the Project would occur throughout unincorporated Los Angeles County in all General Plan, Community Plan, Area Plan, and zoning designations. These areas

occupy approximately 1,696,000 acres, or 2,650 square miles (approximately 65 percent of the total land area of the County).

Comments and Recommendations

CDFW offers the comments and recommendations below to assist DRP in adequately identifying, avoiding, and/or mitigating the Project's significant, or potentially significant, direct, and indirect impacts on fish and wildlife (biological) resources. CDFW recommends the measures or revisions below be included in a science-based monitoring program that contains adaptive management strategies as part of the Project's CEQA mitigation, monitoring, and reporting program (Pub. Resources Code, § 21081.6; CEQA Guidelines, § 15097).

Specific Comments

Comment #1: Impacts on Aquatic Resources and Associated Natural Communities

Issue: Individual projects facilitated by Draft 2045 CAP measures and actions could impact streams and associated natural communities.

Specific impacts: Individual projects facilitated by Draft 2045 CAP measures and actions could affect streams and associated natural communities through channelizing or diverting a stream from its natural course of flow, removing habitat, converting habitat, filling, hydromodification, or changing water quality and quantity. In addition, increasing recycled water use for irrigation or other purposes may affect natural communities that rely on recycled water for survival.

Why impacts would occur: According to the DEIR, "Individual projects facilitated by Draft 2045 CAP measures and actions could affect state or federally protected wetlands when expanding bicycle and pedestrian networks within recreational areas, procuring zero-carbon electricity, electrifying all new development, increasing renewable energy production on new development, and expanding energy resilience. These measures may facilitate new development such as large utility-scale energy projects (e.g., solar, battery storage, substation, and transmission infrastructure) in the Antelope Valley or other undisturbed areas and could affect state or federally protected wetlands (if present) through direct removal, filling, hydromodification, or diversion or change in water quality." In addition, with regards to sensitive natural communities such as riparian habitat, the DEIR states, "Individual projects facilitated by Draft 2045 CAP measures and actions could affect sensitive natural communities […] by direct removal or conversion of habitat. Also, increasing recycled water use for irrigation or other purposes may also potentially affect sensitive natural communities in watersheds that rely on recycled water for survival due to water diversions or drought."

Evidence impacts would be significant: CDFW exercises its regulatory authority as provided by Fish and Game Code section 1600 et seq. to conserve fish and wildlife resources which includes rivers, streams, or lakes and associated natural communities. Fish and Game Code section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW prior to beginning any activity that may do one or more of the following:

- Divert or obstruct the natural flow of any river, stream, or lake[1];
- Change the bed, channel, or bank of any river, stream, or lake;
- Use material from any river, stream, or lake; or,
- Deposit or dispose of material into any river, stream, or lake.

CDFW requires a Lake and Streambed Alteration (LSA) Agreement when a project activity may substantially adversely affect fish and wildlife resources.

The Project may result in significant impacts on streams and associated natural communities if individual projects facilitated by Draft 2045 CAP measures would be in close proximity to these resources. The DEIR concluded that impacts on aquatic resources and associated natural communities are "significant and unavoidable" and "no additional feasible mitigation measures are available" (see Additional Recommendations, Recommendation #5). Without providing appropriate mitigation, the Project continues to have a substantial adverse direct, indirect, and cumulative effect, either directly or through habitat modifications, on fish and wildlife resources, including rivers, streams, or lakes and associated natural communities identified by CDFW.

Recommended Potentially Feasible Mitigation Measure(s) Required for Future Projects Facilitated by the 2045 Climate Action Plan:

Recommendation #1: CDFW's issuance of an LSA Agreement for a project that is subject to CEQA will require CEQA compliance actions by CDFW as a Responsible Agency. As a Responsible Agency, CDFW may consider the CEQA document from the lead agency/project applicant for the project. To minimize additional requirements by CDFW pursuant to Fish and Game Code section 1600 et seq. and/or under CEQA, a project's CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring, and reporting commitments for issuance of the LSA Agreement. To compensate for any on- and off-site impacts to aquatic and riparian resources, additional mitigation conditioned in any LSA Agreement may include the following: erosion and pollution control measures; avoidance of resources; protective measures for downstream resources; on- and/or off-site habitat creation; enhancement or restoration; and/or protection and management of mitigation lands in perpetuity.

Mitigation Measure #1: CDFW recommends DRP revise Mitigation Measure 3.5-1 by including the following <u>underlined</u> language:

> "**Mitigation Measure 3.5-1:** Biological resources shall be analyzed on a project-specific level by a qualified biological consultant. Prior to the start of construction activities, a general survey shall be conducted to characterize the project site, and focused surveys would be conducted as necessary to determine the presence/absence of special-status species (e.g., focused sensitive plant or wildlife surveys) <u>and a jurisdictional delineation[2] shall be required if any river, stream, or lake are present</u>. A biological resources

[1] "Any river, stream, or lake" includes those that are dry for periods of time (ephemeral/episodic) as well as those that flow year-round (perennial). This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a water body.
[2] Be advised that some wetland and riparian habitats subject to CDFW's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers' Section 404 permit and Regional Water Quality Control Board Section 401 Certification.

> assessment report shall be prepared to characterize the biological resources on-site, analyze impacts on biological resources, and propose mitigation measures to offset those impacts […]."

Mitigation Measure #2: If any river, stream, or lake are present and may be impacted, the project should be required to avoid impacts by implementing appropriate vegetative buffers and/or setbacks adjoining the stream or wetland feature to reduce impacts of the project on these resources.

Mitigation Measure #3: If avoidance is not feasible, the project applicant should be required to notify CDFW pursuant to Fish and Game Code 1602 and obtain an LSA Agreement from CDFW prior to obtaining a grading permit. The project applicant should comply with the mitigation measures detailed in a LSA Agreement issued by CDFW. The project applicant should also provide compensatory mitigation at no less than 2:1 for the impacted stream and associated natural community, or at a ratio acceptable to CDFW.

Please visit CDFW's Lake and Streambed Alteration Program webpage for more information (CDFW 2022a).

Comment #2: Impacts on Sensitive Natural Communities Identified by CDFW

Issue: Individual projects facilitated by Draft 2045 CAP measures and actions could impact oak (*Quercus* genus) and other native woodlands within the Project area.

Specific impact: Projects facilitated by Draft 2045 CAP measures and actions could result in loss of individual trees as well as acres of woodlands.

Why impacts would occur: According to the DEIR, **"**Projects facilitated by Draft 2045 CAP measures and actions could potentially affect oak woodlands and other unique native woodlands when expanding bicycle and pedestrian networks within recreational areas, procuring zero-carbon electricity, electrifying all new development, increasing renewable energy production on new development, and expanding energy resilience. These measures may facilitate new development such as large utility-scale energy projects (e.g., solar, battery storage, substation, transmission infrastructure) in the Antelope Valley. Such projects would adversely affect oak woodlands and/or other unique native woodlands directly if they would entail tree or woodland removal, or indirectly (e.g., construction vehicles drive over woodland root systems). Increasing recycled water use for irrigation or other purposes also could adversely affect oak woodlands and other unique native woodlands in watersheds that rely on recycled water due to other water diversions within the watershed or drought."

In the DEIR, DRP states that potential loss of oak and other native woodlands would be mitigated through the County's Oak Tree Ordinance and Oak Woodlands Conservation Management Act. CDFW is concerned that loss of woodlands as an entire community may not be completely mitigated through the Oak Tree Ordinance, which primarily addresses loss and replacement of individual trees. Individual trees may not completely replace the loss of viable habitat, understory vegetation, mycorrhizal fungi, and biological functions. CDFW is also concerned that the specificity of the County's Oak Tree Ordinance and Oak Woodlands Conservation Management Act may not address impacts and loss of other native woodlands

such as California walnut groves (*Juglans californica* Woodland Alliance) and Joshua tree woodland (*Yucca brevifolia* Woodland Alliance).

Evidence impacts would be significant: Oak woodlands have higher levels of biodiversity than any other terrestrial ecosystem in California. Over 330 species of birds, mammals, reptiles, and amphibians depend on oak woodlands in California at some stage in their life cycle (CalPIF 2002). Oak trees provide nesting and perching habitat for approximately 170 species of birds. Large oak trees in oak woodland habitats are important for cover, nesting sites for cup nesting species and cavity nesting species, as well as caching sites for birds storing acorns (CalPIF 2002). Oak woodlands also serve several important ecological functions important within an ecosystem such as protecting soils from erosion and land sliding, regulating water flow in watersheds, and maintaining water quality in streams and rivers.

CDFW considers oak woodlands to be a sensitive plant community. Oak trees and woodlands are protected by the Oak Woodlands Conservation Act (pursuant under Fish and Game Code sections 1360-1372) and Public Resources Code section 21083.4 due to the historic and on-going loss of these resources. Moreover, CDFW's Areas of Conservation Emphasis - Significant Habitats dataset includes oak woodlands as a Terrestrial Significant Habitat based on its priority for conservation and acquisition planning for some counties, local jurisdictions, and the Wildlife Conservation Board (CDFW 2019).

California walnut groves and Joshua tree woodland both have a State Rarity ranking of 3.2. CDFW considers natural communities, alliances, and associations with a State-wide rarity ranking of S1, S2, and S3 to be Sensitive Natural Communities. These ranks can be obtained by visiting the Vegetation Classification and Mapping Program - Natural Communities webpage (CDFW 2022b). Sensitive Natural Communities are threatened communities that have both regional and local significance. In addition, CDFW considers southern California black walnut and Joshua tree as plants with special status. Special Plant taxa are species, subspecies, or varieties that fall into one or more of the following categories:

- Officially listed by California or the Federal Government as Endangered, Threatened, or Rare;
- A candidate for state or federal listing as Endangered, Threatened, or Rare;
- Taxa listed in the California Native Plant Society's Inventory of Rare and Endangered Plants of California;
- Taxa which meet the criteria for listing, even if not currently included on any list, as described in CEQA Guidelines section 15380;
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation;
- A Bureau of Land Management, U.S. Fish and Wildlife Service, or U.S. Forest Service Sensitive Species/Species of Conservation Concern;
- Population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with extirpation in California; and
- Taxa closely associated with a habitat that is declining in California at a significant rate (e.g., wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, etc.) (CDFW 2022c).

Impacts to a Sensitive Natural Community should be considered significant under CEQA unless impacts are clearly mitigated below a level of significance. Without appropriate mitigation, the Project may result in significant impacts on a Sensitive Natural Community if individual projects facilitated by Draft 2045 CAP measures and actions would remove, encroach into, or disturb (e.g., fuel modification) such resources. Accordingly, the Project continues to have a substantial adverse direct, indirect, and cumulative effect, either directly or through habitat modifications, on sensitive natural communities identified by CDFW.

Recommended Potentially Feasible Mitigation Measure(s) Required for Future Projects Facilitated by the 2045 Climate Action Plan:

Mitigation Measure #4: Where an individual project results in the loss of native woodlands, the project should offset the loss by no less than 2:1 of the total acreage of woodlands lost. The number of replacement trees and woodland acres should be higher if a project impacts large oak trees; impacts a woodland supporting rare, sensitive, or special status plants and wildlife; impacts a woodland adjacent to a watercourse; or impacts a woodland with a State Rarity ranking of S1, S2, or S3, or additional ranking of 0.1 or 0.2.

Mitigation Measure #5: Where an individual project results in the loss of loss of native woodlands, the project should remove large trees in phases to the maximum extent feasible. A phased removal plan should be provided as a condition of obtaining a grading permit or permit under the County's Oak Tree Ordinance and/or Oak Woodlands Conservation Management Act. Removing trees in phases minimizes impacts on wildlife, primarily nesting birds, resulting from the temporal loss of trees and to provide structurally diverse woodlands while any on or off-site site mitigation for impacts to woodlands occurs.

Additional Recommendations

Recommendation #2: Impacts on Species Identified as a Candidate, Sensitive, or Special-Status Species by CDFW - CDFW recommends DRP further revise Mitigation Measure 3.5-1 by including the following underlined language in order to provide adequate mitigation to reduce the Project's impact to less than significant:

> "**Mitigation Measure 3.5-1:** Biological resources shall be analyzed on a project-specific level by a qualified biological consultant. Prior to or during the preparation of individual project-level environmental documents, and prior to the start of construction activities, a ~~general survey~~ biological resources assessment shall be conducted to characterize the project site. Adjoining habitat areas shall be included where the project's construction and activities could lead to direct or indirect impacts off site. The assessment and analysis shall place emphasis on identifying endangered, threatened, rare, and sensitive species; regionally and locally unique species; and sensitive habitats. ~~and~~ Focused surveys ~~would~~ shall be conducted as necessary to determine the presence~~/absence~~ of special-status species (e.g., focused sensitive plant or wildlife surveys). Focused surveys shall be conducted according to established CDFW or USFWS protocols if available. Natural communities shall be mapped and identified according to floristic alliance- and/or association-based mapping protocols. A jurisdictional delineation shall be required if any river, stream, or lake are present.

> A biological resources assessment report shall be prepared to characterize the biological resources on site, analyze direct and indirect impacts on biological resources, and propose mitigation measures to offset those impacts. The report shall include site location, literature sources, methodology, timing of surveys, vegetation map, site photographs, and descriptions of biological resources on site (e.g., observed and detected species as well as those species with potential to occur on site)."

Recommendation #3: Impacts on Species Identified as a Candidate, Sensitive, or Special-Status Species by CDFW – The Project area supports fish and wildlife species listed under the Endangered Species Act and CESA. To provide adequate mitigation to reduce the Project's impact to less than significant, CDFW recommends DRP condition the Project's environmental document with the following mitigation measure: If necessary, individual projects facilitated by Draft 2045 CAP measures should be required to enter into consultation with, and obtain the appropriate permits from, the USFWS and/or CDFW for unavoidable impacts to special status species and habitat. Appropriate permits from the USFWS and/or CDFW should be obtained prior to the project obtaining a grading permit.

Recommendation #4: Impacts on Movement of Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors – CDFW recommends DRP further revise Mitigation Measure 3.5-3 by including the following underlined language in order to provide adequate mitigation to reduce the Project's impact to less than significant:

> "**Mitigation Measure 3.5-3:** Individual projects facilitated by Draft 2045 CAP measures and actions shall prepare alternative designs, arrangements, and locations such that there would be no impact or severance of any wildlife corridors, linkages, and pinch points. Corridors, linkages, and pinch points shall not be entirely closed by any development, and partial mitigation shall be mandatory for project-specific impacts on wildlife corridors and wildlife nursery sites. This shall include provision of a minimum of half the corridor width (the width shall be at least what is needed to remain connective for the top predators using the corridor). Mitigation can include preservation by deed in perpetuity of other parts of the wildlife corridor connecting through the development area; it can include native landscaping to provide cover on the corridor. For nursery site impacts, mitigation shall include preservation by deed in perpetuity for another comparable nursery site of the same species."

In addition to Mitigation Measure 3.5-3 in the Project's environmental document, CDFW recommends DRP provide a mitigation measure whereby individual projects should prepare a study analyzing potential impacts on wildlife corridors from the standpoint of the following (at a minimum): 1) introducing new/additional barriers to dispersal; 2) constraining wildlife corridors and pinch points leading to severed migration; 3) habitat loss, fragmentation, and encroachment; 4) increased human presence, noise, and lighting; and 5) increased fire risk. CDFW recommends DRP revise Mitigation Measure 3.5-1 to include these specific recommendations or provide a separate mitigation measure.

Recommendation #5: Evaluation of CDFW's recommended mitigation measures – DRP concluded that many of the Project's impacts on biological resources, especially indirect impacts, are "significant and unavoidable. No additional feasible mitigation measures are available" (e.g., impacts on wildlife movement, special status species). CDFW has provided

DRP with recommended mitigation measures that are potentially feasible in order to reduce the Project's impact on biological resources to less than significant. If DRP determines/concludes that CDFW's recommendations are not feasible, CDFW would appreciate a written response why specific comments and suggestions were not accepted as part of the Project's environmental document (CEQA Guidelines, § 15088). Per CEQA Guidelines section 15091, "No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding."

Recommendation #6: Data - CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database [i.e., CNDDB] which may be used to make subsequent or supplemental environmental determinations [Pub. Resources Code, § 21003, subd. (e)]. Information on special status species should be submitted to the CNDDB by completing and submitting CNDDB Field Survey Forms (CDFW 2022d). Information on special status native plant populations and sensitive natural communities, the Combined Rapid Assessment and Relevé Form should be completed and submitted to CDFW's Vegetation Classification and Mapping Program (CDFW 2022e).

Recommendation #7: Mitigation and Monitoring Reporting Plan - CDFW recommends the DRP condition the Project's environmental document to include mitigation measures recommended in this letter. CDFW provides comments to assist DRP in developing feasible mitigation measures that are specific, detailed (i.e., responsible party, timing, specific actions, location), and clear in order for a measure to be fully enforceable and implemented successfully via a mitigation monitoring and/or reporting program (CEQA Guidelines, § 15097; Pub. Resources Code, § 21081.6). DRP is welcome to coordinate with CDFW to further review and refine the Project's mitigation measures. Per Public Resources Code section 21081.6(a)(1), CDFW has provided DRP with a summary of our suggested mitigation measures and recommendations in the form of an attached Draft Mitigation Monitoring and Reporting Plan (MMRP) (Attachment A).

Filing Fees

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Los Angeles County Department of Regional Planning and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required for the underlying Project approval to be operative, vested, and final (Cal. Code Regs., tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089).

Conclusion

We appreciate the opportunity to comment on the Project to assist the Los Angeles County Department of Regional Planning in adequately analyzing and minimizing/mitigating impacts to biological resources. CDFW requests an opportunity to review and comment on any response that the Los Angeles County Department of Regional Planning has to our comments and to receive notification of any forthcoming hearing date(s) for the Project [CEQA Guidelines, § 15073(e)]. If you have any questions or comments regarding this letter, please contact

Ruby Kwan-Davis, Senior Environmental Scientist (Specialist), at Ruby.Kwan-Davis@wildlife.ca.gov or (562) 619-2230.

Sincerely,

DocuSigned by:
B6E58CFE24724F5...

Erinn Wilson-Olgin
Environmental Program Manager I
South Coast Region

ec: CDFW
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References:

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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

Attachment A: Draft Mitigation and Monitoring Reporting Plan

Biological Resources (BIO)			
Mitigation Measure (MM) or Recommendation (REC)		**Timing**	**Responsible Party**
REC-1-Lake and Streambed Alteration (LSA) Agreement	To minimize additional requirements by CDFW pursuant to Fish and Game Code section 1600 et seq. and/or under CEQA, a project's CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring, and reporting commitments for issuance of an LSA Agreement.	Prior to finalizing the Project's CEQA document/ project-level CEQA documents	Los Angeles County Department of Regional Planning (DRP)/ Applicants of future projects facilitated by the 2045 Climate Action Plan
REC-2-Impacts on Species Identified as a Candidate, Sensitive, or Special-Status Species by CDFW	DRP should further revise Mitigation Measure 3.5-1 to state: **Mitigation Measure 3.5-1:** Biological resources shall be analyzed on a project-specific level by a qualified biological consultant. Prior to or during the preparation of individual project-level environmental documents, and prior to the start of construction activities, a biological resources assessment shall be conducted to characterize the project site. Adjoining habitat areas shall be included where the project's construction and activities could lead to direct or indirect impacts off site. The assessment and analysis shall place emphasis on identifying endangered, threatened, rare, and sensitive species; regionally and locally unique species; and sensitive habitats. Focused surveys shall be conducted as necessary to determine the presence of	Prior to finalizing the Project's CEQA document	DRP

	special-status species (e.g., focused sensitive plant or wildlife surveys). Focused surveys shall be conducted according to established CDFW or USFWS protocols if available. Natural communities shall be mapped and identified according to floristic alliance- and/or association-based mapping protocols. A jurisdictional delineation shall be required if any river, stream, or lake are present. A biological resources assessment report shall be prepared to characterize the biological resources on site, analyze direct and indirect impacts on biological resources, and propose mitigation measures to offset those impacts. The report shall include site location, literature sources, methodology, timing of surveys, vegetation map, site photographs, and descriptions of biological resources on site (e.g., observed and detected species as well as those species with potential to occur on site).		
REC-3-Impacts on Species Identified as a Candidate, Sensitive, or Special-Status Species by CDFW	DRP should condition the Project's environmental document with the following mitigation measure: If necessary, individual projects facilitated by Draft 2045 CAP measures shall be required to enter into consultation with, and obtain the appropriate permits from, the USFWS and/or CDFW for unavoidable impacts to special status species and habitat. Appropriate permits from the USFWS and/or CDFW shall be obtained prior to the project obtaining a grading permit.	Prior to finalizing the Project's CEQA document	DRP
REC-4-Impacts on Movement of Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory	DRP should revise **Mitigation Measure 3.5-3** to state: Individual projects facilitated by Draft 2045 CAP measures and actions shall prepare alternative designs, arrangements, and locations such that there would be no impact or severance of any wildlife corridors, linkages, and pinch points. Corridors, linkages, and pinch points shall not be entirely closed by any development, and partial mitigation shall be mandatory for project-specific impacts	Prior to finalizing the Project's CEQA document	DRP

Wildlife Corridors	on wildlife corridors and wildlife nursery sites. This shall include provision of a minimum of half the corridor width (the width shall be at least what is needed to remain connective for the top predators using the corridor). Mitigation can include preservation by deed in perpetuity of other parts of the wildlife corridor connecting through the development area; it can include native landscaping to provide cover on the corridor. For nursery site impacts, mitigation shall include preservation by deed in perpetuity for another comparable nursery site of the same species." In addition to Mitigation Measure 3.5-3 in the Project's environmental document, DRP should provide a mitigation measure whereby individual projects should prepare a study analyzing potential impacts on wildlife corridors from the standpoint of the following (at a minimum): 1) introducing new/additional barriers to dispersal; 2) constraining wildlife corridors and pinch points leading to severed migration; 3) habitat loss, fragmentation, and encroachment; 4) increased human presence, noise, and lighting; and 5) increased fire risk. DRP should revise Mitigation Measure 3.5-1 to include these specific recommendations or provide a separate mitigation measure.		
REC-5- Evaluation of CDFW's recommended mitigation measures	If DRP determines/concludes that CDFW's recommendations are not feasible, DRP should prepare a written response to CDFW's comments why specific comments and suggestions were not accepted as part of the Project's environmental document.	Prior to finalizing the Project's CEQA document	DRP
REC-6- Submitting Data for Sensitive and Special Status Species	Information on special status species should be submitted to the CNDDB by completing and submitting CNDDB Field Survey Forms. Information on special status native plant populations and sensitive natural communities, the Combined Rapid Assessment and Relevé Form should be completed and submitted to CDFW's Vegetation Classification and Mapping Program.	Prior to finalizing future project-level CEQA documents	Applicants of future projects facilitated by the 2045 Climate Action Plan

and Natural Communities			
MM-BIO-1 Impacts on Aquatic Resources and Associated Natural Communities – Biological Resources Assessment	Biological resources shall be analyzed on a project-specific level by a qualified biological consultant. Prior to the start of construction activities, a general survey shall be conducted to characterize the project site, and focused surveys would be conducted as necessary to determine the presence/absence of special-status species (e.g., focused sensitive plant or wildlife surveys) and a jurisdictional delineation may be required if there are signs of potentially regulated wetlands and non-wetland waters). A biological resources assessment report shall be prepared to characterize the biological resources on site, analyze impacts on biological resources, and propose mitigation measures to offset those impacts. The report shall include site location, literature sources, methodology, timing of surveys, vegetation map, site photographs, and descriptions of biological resources on site (e.g., observed and detected species as well as those species with potential to occur on site).	Preparation of project-specific CEQA document	Applicants of future projects facilitated by the 2045 Climate Action Plan
MM-BIO-2 Impacts on Aquatic Resources and Associated Natural Communities – Setbacks & Buffers	If any river, stream, or lake are present and may be impacted, the project shall be required to avoid impacts by implementing appropriate vegetative buffers and/or setbacks adjoining the stream or wetland feature to reduce impacts of the project on these resources.	Prior to finalizing project design Prior to obtaining a grading permit	DRP Applicants of future projects facilitated by the 2045 Climate Action Plan
MM-BIO-3 Impacts on Aquatic Resources and Associated Natural	If avoidance is not feasible, the project applicant shall be required to notify CDFW pursuant to Fish and Game Code 1602 and obtain an LSA Agreement from CDFW prior to obtaining a grading permit. The project applicant shall comply with the mitigation measures detailed in a LSA Agreement issued by CDFW. The project applicant shall also provide compensatory mitigation at no less	Prior to obtaining a grading permit	DRP Applicants of future projects facilitated by the

Communities – LSA Agreement under Fish and Game Code 1602	than 2:1 for the impacted stream and associated natural community, or at a ratio acceptable to CDFW.		2045 Climate Action Plan
MM-BIO-4 Impacts on Sensitive Natural Communities – Compensatory Mitigation	Where an individual project results in the loss of native woodlands, the project shall offset the loss by no less than 2:1 of the total acreage of woodlands lost. The number of replacement trees and woodland acres shall be higher if a project impacts large oak trees; impacts a woodland supporting rare, sensitive, or special status plants and wildlife; impacts a woodland adjacent to a watercourse; or impacts a woodland with a State Rarity ranking of S1, S2, or S3, or additional ranking of 0.1 or 0.2.	Prior to issuance of a grading permit or permit under the County's Oak Tree Ordinance and/or Oak Woodlands Conservation Management Act	DRP Applicants of future projects facilitated by the 2045 Climate Action Plan
MM-BIO-5 Impacts on Sensitive Natural Communities – Phased Removal of Trees	Where an individual project results in the loss of loss of native woodlands, the project shall remove large trees in phases to the maximum extent feasible. A phased removal plan shall be provided as a condition of obtaining a grading permit or permit under the County's Oak Tree Ordinance and/or Oak Woodlands Conservation Management Act.	Prior to issuance of a grading permit or permit under the County's Oak Tree Ordinance and/or Oak Woodlands Conservation Management Act	DRP Applicants of future projects facilitated by the 2045 Climate Action Plan

City of
SANTA CLARITA

23920 Valencia Boulevard • Santa Clarita, California 91355-2196
Phone: (661) 259-2489 • FAX: (661) 259-8125
www.santa-clarita.com

July 6, 2022

Los Angeles County Department of Regional Planning
Attn: Thuy Hua
320 West Temple Street, 13th Floor
Los Angeles, CA 90012

Dear Ms. Hua:

RE: COMMENTS REGARDING THE DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT FOR THE LOS ANGELES COUNTY 2045 CLIMATE ACTION PLAN

Thank you for the opportunity to comment on the Draft Program Environmental Impact Report (DPEIR) for Los Angeles County's 2045 Climate Action Plan (CAP). The City of Santa Clarita (City) has reviewed the document and prepared the following remarks:

1) Please find the attached map of the City's current boundaries. Figure 2-1 on page 2-2 of the Executive Summary contains an inaccurate depiction of these boundaries. Please use the attached map to amend Figure 2-1 and any figures or exhibits throughout the document that demonstrate the project area for the CAP and/or the City;

2) During any future review process, the County of Los Angeles (County) should carefully consider the impacts of large or utility-sized ground mounted solar fields, wind farms, and other types of alternative energy generation facilities proposed within the unincorporated areas of the Santa Clarita Valley. In cases where these types of facilities are proposed, the County should notify and solicit comments from the City;

3) During any future review process of any project contemplated by the CAP, the County should carefully consider the impacts to the scenic vistas, natural topography, and recreational facilities within the Santa Clarita Valley. In cases where these projects are proposed, the County should notify and solicit comments from the City;

4) The City of Santa Clarita will oppose any projects contemplated by the CAP within the unincorporated areas of the Santa Clarita Valley that are owned by the City of Santa Clarita and designated as natural open space; and

5) While the City of Santa Clarita, in partnership with the County, operates a robust transit system within the Santa Clarita Valley and also provides commuter service to several locations in Southern California, a significant portion of the City's working population still uses their own personal transportation to travel to and from work throughout Los Angeles County. The City encourages the County to consider reasonable and realistic transportation projects along major transportation corridors within the project area that protect and preserve the environment, while also making the daily commute for our residents more efficient and feasible.

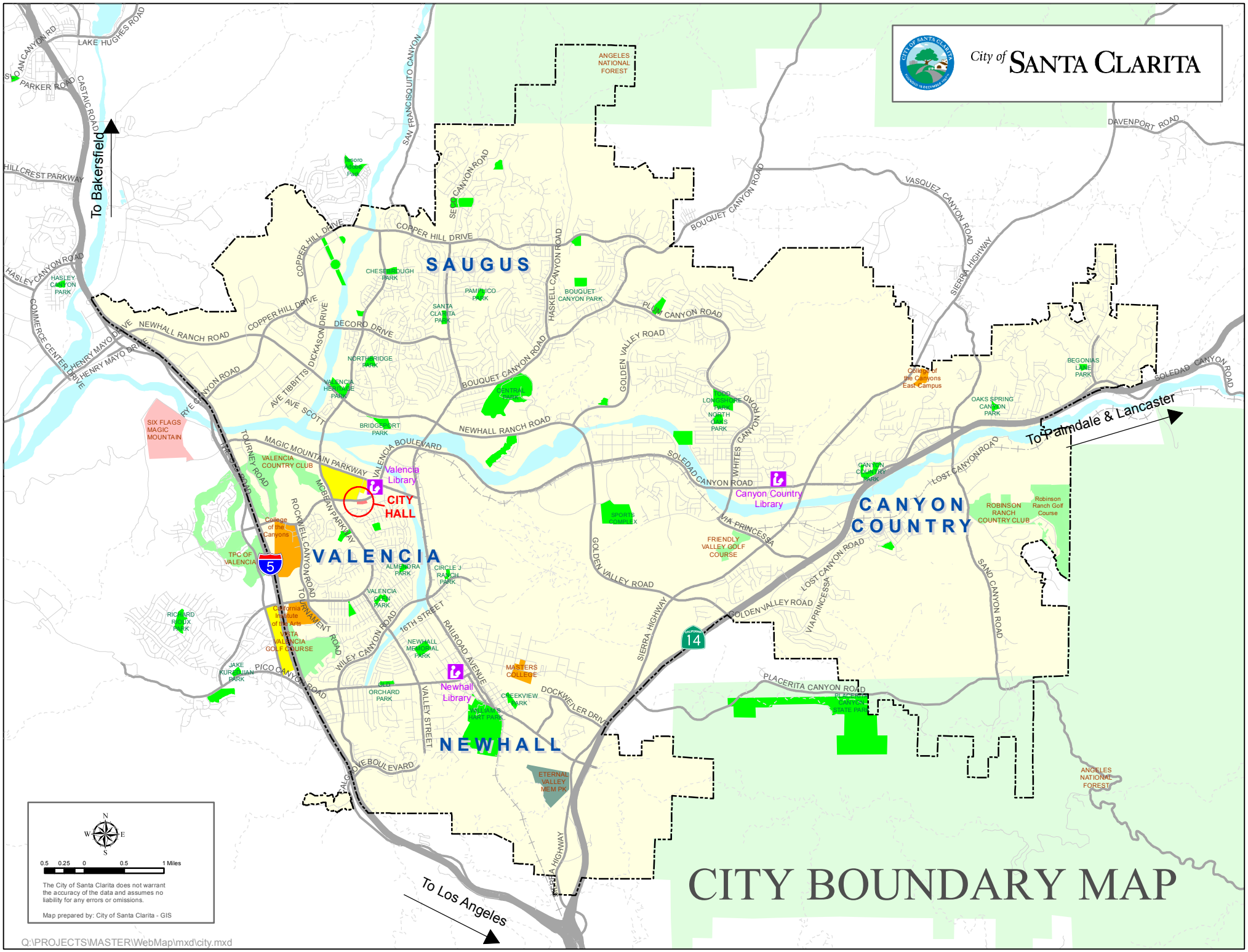
The City continues to look forward to working in partnership with the County's Department of Regional Planning on these and other issues in a manner consistent with the One Valley One Vision General Plan. Should you have any questions, please contact David Peterson, Associate Planner with the City's Planning Division. Mr. Peterson can be reached at (661) 284-1406 or via email at dpeterson@santa-clarita.com.

Sincerely,

Kenneth W. Striplin
City Manager

KS:MH:kl
s\ms\masis\letters\CAP_7.6.22

cc: Members of the City Council
Frank Oviedo, Assistant City Manager
Leadership Team
Anish Saraiya, Supervisor Kathryn Barger's Office
Stephanie English, Supervisor Kathryn Barger's Office
David Peterson, Associate Planner
Masis Hagobian, Intergovernmental Relations Officer


City of SANTA CLARITA
SAUGUS
VALENCIA
NEWHALL
CANYON COUNTRY
CITY HALL
Valencia Library
Newhall Library
Canyon Country Library
To Bakersfield
To Palmdale & Lancaster
To Los Angeles
SIX FLAGS MAGIC MOUNTAIN
VALENCIA COUNTRY CLUB
TPC OF VALENCIA
College of the Canyons
College of the Canyons East Campus
ROBINSON RANCH COUNTRY CLUB
Robinson Ranch Golf Course
FRIENDLY VALLEY GOLF COURSE
VISTA VALENCIA GOLF COURSE
MASTERS COLLEGE
ETERNAL VALLEY MEM PK
ANGELES NATIONAL FOREST
SAN FRANCISQUITO CANYON
SOLEDAD CANYON ROAD
SIERRA HIGHWAY
GOLDEN VALLEY ROAD
LOST CANYON ROAD
VIA PRINCESSA
SAND CANYON ROAD
PLACERITA CANYON ROAD
HASKELL CANYON ROAD
BOUQUET CANYON ROAD
VASQUEZ CANYON ROAD
COPPER HILL DRIVE
NEWHALL RANCH ROAD
DECORO DRIVE
PLUM CANYON ROAD
MAGIC MOUNTAIN PARKWAY
VALENCIA BOULEVARD
TOURNEY ROAD
ROCKWELL CANYON ROAD
MCBEAN PARKWAY
TOURNAMENT ROAD
WILEY CANYON ROAD
16TH STREET
RAILROAD AVENUE
DOCKWEILER DRIVE
VALLEY STREET
PICO CANYON ROAD
ALGODON DRIVE BOULEVARD
DAVENPORT ROAD
HILLCREST PARKWAY
LAKE HUGHES ROAD
PARKER ROAD
CASTAIC ROAD
HASLEY CANYON ROAD
COMMERCE CENTER DRIVE
HENRY MAYO DRIVE
RYE CANYON ROAD
AVE SCOTT
AVE TIBBITTS
DICKASON DRIVE
SEC CANYON ROAD
WHITES CANYON ROAD
SOLEDAD CANYON ROAD
LOST CANYON ROAD
CHESEBROUGH PARK
PAMPICO PARK
SANTA CLARITA PARK
BOUQUET CANYON PARK
NORTHRIDGE PARK
VALENCIA HERITAGE PARK
CENTRAL PARK
BRIDGEPORT PARK
TODD LONGSHORE PARK
NORTH OAKS PARK
OAKS SPRING CANYON PARK
BEGONIAS LANE PARK
SPORTS COMPLEX
ALMENDRA PARK
CIRCLE J RANCH PARK
VALENCIA GLEN PARK
NEWHALL MEMORIAL PARK
OLD ORCHARD PARK
CREEKVIEW PARK
PLACERITA CANYON STATE PARK
HASLEY CANYON PARK
RICHARD REDUX PARK
JAKE KURALIAN PARK
0.5 0.25 0 0.5 1 Miles
The City of Santa Clarita does not warrant the accuracy of the data and assumes no liability for any errors or omissions.
Map prepared by: City of Santa Clarita - GIS
Q:\PROJECTS\MASTER\WebMap\mxd\city.mxd
CITY BOUNDARY MAP

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

Robert C. Ferrante
Chief Engineer and General Manager

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
(562) 699-7411 • www.lacsd.org

July 6, 2022

Ms. Thuy Hua
Los Angeles County Department of Regional Planning
320 W. Temple Street, 13th Floor
Los Angeles, California 90012

Dear Ms. Hua,

LA County Draft 2045 Climate Action Plan – Comment Letter

On behalf of the Los Angeles County Sanitation Districts (Sanitation Districts) we are pleased to support the LA County Draft 2045 Climate Action Plan (Draft 2045 CAP) and would like to provide the comments below for your consideration. The Sanitation Districts serve the wastewater and solid waste management needs of approximately 5.6 million residents in the Los Angeles Basin, Santa Clarita Valley, and Antelope Valley. We operate eleven water reclamation plants, two sanitary landfills, three materials recovery/transfer facilities, and two facilities that convert landfill gas into renewable energy. An important part of our mission is to convert waste into resources such as recycled water, energy, and recycled materials.

As stated in the Draft 2045 CAP, now, more than ever, climate change has become a real, urgent, and significant threat, with impacts being felt today in Los Angeles County and around the globe. The Draft 2045 CAP adapts Los Angeles County programs and services to reduce the unincorporated County areas' greenhouse gas (GHG) emissions and help limit global temperature increases. Further, the Draft 2045 sets forth Los Angeles County's path toward meeting the goals of the Paris Agreement and achieving carbon neutrality for unincorporated areas of the County. The document is comprehensive, thoughtful and reflects the diversity and complexity of Los Angeles County.

As mentioned above, the Sanitation Districts support the vision of the Draft 2045 CAP, however, we offer the following two comments for your consideration:

1) Many Sanitation Districts' facilities are included in the Draft 2045 CAP. To ensure potential emission reductions can be achieved and to avoid double-counting emissions or proposed reductions, an inventory boundary should be determined, and each individual agency should account for and report their own GHG activities within their organization's responsibilities and sphere of control. Similarly, emission estimation methods should reflect the same inventory boundary and rely on the best available information. The Sanitation Districts have performed such an inventory using site-specific data rather than population-based estimates as assumed in the Draft 2045 CAP. While both methods are acceptable, the publication of conflicting emission estimates can be confusing to the public and decision-makers. Due to these differences, we recommend that the Draft 2045 CAP include references to the Sanitation Districts' inventory and to state that Los Angeles County and the Sanitation Districts will work cooperatively to achieve carbon neutrality. A copy of our recently completed "2021 Greenhouse Gas Inventory Report" and a third-party verification of the report titled "Positive Verification Opinion for Greeenhouse Gas Emissions and

Reductions for Emissions Year 2021" are attached. We would be happy to provide supporting data and information for our analysis, upon request.

2) The Draft 2045 CAP contains an action to capture all fugitive wastewater treatment process emissions and convert them to fuel. The Sanitation Districts would like to clarify whether Regional Planning meant to state that methane emissions from wastewater treatment processes should be captured and used as a vehicle fuel. GHG emission protocols assume nitrous oxide emissions are emitted from the wastewater treatment process and effluent discharge. If process nitrous oxide emissions cause Sanitation Districts' facilities to become carbon positive, control technologies or process enhancements would be assessed. Regarding nitrous oxide emissions from wastewater effluent, it's unlikely such a source could be controlled after being discharged from a treatment plant. In addition, fugitive emissions are defined by the EPA as "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening," so it's unclear whether such a specific statement should be made about fugitive emissions. Therefore, we recommend this action be changed to reflect that methane produced during the wastewater treatment process is collected and converted into renewable energy or fuel. Please see our website (www.lacsd.org) under "Solid Waste Programs – Food Waste Recycling" and "JWPCP CNG Fueling Facility – Alternative Fuels" for further information about our activities to utilize digester gas from wastewater treatment from diverted processed organic waste to produce renewable natural gas that is available for use as a renewable low carbon vehicle fuel.

We know that updating Los Angeles County's CAP was a significant undertaking and appreciate your leadership and all the people who have brought their dedication to help guide this effort. Please contact me at rtremblay@lacsd.org or at (562) 908-4288, extension 2701 if the Sanitation Districts can be of any assistance as you work toward implementation of the 2045 CAP.

Very truly yours,

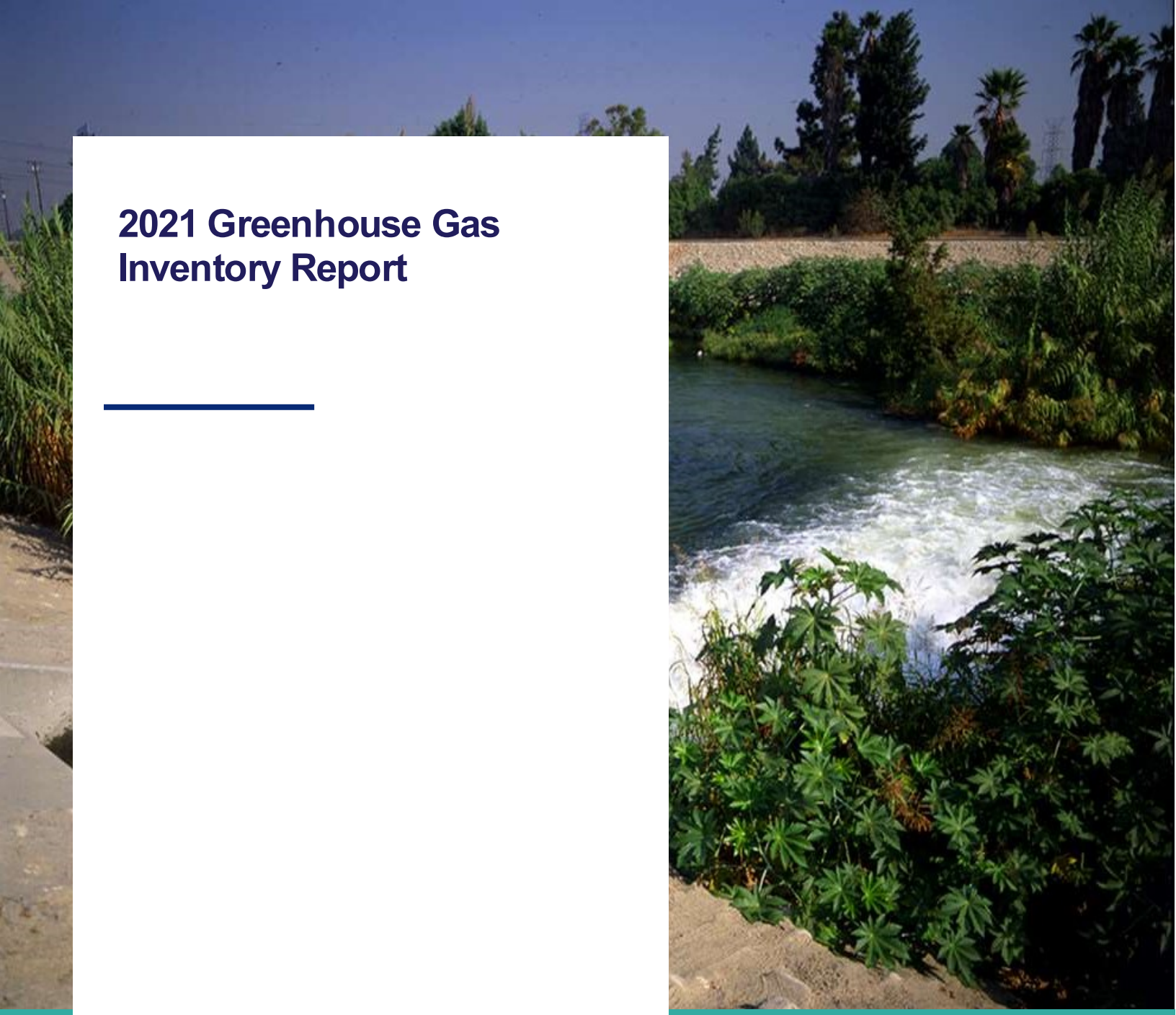
Ray Tremblay

Raymond L. Tremblay
Department Head
Facilities Planning

RT:pb

Attachments

cc: climate@planning.lacounty.gov



2021 Greenhouse Gas Inventory Report

LOS ANGELES COUNTY
SAN|TAT|ON D|STR|CTS
Converting Waste Into Resources

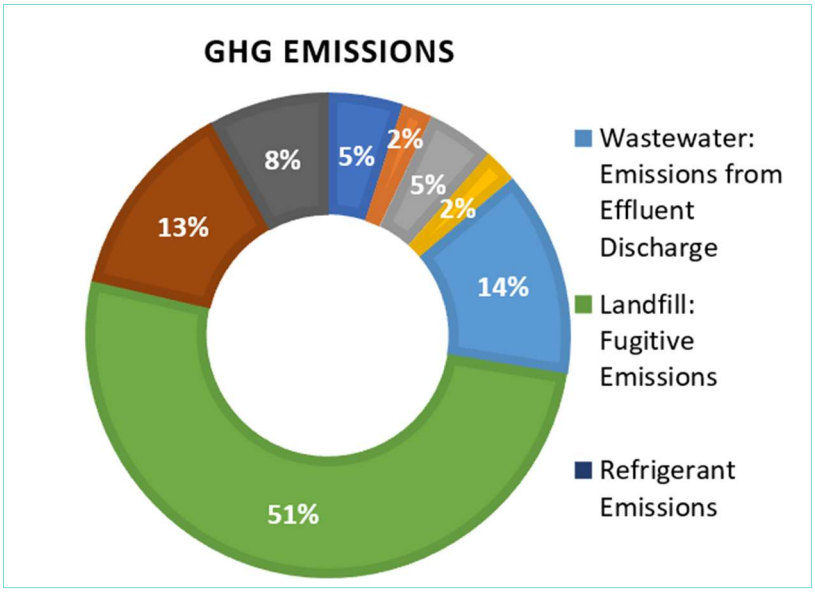
Table of Contents

Appendixes

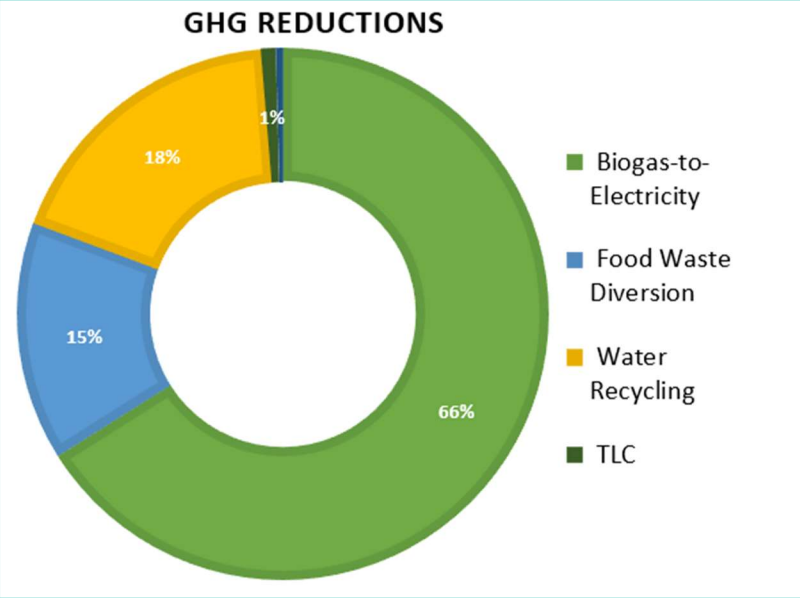
Executive Summary

This report compiles results from the 2021 greenhouse gas (GHG) inventory evaluation conducted by the Air Quality Engineering Section that encompasses all aspects of the Districts' operations. The evaluation provides information on the GHG quantities that the Districts emitted and reduced from operations, renewable energy projects, and waste diversion projects.

Of the emissions sources, fugitive landfill emissions made up 51% of the CO_2e produced. The following largest sources were emissions from wastewater effluent discharge (14%) and purchased electricity (13%).



As reported above, Districts' facilities reduced more GHG emissions than were produced. Reductions were led by biogas-to-electricity (66%), followed by water recycling (18%) and food waste diversion (15%).



It is important to remember that consultants apply a wide variety of assumptions when estimating GHG emissions and reductions. The information contained herein includes assumptions Air Quality Engineering believes are defendable. Specific information pertaining to these calculations are contained in the report below.

Background and Methodology

Emissions

The GHG emission calculations were primarily based on the current Local Government Operations Protocol (LGOP) Version 1.1, except as noted below. The LGOP categorized GHG emissions calculations into three scopes, as follows:

Scope 1	Direct emissions include emissions directly resulting from stationary and mobile combustions, process emissions from wastewater treatment processes, and fugitive emissions from landfills.
Scope 2	Indirect emissions include emissions from purchased electricity and natural gas.
Scope 3	Other emissions include emissions from employee commuting, employee business travel, and waste disposed of outside the organization boundary. [*This scope was not included in the evaluation because the Districts do not have financial or operational control over this emissions category*].

The LGOP draws a distinction between biogenic and anthropogenic emissions by excluding CO_2 from biogenic combustions. By way of review, biogenic emissions (which can only be CO_2) are considered part of the natural carbon cycle, thus typically not included in GHG inventories. Anthropogenic emissions are fossil in origin, thus adding to the existing GHG emissions inventory. For our industry, anthropogenic emissions can be fossil-based CO_2, CH_4, and N_2O. Therefore, they are included in the protocol and this evaluation as direct emissions.

Estimates of GHG Reduction

The standard protocols cited above do not estimate reductions; therefore, other calculations were used to estimate the GHG reductions. Below is the summary of methods used to evaluate the GHG reductions:

1. Biogas-to-Energy: The 2018 EPA's Avoided Emissions and Generation Tool (AVERT) emission factor was used to calculate avoided emissions from electricity produced by biogas-to-energy projects.
2. Water Recycling: The GHG reductions from water recycling were determined by comparing the energy intensity of importing water from the State Water Project (SWP) to the energy intensity of recycled water.
3. Food Waste Diversion: The EPA's Waste Reduction Model (WARM) was used to determine the GHG reduction from the food waste diversion program.
4. Tulare Lake Compost (TLC): The Biosolids Emissions Assessment Model (BEAM) was used to estimate the GHG reduction from the offset of fertilizer that would otherwise be used on the land.
5. Biogas-to-Vehicle Fuel: Carbon intensities comparison was used to estimate GHG reduction from this project.

Results

For consistency, all emission and reduction results use the standard reporting format, metric tons of CO_2 equivalent ($MTCO_2e$). CH_4 and N_2O emissions were converted to CO_2 equivalent using global warming potentials (GWP[1]). Based on the evaluation, in 2021, the Districts emitted 234,851 $MTCO_2e$ and reduced 287,449 $MTCO_2e$ of GHGs. Thus, net emissions of GHG are a negative 52,598 $MTCO_2e$ (see Tables 1.1 and 1.2).

[1] GWPs for CH_4 and N_2O are 28 and 265, respectively. Source: Intergovernmental Panel on Climate Change Fifth Assessment Report, 2014.

Table 1.1 GHG Emissions	
Stationary Emissions	12,222
Mobile Emissions	4,951
Wastewater: Emissions from Stationary Combustion	11,008
Wastewater: Emissions from Nitrification/Denitrification Process	5,478
Wastewater: Emissions from Effluent Discharge	33,665
Landfill: Fugitive Emissions	124,558
Refrigerant Emissions	126
Purchased Electricity	32,574
Natural Gas	19,626
Total	**244,207**

Table 1.2 GHG Reductions	
Biogas-to-Electricity	189,716
Food Waste Diversion	41,944
Water Recycling	52,214
TLC	2,439
Biogas-to-Vehicle Fuel	1,136
Total	**287,449**

A. Emissions

The LGOP categorized emission calculations into three scopes: direct emissions, indirect emissions, and other emissions. This evaluation includes direct and indirect emissions but excludes other emissions because the Districts do not have financial or operational control over this category. Below is the summary of 2021 direct emissions and indirect emissions.

Table A GHG Emissions		
Direct Emissions	Stationary Emissions	12,222
	Mobile Emissions	4,950
	Wastewater: Emissions from Stationary Combustion	11,008
	Wastewater: Emissions from Nitrification/Denitrification Process	5,478
	Wastewater: Emissions from Effluent Discharge	33,665
	Landfill: Fugitive Emissions	124,558
	Refrigerant Emissions	126
Indirect Emissions	Purchased Electricity	32,574
	Natural Gas	19,626
Other emissions include emissions from employee commuting, employee business travel, and waste disposed of outside the organization boundary.		Not Included
	Total	244,207

A.1 Direct Emissions

Below is the summary of direct GHG emissions:

Table A.1 - Direct Emissions	
Category	MTCO2e
Stationary Emissions	12,222
Mobile Emissions	4.950
Wastewater: Emissions from Wastewater Stationary Combustion	11,008
Wastewater: Emissions from Nitrification/Denitrification Process	5,478
Wastewater: Emissions from Effluent Discharge	33,665
Landfill Fugitive Emissions	124,558
Refrigerant Emissions	126
Total Direct Emissions	192,007

A.1.1. Emissions from Stationary Combustion

This section of the evaluation includes emissions from stationary source combustion that use diesel, renewable diesel, and gasoline. Emissions from permitted portable engines are also included in this section. Emission factors were obtained from the Emission Factors for GHG Inventories included in Appendix A. Equations 6.2, 6.3, and 6.5 of the LGOP were used for these calculations.

Equation 6.2	CO_2 Emissions from Stationary Combustion (gallons)
Fuel CO_2 Emissions (metric tons) = Fuel Consumed (gallons) × Emission Factor (kg CO_2/gallon) ÷ 1,000 (kg/metric ton)	

Equation 6.3	CH_4 Emissions from Stationary Combustion (MMBtu)
CH_4 Emissions (metric tons) = Fuel Use (MMBtu) × Emission Factor (kg CH_4/MMBtu) ÷ 1,000 (kg/metric ton)	

Equation 6.5	N_2O Emissions from Stationary Combustion (MMBtu)
N_2O Emissions (metric tons) = Fuel Use (MMBtu) × Emission Factor (kg N_2O /MMBtu) ÷ 1,000 (kg/metric ton)	

Table A.1.1 - Emissions from Stationary Combustion

Global Warming Potential			1	28	265	
Fuel Type	Gallon	Emission Factors (kg CO_2e/Gallon)	CO_2 Emission Factor (kg CO_2/Gallon)	CH_4 Emission Factor (g CH_4/Gallon)	N_2O Emission Factor (g N_2O/Gallon)	$MTCO_2e$ Total
Renewable Diesel	25,293	5.02[1]	Combined in CO_2 Equivalent			127
Diesel	6,907		10.96	0.44	0.09	76
Gasoline	11,675		8.78	0.38	0.08	103
					Sub Total	306
Natural Gas	MMBTU		kg CO_2 /MMBTU	g CH_4 /MMBTU	g N_2O /MMBTU	$MTCO_2e$ Total
JAO	11,704		53.06	1.000	0.100	622
JWPCP	210,289		53.06	1.000	0.100	11,169
Palmdale	334		53.06	1.000	0.100	18
Valencia	1,078		53.06	1.000	0.100	57
					Subtotal	11,866
Propane	SCF		kg CO_2/SCF	g CH_4/SCF	g N_2O/SCF	$MTCO_2e$ Total
All Facilities	319,865		0.15463	0.007548	0.00151	50
					Sub Total	50
					Total	12,222

The entire volume of natural gas usage was included for facilities with natural gas combustion because combustion accounts for most of the usage in those facilities.

[1]The emission factor for renewable diesel is included in Appendix B.

A.1.2. Emissions from Mobile Combustion

This section of the evaluation includes emissions from mobile sources such as passenger cars, vans, trucks, and heavy equipment. Equations 7.2, 7.6, and 7.7 of the LGOP were used for these calculations. Emission factors were obtained from the Emission Factors for GHG Inventories included in Appendix B.

Equation 7.2	CO_2 Emissions from Mobile Combustion
Fuel CO_2 Emissions (metric tons) = Fuel Consumed (gallons) × Emission Factor (kg CO_2/gallon) ÷ 1,000 (kg/metric ton)	

Equation 7.6	CH_4 Emissions from Mobile Combustion
CH_4 Emissions (metric tons) = Annual Distance (miles) × Emission Factor (g CH_4/mile) ÷ 1,000,000 (g/metric ton)	

Equation 7.7	N_2O Emissions from Mobile Combustion
N_2O Emissions (metric tons) = Annual Distance (miles) × Emission Factor (g N_2O/mile) ÷ 1,000,000 (g/metric ton)	

The table below summarizes the input units used in calculations based on the fuel and mobile unit types.

Fuel	Mobile Type	CO_2e	CO_2	CH_4	N_2O
		Input Unit	Input Unit	Input Unit	Input Unit
Renewable Diesel	On-Road Vehicle	Gallon	Not applicable because the emission factor provided by the vendor has already been converted to Carbon Dioxide Equivalent (CO_2e)		
	Non-Road Heavy Equipment	Gallon			
Diesel	On-Road Vehicle	Not Applicable	Gallon	Mileage	Mileage
	Non-Road Heavy Equipment	Not Applicable	Gallon	Gallon	Gallon
Gasoline	On-Road Vehicle	Not Applicable	Gallon	Mileage	Mileage
Compressed Natural Gas (CNG)	On-Road Vehicle	Not Applicable	Cubic Foot	Mileage	Mileage

Table A.1.2 - Emissions from Mobile Combustion							
Global Warming Potential			1	28	265		
Fuel Type	Gallon or SCF	Mile	CO_2 Emission Factor (kg CO_2/Gallon or scf)	CH_4 Emission Factor (g CH_4/mile)	N_2O Emission Factor (g N_2O/mile)	Emission Factors (kg CO_2e/Gallon)	$MTCO_2e$ Total
Renewable Diesel	326,110	N/A	Combined in CO2 Equivalent			5.02[1]	1,637
Diesel (Heavy/Medium) 1995-2005	10,353	62,117	10.21	0.0051	0.0048		106
Diesel (Heavy/Medium) 2007-2021	34,596	207,574	10.21	0.0095	0.0491		356
Gasoline (total)	289,208		8.78				2,539
Passenger Car (2009 -2014)		227,715		0.0071	0.0046		0.32
Passenger Car (2015)		59,919		0.0068	0.0042		0.08
Passenger Car (2016)		1,785		0.0065	0.0038		0.00
Passenger Car (2017)		55,294		0.0054	0.0018		0.03
Passenger Car (2018 & after)		197,939		0.0052	0.0016		0.11
Trucks (1999)		2,317		0.0333	0.0618		0.04
Trucks (2003)		24,727		0.0221	0.0373		0.26
Trucks (2004)		41,617		0.0115	0.0088		0.11
Trucks (2005)		21,155		0.0105	0.0064		0.04
Trucks (2006)		99,765		0.0108	0.0080		0.24
Trucks (2007)		36,429		0.0103	0.0061		0.07
Trucks (2008)		234,326		0.0095	0.0036		0.29
Trucks (2009)		144,057		0.0095	0.0036		0.18
Trucks (2010)		46,221		0.0095	0.0035		0.06
Trucks (2011)		542,791		0.0096	0.0034		0.63
Trucks (2012)		291,187		0.0096	0.0033		0.33
Trucks (2013)		271,531		0.0095	0.0033		0.31
Trucks (2014)		194,467		0.0095	0.0033		0.22
Trucks (2015)		462,302		0.0094	0.0031		0.50
Trucks (2016)		308,598		0.0091	0.0029		0.32
Trucks (2017)		348,451		0.0084	0.0018		0.25
Trucks (2018 and after)		1,390,754		0.0081	0.0015		0.87

Heavy Duty Trucks (1987)		460		0.0322	0.0015		0.00
Heavy Duty Trucks (2008 & after)		23,306		0.0333	0.0134		0.10
CNG	5,399,401		0.054				294
CNG Light-Duty Cars		86,779		0.0820	0.0060		0.34
CNG Light-Duty Trucks		368,395		0.1230	0.0110		2.34
CNG Heavy-Duty Trucks		96,806		3.7000	0.0010		10.05
						Total	4,950

[1]The emission factor for renewable diesel is included in Appendix B.

A.1.3 Wastewater Treatment Plants Direct Emissions

The table below summarizes GHG types and sources that are directly emitted from wastewater treatment processes to the environment according to the LGOP. The first column was added to identify processes that apply to the Districts' operations.

Summary of Wastewater Treatment Process and Fugitive Emission Sources				
Scope	GHG type	GHG source	Data Available	Equation
A.1.3.a	Stationary CH_4 emissions	Incomplete combustion of digester gas at a centralized WWTP with anaerobic digestion of biosolids	Digester gas (ft^3/day) Fraction of CH_4 in biogas	Equation 10.1
			Population served	Equation 10.2
Not Applicable	Process CH_4 emissions	Anaerobic and facultative treatment lagoons	BOD_5 load (kg BOD_5/day) Fraction of overall BOD_5 removal performance	Equation 10.3
			Population served	Equation 10.4
Not Applicable	Fugitive CH_4 emissions	Septic systems	BOD_5 load (kg BOD_5/person/day)	Equation 10.5
			Population served	Equation 10.6
A.1.3.b	Process N_2O emissions	Centralized WWTP with nitrification/denitrification	Population served	Equation 10.7
Not Applicable	Process N_2O emissions	Centralized WWTP without nitrification/denitrification	Population served	Equation 10.8
A.1.3.c	Process N_2O emissions	Effluent discharge to receiving aquatic environments	N load (kg N/day)	Equation 10.9
			Population served	Equation 10.10

Below is the summary of GHG emissions for these LGOP Scope sources that are directly emitted from wastewater treatment processes to the environment:

Table A.1.3 - Wastewater Treatment Plants Direct Emissions	
CATEGORY	TOTAL ($MTCO_2e$)
STATIONARY EMISSIONS	11,008
PROCESS N_2O EMISSION FROM NITRIFICATION/DENITRIFICATION	5,478
PROCESS N_2O EMISSIONS FROM EFFLUENT	33,665
TOTAL WASTEWATER DIRECT EMISSION	50,152

A.1.3.a Emissions from Wastewater Stationary Combustion

This section includes the calculations of annual CH_4 emissions from the inherent inefficiency of combustion equipment. Equation 10.1 of the LGOP was used to calculate the CH_4 emissions from the incomplete combustion of digester gas.

Equation 10.1	Stationary CH_4 from Incomplete Combustion of Digester Gas (site-specific digester gas data)
Annual CH4 emissions (metric tons CO_2e) = (Digester Gas x F_{CH4} x $\rho(CH_4)$ x (1-DE) x 0.0283 x 365.25 x 10^{-6}) x GWP	

Where:

Term	Description	Value
Digester Gas	Measured total standard cubic feet of digester gas combusted	user input
F CH_4	measured fraction of CH_4 in biogas	user input
ρ (CH_4)	density of methane at standard conditions [g/m^3]	662.00
DE	CH_4 Destruction Efficiency	.99
0.0283	conversion from ft^3 to m^3 [m^3/ft^3]	0.0283
365.25	conversion factor [day/year]	365.25
10^{-6}	conversion from g to metric ton [metric ton/g]	10^{-6}
GWP	Global Warming Potential	28

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).

Below is the summary of the results of annual CH_4 emissions from the incomplete combustion of digester gas:

Table A.1.3.a Emissions from Wastewater Stationary Combustion

	Combusted Gas (SCF)	CH_4 Fraction	$p(CH_4)$	DE	GWP	$MTCO_2e$ Total (MTCO2e)
JWPCP	3,141,590,585	0.61	662	0.99	28	10,097
Lancaster	92,279,508	0.61	662	0.99	28	297
Palmdale	54,687,225	0.61	662	0.99	28	176
Valencia WRP	136,549,000	0.61	662	0.99	28	439
					Total	11,008

A.1.3.b Emissions from Nitrification/Denitrification Process

This section includes the calculations of annual N_2O emissions from the nitrification and denitrification process used in wastewater treatment. Except for the industrial/commercial factor ($F_{ind-com}$), this GHG evaluation utilized values specified in the LGOP. The $F_{ind-com}$ factors used in this evaluation were obtained from the 2020 Pretreatment Program Annual Report. Equation 10.7 of the LGOP was used to calculate N_2O emissions from the wastewater treatment processes.

Equation 10.7 Process N_2O Emissions from WWTP with Nitrification/Denitrification
Annual N_2O emissions (metric tons CO_2e) = ((P total x Find-com) x EF nit/den x 10^{-6}) x GWP

Where:

Term	Description	Value
P total	the total population that is served by the centralized WWTP adjusted for industrial discharge, if applicable [person]	User input
$F_{ind-com}$	the factor for industrial and commercial co-discharge waste into the sewer system	Varies, used value from the 2020 Pretreatment Report
EF nit/den	emission factor for a WWTP with nitrification/denitrification [g N2O/person/year]	7
10^6	conversion from g to metric ton [metric ton/g]	10^6
GWP	N2O Global Warming Potential	265
Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).		

The results of N_2O emissions from the nitrification and denitrification are included in Table A.1.3.a below:

Table A.1.3.b Emissions from Nitrification/Denitrification Process

Facility	Population Served	F Industrial Factor	EF Emission Factor	Conversion Factor	GWP	MTCO2e Total
Long Beach WRP	226,811	1.05	7.00	1.00E-06	265	442
Los Coyotes WRP	359,001	1.13	7.00	1.00E-06	265	753
Whittier Narrows WRP	406,051	1.11	7.00	1.00E-06	265	836
San Jose Creek WRP	1,069,856	1.07	7.00	1.00E-06	265	2,124
Pomona WRP	79,262	1.04	7.00	1.00E-06	265	153
Saugus WRP	74,351	1.01	7.00	1.00E-06	265	139
Lancaster WRP	128,204	1.06	7.00	1.00E-06	265	252
Palmdale WRP	196,826	1.01	7.00	1.00E-06	265	369
Valencia WRP	201,619	1.10	7.00	1.00E-06	265	411
					Total	5,478

A.1.3.c Emissions from Effluent Discharge

This section includes the calculations of annual N_2O emissions from effluent discharged into rivers and estuaries. This GHG evaluation utilized all values that are specified in the LGOP. It should be noted that the LGOP does not include an emission factor for ocean discharge; therefore, the JWPCP results may be overestimated because there is less biological conversion of nitrogen to N_2O in the ocean.

Equation 10.9	Process N_2O Emissions from Effluent Discharge (site-specific N load data)
Annual N_2O emissions (metric tons CO_2e) = (N Load x EF effluent x 365.25 x 10-3 x 44/28) x GWP	

Where:

Term	Description	Value
N Load	= measured average total nitrogen discharged [kg N/day]	user input
EF effluent	= emission factor [kg N_2O-N/kg sewage-N produced]	0.005
365.25	= conversion factor [day/year]	365.25
10^{-3}	= conversion from kg to metric ton [metric ton/kg]	10^{-3}
44/28	= molecular weight ratio of N_2O to N_2	1.57
GWP	= Global Warming Potential	265
Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).		

Below is the summary of the results of annual N_2O emissions from effluent that discharged into rivers and estuaries, apart from JWPCP which discharges to the Pacific Ocean:

Table A.1.3.c.1 Emissions from Effluent Discharge

Facility	Average Total Nitrogen	Average Effluent* (MGD)	N load (kg N/day)	N_2O to N_2 Conversion	GWP	Annual N_2O Emissions ($MTCO_2e$)
JWPCP	43.93	242.28	40,232	1.57	265	30,569
Long Beach WRP	9.87	12.67	473	1.57	265	359
Los Coyotes WRP	8.11	17.52	537	1.57	265	408
San Jose Creek East WRP	7.05	35.71	952	1.57	265	723
San Jose Creek West WRP	7.09	26.9	721	1.57	265	548
Pomona WRP	10.10	5.45	208	1.57	265	158
Saugus WRP	6.61	4.85	121	1.57	265	92
Valencia WRP	6.34	13.55	325	1.57	265	247
Lancaster WRP	5.45	13.9	286	1.57	265	218
Palmdale WRP	6.40	8.33	202	1.57	265	153
La Canada WRP	17.95	0.066	4	1.57	265	3
Whittier Narrows WRP	7.90	8.27	247	1.57	265	188
					Total	33,665

* Annual flows are still under review and subject to change.

A.1.4. Landfill Fugitive Emissions

The LGOP specified equation 9.1 to calculate the direct emissions from landfills with comprehensive landfill gas collection systems. Except for the collection efficiency (CE) factor, this GHG evaluation utilized values specified in the LGOP. Actual CE factors, based on research performed by the Districts, were used in place of the 0.75 CE factor specified in the LGOP. Since the actual CE factors are based upon emissions above the soil cover, the oxidation factor (OX) was omitted from these calculations. Collection efficiency factors used in this section are included in Appendix C.

Equation 9.1	Landfills with Comprehensive LFG Collection Systems
CH_4 emitted (metric tons CO_2e) = LFG collected x CH_4% x {(1 - DE) + [((1 – CE) / CE) x (1 – OX)]} x unit conversion x GWP	

Where:

Term	Description	Value
LFG collected	= Annual LFG collected by the collection system (MMSCF)	user input
CH_4%	= Fraction of CH_4 in LFG	0.5, if no facility-specific value is available
DE	= CH_4 Destruction Efficiency, based on the type of combustion/flare system.	.991
CE	= Collection Efficiency	Varies, used actual CE factors
OX	= Oxidation Factor	LGOP specify 0.10 but omitted in this evaluation
Unit conversion	= Convert million standard cubic feet of CH_4 to metric tons of CH_4 (volume units to mass units)	19.125
GWP	= Global Warming Potential to convert metric tons of methane into metric tons of CO_2 equivalents (CO_2e).	28

Table A.1.4: CH_4 Emissions from Landfill

Facility	Collected Landfill Gas (MMSCF)	CH_4%	DE	CE	OX	Unit Conversion	GWP	Landfill Direct Emission ($MTCO_2e$)
Puente Hills Landfill	7,459	28.29	0.99	0.950	0	19.125	28	70,775
Calabasas Landfill	1,967	27.53	0.99	0.918	0	19.125	28	28,800
Scholl Canyon Landfill	3,135	33.99	0.99	0.989	0	19.125	28	12,051
Spadra Landfill	1,690	22.69	0.99	0.972	0	19.125	28	7,969
Palos Verdes Landfill	2,323	6.88	0.99	0.957	0	19.125	28	4,699
Mission Canyon Landfill	41	11.67	0.99	0.915	0	19.125	28	264
							Total	124,558

A.1.5 Refrigerant Emissions

Per the refrigerant leak checks performed in 2021, below are the emissions from refrigerant leaks. The refrigerant leak testing results are included in Appendix D.

Table A.1.5 - Refrigerant Emissions				
Facility	Refrigerant Blend	Quantity (lb)	GWP*	Emission (MTCO2e)
Tulare Lake Compost	R-410B	27	2,229	27.30
Palmdale WRP	R-410A	23.5	2,088	22.26
Lancaster WRP	R-410A	80.5	2,088	76.24
			Total	125.80

*From 100-year GWPs from IPCC Fourth Assessment Report (AR4), 2007.

A.2 Indirect Emissions

According to the LGOP, indirect emissions are emissions from purchased energy. Only two indirect emissions sources apply to the Districts' operations: purchased electricity and natural gas for heating. Calculations for GHG emissions and emission factors are included in Appendix E. The following equations were used to determine the indirect emissions from purchased electricity and natural gas:

A.2.1 Electricity

Equation 6.10	Indirect Emissions from Electricity Use (mt)
CO_2 Emissions = Electricity Use (MWh) × Emission Factor (lbs. CO_2/MWh) ÷ 2,204.62 (lbs./mt)	
CH_4 Emissions = Electricity Use (MWh) × Emission Factor (lbs. CH_4/MWh) ÷ 2,204.62 (lbs./mt)	
N_2O Emissions = Electricity Use (MWh) × Emission Factor (lbs. N_2O /MWh) ÷ 2,204.62 (lbs./mt)	

A.2.2 Natural Gas

Equation 6.16	Converting Steam or Heat Consumption from Therms to MMBtu
Energy Consumption (MMBtu) = Energy Consumption (Therms) x 0.1 (MMBtu/Therm)	

Equation 6.20	Emissions from Imported Steam or Heat (mt)
Total CO_2 Emissions = Energy Consumed (MMBtu) x Emission Factor (kg CO_2 / MMBtu) ÷ 1,000 (kg/mt)	
Total CH_4 Emissions = Energy Consumed (MMBtu) x Emission Factor (kg CH_4 / MMBtu) ÷ 1,000 (kg/mt)	
Total N_2O Emissions = Energy Consumed (MMBtu) x Emission Factor (kg N_2O / MMBtu) ÷ 1,000 (kg/mt)	

Below is the summary of the 2021 indirect emissions:

Table A.2 Indirect Emissions				
Global Warming	1	28	265	
Emission Factors	496.50	0.0340	0.0040	
Purchased Electricity	$MTCO_2$	$MTCH_4$ as CO_2e	MTN_20 as CO2e	$MTCO_2e$ Total
144,056	32,443	62.21	69.26	32,574
Emission Factors	53.06	0.0010	0.0001	
Purchased Natural Gas	$MTCO_2$	$MTCH_4$ as CO2e	MTN_20 as CO_2e	$MTCO_2e$ Total
369,867	19,625	0.55	0.000015	19,626
			Total	52,200

B. 2021 GHG Reductions

This section of the report includes results of GHG reductions from programs operated by the Districts. Table 1 displays a summary of the GHG reductions achieved by each program.

Table B – GHG Reductions and Equivalent Units	
Programs	Reduction $MTCO_2e$
Biogas-to-Electricity	189,716
Food Waste Diversion	41,944
Water Recycling	52,214
Tulare Lake Compost	2,439
Biogas-to-Vehicle Fuel	1,136
2021 Total Reduction	287,449

B.1 Biogas-to-Electricity

The Districts operate three biogas-to-electricity facilities: the Calabasas Landfill Gas-to-Energy (CALF), the Puente Hills Gas-to-Energy Facility (PERG), and the JWPCP Total Energy Facility (TEF). The calculations shown in the table below were based on the EPA's GHG Equivalency Calculator. The emission factor used in this section was obtained from the EPA's 2019 Avoided Emissions and Generation Tool (AVERT) included in Appendix F. The quantity of net electricity generated at each facility was used to determine the amount of GHG reduction resulting from these renewable energy facilities.

Table B.1 – Gas-to-Electricity			
Program	Electricity Generated (MW)	AVERT Emission Factor (lb/MWh)	Offset of Carbon Dioxide ($MTCO_2E$)
JWPCP	20	1,061	84,318
Puente Hills Energy Recovery from Gas Facility	21	1,061	88,534
Calabasas Turbine Facility	4	1,061	16,864
		GHG Benefit	189,716

B.2 Food Waste Diversion

The Districts divert food waste from landfills and direct this resource to the Joint Water Pollution Control Plant (JWPCP) for anaerobic digestion. Food waste enters the Districts' anaerobic digestion stream either directly from waste haulers or through the diversion process at the Puente Hills Materials Recovery Facility (PHMRF). The EPA's Waste Reduction Model (WARM) was used to evaluate the GHG reductions from food waste diversion. The table below shows the results from the WARM evaluation. The WARM worksheet and reference pages are included in Appendix G.

Table B.2 Food Waste Management	
Food Waste (Ton)	GHG Benefit ($MTCO_2e$)
77,794	41,944

B.3 Water Recycling

This portion of the evaluation included the GHG reduction from the beneficial use of recycled water. The GHG reductions are shown in the table below and were determined by comparing the energy intensity of imported water to the energy intensity of recycled water. The GHG calculations used in this section were based on the method used in the Role of Recycled Water in Energy Efficiency and Greenhouse Gas Reduction (2008) published by the California Sustainability Alliance. The energy intensity includes the energy needed for pumping, treatment, and water delivery. Reference pages for the calculations are included in Appendix H.

Table B.3 - GHG Reductions from Water Recycling

	Water Volume (AFY)	Estimated Energy Usage (kWh/AF) *	Emission Factor (MTCO2e /MWH)**	GHG Emission (MTCO2e)
Recycled Water	112,700	600	0.226	15,282
			Total Emission	15,282
Colorado River Aqueduct Imported Water (Baseline)	56,350	2,000	0.226	25,470
State Water Project Imported Water (Baseline)	56,350	3,300	0.226	42,026
			Total Baseline	67,496
			GHG Benefit	52,214

*Estimated energy usages are from the Role of Recycled Water in Energy Efficiency and Greenhouse Gas Reduction Study and the updated Estimation of Greenhouse Gas Production from Advanced Treatment and Pumping of JWPCP Effluent memo.

**The emission factor presented in this column was based on the emission rating of 498.7 lb of CO2e per MWh, which equals 0.226 metric tons of CO2e per MWh. The emission rating was obtained from the 2018 eGRID summary published by the EPA. The emission rating used in this calculation was selected because it represents the average emission output in California. The conversion factor from the Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources published by the EPA was not selected because it represents the highest nationwide emission rating rather than the regional average emission rating.

B.4 Tulare Lake Compost (TLC)

This portion of the evaluation examined the GHG reductions from biosolids management at TLC. Biosolids generated by the Districts were managed through Aerated Static Pile (ASP) composting. The Biosolids Emissions Assessment Model (BEAM) was used to estimate the GHG reduction from the process. BEAM was prepared by SYLVIS for the Canadian Council of Ministers of the Environment. The GHG reduction was from the offset of fertilizer that would otherwise be used on the land. The GHG reduction is shown below, and the BEAM worksheets are included in Appendix I.

Table B.4 Biosolids Management

Facility	Quantity (Ton)	GHG Emission ($MTCO_2e$)
TLC	40,613	2,439

B.5 Biogas-to-Vehicle Fuel

This portion of the evaluation included the GHG reduction from the Biogas-to-Vehicle Fuel project. The GHG reductions are shown in the table below and were determined by comparing the carbon intensity of renewable natural gas (RNG) produced by the project with that of traditional diesel. Carbon intensities used in this evaluation are included in Appendix J**.**

Table B.5 Biogas-to-Vehicle Fuel Project			
Fuel Type	GGE or Gallon	Carbon Intensity (kg CO_2e/Gallon)	$MTCO_2e$ Total
RNG	102,172	2.59	265
Diesel (Baseline)	102,172	13.72	1,401
		GHG Reduction	1,136

Appendix A: Stationary Emissions

Emission Factors for Greenhouse Gas Inventories

Last Modified: 1 April 2021

Red text indicates an update from the 2020 version of this document.

Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Gases are converted to CO_2e by multiplying by their global warming potential (GWP). The emission factors listed in this document have not been converted to CO_2e. To do so, multiply the emissions by the corresponding GWP listed in the table below.

Gas	100-Year GWP
CH_4	25
N_2O	298

Source: Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4), 2007. See the source note to Table 11 for further explanation.

Table 1 Stationary Combustion

Fuel Type	Heat Content (HHV)	CO_2 Factor	CH_4 Factor	N_2O Factor	CO_2 Factor	CH_4 Factor	N_2O Factor
	mmBtu per short ton	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per short ton	g CH_4 per short ton	g N_2O per short ton
Coal and Coke							
Anthracite Coal	25.09	103.69	11	1.6	2,602	276	40
Bituminous Coal	24.93	93.28	11	1.6	2,325	274	40
Sub-bituminous Coal	17.25	97.17	11	1.6	1,676	190	28
Lignite Coal	14.21	97.72	11	1.6	1,389	156	23
Mixed (Commercial Sector)	21.39	94.27	11	1.6	2,016	235	34
Mixed (Electric Power Sector)	19.73	95.52	11	1.6	1,885	217	32
Mixed (Industrial Coking)	26.28	93.90	11	1.6	2,468	289	42
Mixed (Industrial Sector)	22.35	94.67	11	1.6	2,116	246	36
Coal Coke	24.80	113.67	11	1.6	2,819	273	40
Other Fuels - Solid							
Municipal Solid Waste	9.95	90.70	32	4.2	902	318	42
Petroleum Coke (Solid)	30.00	102.41	32	4.2	3,072	960	126
Plastics	38.00	75.00	32	4.2	2,850	1,216	160
Tires	28.00	85.97	32	4.2	2,407	896	118
Biomass Fuels - Solid							
Agricultural Byproducts	8.25	118.17	32	4.2	975	264	35
Peat	8.00	111.84	32	4.2	895	256	34
Solid Byproducts	10.39	105.51	32	4.2	1,096	332	44
Wood and Wood Residuals	17.48	93.80	7.2	3.6	1,640	126	63
	mmBtu per scf	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per scf	g CH_4 per scf	g N_2O per scf
Natural Gas							
Natural Gas	0.001026	53.06	1.0	0.10	0.05444	0.00103	0.00010
Other Fuels - Gaseous							
Blast Furnace Gas	0.000092	274.32	0.022	0.10	0.02524	0.000002	0.000009
Coke Oven Gas	0.000599	46.85	0.48	0.10	0.02806	0.000288	0.000060
Fuel Gas	0.001388	59.00	3.0	0.60	0.08189	0.004164	0.000833
Propane Gas	0.002516	61.46	3.0	0.60	0.15463	0.007548	0.001510
Biomass Fuels - Gaseous							
Landfill Gas	0.000485	52.07	3.2	0.63	0.025254	0.001552	0.000306
Other Biomass Gases	0.000655	52.07	3.2	0.63	0.034106	0.002096	0.000413
	mmBtu per gallon	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per gallon	g CH_4 per gallon	g N_2O per gallon
Petroleum Products							
Asphalt and Road Oil	0.158	75.36	3.0	0.60	11.91	0.47	0.09
Aviation Gasoline	0.120	69.25	3.0	0.60	8.31	0.36	0.07
Butane	0.103	64.77	3.0	0.60	6.67	0.31	0.06
Butylene	0.105	68.72	3.0	0.60	7.22	0.32	0.06
Crude Oil	0.138	74.54	3.0	0.60	10.29	0.41	0.08
Distillate Fuel Oil No. 1	0.139	73.25	3.0	0.60	10.18	0.42	0.08
Distillate Fuel Oil No. 2	0.138	73.96	3.0	0.60	10.21	0.41	0.08
Distillate Fuel Oil No. 4	0.146	75.04	3.0	0.60	10.96	0.44	0.09
Ethane	0.068	59.60	3.0	0.60	4.05	0.20	0.04
Ethylene	0.058	65.96	3.0	0.60	3.83	0.17	0.03
Heavy Gas Oils	0.148	74.92	3.0	0.60	11.09	0.44	0.09
Isobutane	0.099	64.94	3.0	0.60	6.43	0.30	0.06
Isobutylene	0.103	68.86	3.0	0.60	7.09	0.31	0.06
Kerosene	0.135	75.20	3.0	0.60	10.15	0.41	0.08
Kerosene-Type Jet Fuel	0.135	72.22	3.0	0.60	9.75	0.41	0.08
Liquefied Petroleum Gases (LPG)	0.092	61.71	3.0	0.60	5.68	0.28	0.06
Lubricants	0.144	74.27	3.0	0.60	10.69	0.43	0.09
Motor Gasoline	0.125	70.22	3.0	0.60	8.78	0.38	0.08
Naphtha (<401 deg F)	0.125	68.02	3.0	0.60	8.50	0.38	0.08
Natural Gasoline	0.110	66.88	3.0	0.60	7.36	0.33	0.07
Other Oil (>401 deg F)	0.139	76.22	3.0	0.60	10.59	0.42	0.08
Pentanes Plus	0.110	70.02	3.0	0.60	7.70	0.33	0.07
Petrochemical Feedstocks	0.125	71.02	3.0	0.60	8.88	0.38	0.08
Propane	0.091	62.87	3.0	0.60	5.72	0.27	0.05
Propylene	0.091	67.77	3.0	0.60	6.17	0.27	0.05
Residual Fuel Oil No. 5	0.140	72.93	3.0	0.60	10.21	0.42	0.08
Residual Fuel Oil No. 6	0.150	75.10	3.0	0.60	11.27	0.45	0.09
Special Naphtha	0.125	72.34	3.0	0.60	9.04	0.38	0.08
Unfinished Oils	0.139	74.54	3.0	0.60	10.36	0.42	0.08
Used Oil	0.138	74.00	3.0	0.60	10.21	0.41	0.08
Biomass Fuels - Liquid							
Biodiesel (100%)	0.128	73.84	1.1	0.11	9.45	0.14	0.01
Ethanol (100%)	0.084	68.44	1.1	0.11	5.75	0.09	0.01
Rendered Animal Fat	0.125	71.06	1.1	0.11	8.88	0.14	0.01
Vegetable Oil	0.120	81.55	1.1	0.11	9.79	0.13	0.01
Biomass Fuels - Kraft Pulping Liquor, by Wood Furnish							
North American Softwood		94.4	1.9	0.42			
North American Hardwood		93.7	1.9	0.42			
Bagasse		95.5	1.9	0.42			
Bamboo		93.7	1.9	0.42			
Straw		95.1	1.9	0.42			

Source:

Federal Register EPA; 40 CFR Part 98; e-CFR, (see link below). Table C-1, Table C-2 (as amended at 81 FR 89252, Dec. 9, 2016), Table AA-1 (78 FR 71965, Nov. 29, 2013).

https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1

Note: Emission factors are per unit of heat content using higher heating values (HHV). If heat content is available from the fuel supplier, it is preferable to use that value. If not, default heat contents are provided.

Appendix B: Mobile Emissions

Deemed Complete:	**December 14, 2018**	**Staff Summary**
Posted for Comment:	**December 31, 2018**	**Tier 2 Method 2B Pathway**
Certified and Posted:	**January 16, 2019**	**AltAir Paramount LLC, Paramount, California**
CI Effective:	**October 1, 2018**	**North American Tallow to Renewable Diesel Pathway**
Fuel Pathway Code:	**RDT209**	

Pathway Summary

AltAir Paramount (AltAir) LLC operates a Renewable Diesel (RD) plant in Paramount, California. This plant produces RD and renewable naphtha (RN) using a mixture of animal tallow and small quantities of other non-edible vegetable oils. The feedstocks are processed in AltAir's hydro-treating unit to produce RD and RN with renewable jet fuel and renewable propane as co-products. The renewable propane is used on-site as process fuel and small amounts are used in a process burner.

Because AltAir does not have access to a hydrogen plant to pipe in gaseous hydrogen, AltAir purchases liquefied hydrogen which is then transported by truck to their facility. AltAir has applied for a provisional Tier 2 Method 2B RD pathway using North American tallow as feedstock.

Carbon Intensity of Tallow to RD Pathway

The following table lists the proposed CI for this pathway.

Proposed Pathway CI

Fuel	Pathway FPC	Pathway Description	Carbon Intensity (gCO_2e/MJ)		
			Direct Emissions	Indirect Land Use	Total
Renewable Diesel from Tallow	RDT209	Tier 2 Method 2B Pathway: Renewable Diesel produced from North American Tallow. Fuel produced in Paramount, California (Provisional)	38.75	0	38.75

Operating Conditions

Operations at the plant will be subject to the following conditions designed to ensure that the CI of the RD produced at the AltAir plant will remain at or below the value appearing in the above table for all volumes of RD produced using this feedstock and sold in California:

1. Except for periods of abnormal operations, such as planned maintenance or unpredictable, unavoidable, and uncontrollable force majeure events, the CI value specified in the application shall not be exceeded.
2. The commingled feedstock accounting method will be used to determine the CIs of the mixed feedstock. Producers and regulated parties should use this approach to calculate the volumes based on weighted averages of renewable diesel associated with each feedstock present in the finished fuel storage tank at any given time. Producers should be able to provide records that unequivocally associate specific quantities of feedstock with specific volumes of fuel produced. As volumes are added to and withdrawn from the tank, the volume of each feedstock-related CI will be adjusted to account for those additions and withdrawals. Commingled feedstock CI accounts for mixed-feedstocks must be directly determined over an accounting period of no more than a calendar quarter. That is, all volumes of fuel produced must be associated with a specific feedstock within a calendar quarter. Gallons will be associated with feedstock based on the accepted yields for each fuel.
3. Because this pathway is classified as provisional, AltAir must submit two years of quarterly operating data for this plant that is indicative of long-term stable operation. The data must be

submitted every quarter until CARB receives two full years of operating data. Adjustments related to provisional CIs are subject to section 94888(d)(2).

Staff Analysis and Recommendations

Staff has reviewed the AltAir application for certification of Renewable Diesel produced from tallow and finds the following:

- Staff has replicated using the modified version of the CA-GREET 2.0 Tier 2 model with reasonable accuracy the carbon intensity calculations provided by the applicant. Staff has made this determination based upon the material and energy use information, design considerations, process yields, and other input parameters furnished by the applicant.

- On the basis of these findings, CARB staff recommends that the AltAir application for Method 2B LCFS pathway stated in above table be certified, subject to the operating conditions set forth in this document.

Alternative Fuel Tax

The excise tax imposed on compressed natural gas (CNG), liquefied natural gas (LNG), and propane used to operate a vehicle can be paid through an annual flat rate sticker tax based on the following vehicle weights:

Unladen Weight	Fee
All passenger cars and other vehicles 4,000 pounds (lbs.) or less	$36
More than 4,000 lbs. but less than 8,001 lbs.	$72
More than 8,000 lbs. but less than 12,001 lbs.	$120
12,001 lbs. or more	$168

Alternatively, owners and operators may pay an excise tax on CNG of $0.0887 per gasoline gallon equivalent (GGE) measured at standard pressure and temperature, $0.1017 for each diesel gallon equivalent (DGE) of LNG, and $0.06 per gallon of propane. One GGE is equal to 126.67 cubic feet or 5.66 lbs. of CNG and one DGE is equal to 6.06 lbs. of LNG. The excise tax on ethanol and methanol fuel blends containing up to 15% gasoline or diesel fuel is one-half the tax on gasoline and diesel prescribed by California Revenue and Taxation Code (https://leginfo.legislature.ca.gov/faces/home.xhtml) section 8651.

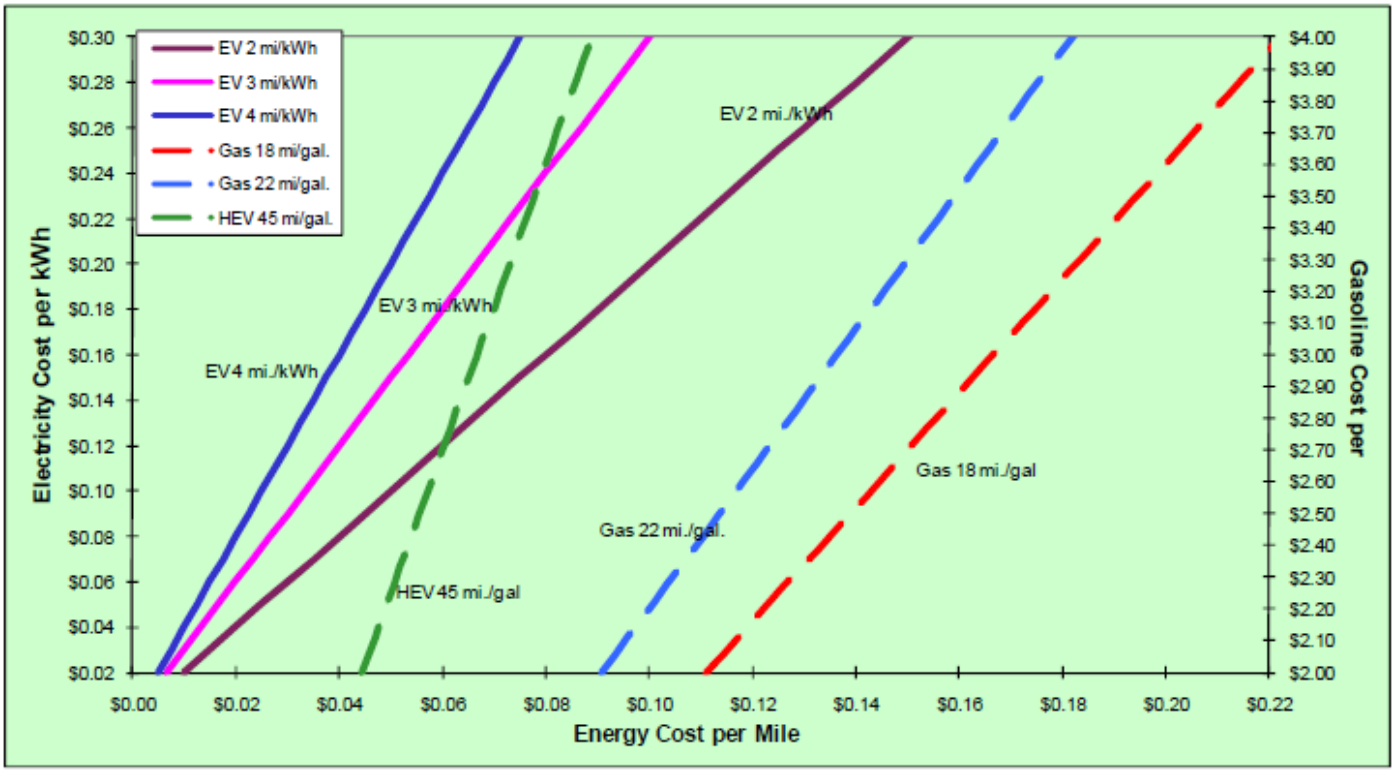
(Reference California Revenue and Taxation Code (https://leginfo.legislature.ca.gov/faces/home.xhtml) 8651-8651.8, and California Business and Professions Code (https://leginfo.legislature.ca.gov/faces/home.xhtml) 13404 and 13470)

ABOUT THE DATA (/LAWS/DATA_METHODOLOGY.HTML) Download Data (/data_download/) Data Fields (/data_download/laws_and_incentives_format)

Developer API (https://developer.nrel.gov/docs/transportation/transportation-incentives-laws-v1/)

Comparing Energy Costs per Mile for Electric and Gasoline-Fueled Vehicles

The fuel cost of driving an electric vehicle depends on the cost of electricity per kilowatt-hour (kWh) and the energy efficiency of the vehicle. For example, to determine the energy cost per mile of an electric vehicle, select the location on the left axis (Electricity Cost per kWh) at 10 cents in the graph below. Draw a horizontal line to the right until you bisect the EV 3 mi/kWh line. Now draw a vertical line down until you bisect the bottom axis (Energy Cost per Mile). This tells you that the fuel for an electric vehicle with an energy efficiency of 3 miles per kWh costs about 3.3 cents per mile when electricity costs 10 cents per kWh.



The national average cost for electricity in the U.S. is about 10 cents per kWh, while the average residential rate is about 11.7 cents per kWh. Some electric utilities have historically had electric vehicle charging rates that vary by time of use, day, and season. In the past, these rates have ranged from 3 cents to as high as 50 cents per kWh. Older electric vehicles have energy efficiencies of about 2 miles per kWh. Some electric vehicles, such as the EV1 from General Motors, had energy efficiencies of over 6 miles per kWh under some testing.

To determine the energy cost per mile of a gasoline vehicle, pick the location on the right axis (Gasoline Cost per gallon) at $3.50. Draw a horizontal line to the left until you bisect the Gas 22 mi/gal line. Now draw a vertical line down until you bisect the bottom axis (Energy Cost per Mile). This tells you that the fuel for a gasoline vehicle with an energy efficiency of 22 miles per gallon costs about 15.9 cents per mile when gasoline costs $3.50 per gallon. The mileage for commercial fleet vehicles such as light-duty pickups ranges from below 17 miles per gallon to generally about 22 miles per gallon.

The energy cost per mile is also included for a hybrid electric vehicle (HEV) with an energy efficiency of 45 miles per gallon, as these types of vehicles are increasingly being used. If $3.50 per gallon of gasoline is also assumed for the HEV that gets 45 mpg, the energy cost per mile would be 7.8 cents per mile.

Table 2 Mobile Combustion CO_2

Fuel Type	kg CO_2 per unit	Unit
Aviation Gasoline	8.31	gallon
Biodiesel (100%)	9.45	gallon
Compressed Natural Gas (CNG)	0.05444	scf
Diesel Fuel	10.21	gallon
Ethanol (100%)	5.75	gallon
Kerosene-Type Jet Fuel	9.75	gallon
Liquefied Natural Gas (LNG)	4.50	gallon
Liquefied Petroleum Gases (LPG)	5.68	gallon
Motor Gasoline	8.78	gallon
Residual Fuel Oil	11.27	gallon

Source:
Federal Register EPA; 40 CFR Part 98; e-CFR, June 13, 2017 (see link below). Table C-1.
https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1
LNG: The factor was developed based on the CO_2 factor for Natural Gas factor and LNG fuel density from GREET1_2017.xlsx Model, Argonne National Laboratory. This represents a methodology change from previous versions.

Table 3 Mobile Combustion CH_4 and N_2O for On-Road Gasoline Vehicles

Vehicle Type	Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)
Gasoline Passenger Cars	1973-74	0.1696	0.0197
	1975	0.1423	0.0443
	1976-77	0.1406	0.0458
	1978-79	0.1389	0.0473
	1980	0.1326	0.0499
	1981	0.0802	0.0626
	1982	0.0795	0.0627
	1983	0.0782	0.0630
	1984-93	0.0704	0.0647
	1994	0.0617	0.0603
	1995	0.0531	0.0560
	1996	0.0434	0.0503
	1997	0.0337	0.0446
	1998	0.0240	0.0389
	1999	0.0215	0.0355
	2000	0.0175	0.0304
	2001	0.0105	0.0212
	2002	0.0102	0.0207
	2003	0.0095	0.0181
	2004	0.0078	0.0085
	2005	0.0075	0.0067
	2006	0.0076	0.0075
	2007	0.0072	0.0052
	2008	0.0072	0.0049
	2009	0.0071	0.0046
	2010	0.0071	0.0046
	2011	0.0071	0.0046
	2012	0.0071	0.0046
	2013	0.0071	0.0046
	2014	0.0071	0.0046
	2015	0.0068	0.0042
	2016	0.0065	0.0038
	2017	0.0054	0.0018
	2018	0.0052	0.0016
Gasoline Light-Duty Trucks (Vans, Pickup Trucks, SUVs)	1973-74	0.1908	0.0218
	1975	0.1634	0.0513
	1976	0.1594	0.0555
	1977-78	0.1614	0.0534
	1979-80	0.1594	0.0555
	1981	0.1479	0.0660
	1982	0.1442	0.0681
	1983	0.1368	0.0722
	1984	0.1294	0.0764
	1985	0.1220	0.0806
	1986	0.1146	0.0848
	1987-93	0.0813	0.1035
	1994	0.0646	0.0982
	1995	0.0517	0.0908
	1996	0.0452	0.0871
	1997	0.0452	0.0871
	1998	0.0412	0.0787
	1999	0.0333	0.0618
	2000	0.0340	0.0631
	2001	0.0221	0.0379
	2002	0.0242	0.0424
	2003	0.0221	0.0373
	2004	0.0115	0.0080
	2005	0.0105	0.0064
	2006	0.0106	0.0060
	2007	0.0103	0.0061
	2008	0.0095	0.0056
	2009	0.0095	0.0036
	2010	0.0095	0.0035
	2011	0.0096	0.0034
	2012	0.0096	0.0033
	2013	0.0095	0.0035
	2014	0.0095	0.0033
	2015	0.0094	0.0031
	2016	0.0091	0.0029
	2017	0.0084	0.0018
	2018	0.0081	0.0015
Gasoline Heavy-Duty Vehicles	<1981	0.4604	0.0497
	1982-84	0.4492	0.0538
	1985-86	0.4090	0.0515
	1987	0.3675	0.0849
	1988-1989	0.3492	0.0933
	1990-1995	0.3246	0.1142
	1996	0.1278	0.1680
	1997	0.0924	0.1726
	1998	0.0655	0.1750
	1999	0.0648	0.1724
	2000	0.0630	0.1660
	2001	0.0577	0.1468
	2002	0.0634	0.1673
	2003	0.0602	0.1553
	2004	0.0298	0.0164
	2005	0.0297	0.0083
	2006	0.0299	0.0241
	2007	0.0322	0.0015
	2008	0.0340	0.0015
	2009	0.0339	0.0015
	2010	0.0320	0.0015
	2011	0.0304	0.0015
	2012	0.0313	0.0015
	2013	0.0313	0.0015
	2014	0.0315	0.0015
	2015	0.0332	0.0021
	2016	0.0321	0.0061
	2017	0.0329	0.0084
	2018	0.0326	0.0082
Gasoline Motorcycles	1960-1995	0.0899	0.0087
	1996-2018	0.0672	0.0069

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. All values are calculated from Tables A-107 through A-111.

Table 4 Mobile Combustion CH_4 and N_2O for On-Road Diesel and Alternative Fuel Vehicles

Vehicle Type	Fuel Type	Vehicle Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)
Passenger Cars	Diesel	1960-1982	0.0006	0.0012
		1983-1995	0.0005	0.0010
		1996-2006	0.0005	0.0010
		2007-2018	0.0302	0.0192
Light-Duty Trucks	Diesel	1960-1982	0.0011	0.0017
		1983-1995	0.0009	0.0014
		1996-2006	0.0010	0.0015
		2007-2018	0.0290	0.0214
Medium- and Heavy-Duty Vehicles	Diesel	1960-2006	0.0051	0.0048
		2007-2018	0.0095	0.0431
Light-Duty Cars	Methanol		0.0080	0.0060
	Ethanol		0.0080	0.0060
	CNG		0.0820	0.0060
	LPG		0.0080	0.0060
	Biodiesel		0.0300	0.0190
Light-Duty Trucks	Ethanol		0.0120	0.0110
	CNG		0.1230	0.0110
	LPG		0.0120	0.0130
	LNG		0.1230	0.0110
	Biodiesel		0.0290	0.0210
Medium-Duty Trucks	CNG		4.2000	0.0010
	LPG		0.0140	0.0340
	LNG		4.2000	0.0430
	Biodiesel		0.0090	0.0010
Heavy-Duty Trucks	Methanol		0.0750	0.0280
	Ethanol		0.0750	0.0280
	CNG		3.7000	0.0010
	LPG		0.0130	0.0260
	LNG		3.7000	0.0010
	Biodiesel		0.0090	0.0430
Buses	Methanol		0.0220	0.0320
	Ethanol		0.0220	0.0320
	CNG		10.0000	0.0010
	LPG		0.0340	0.0170
	LNG		10.0000	0.0010
	Biodiesel		0.0090	0.0430

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. All values are calculated from Tables A-110 through A-113.

Table 5 Mobile Combustion CH_4 and N_2O for Non-Road Vehicles

Vehicle Type	Fuel Type	CH_4 Factor (g / gallon)	N_2O Factor (g / gallon)
Ships and Boats	Residual Fuel Oil	0.55	0.55
	Gasoline (2 stroke)	9.54	0.06
	Gasoline (4 stroke)	4.88	0.23
	Diesel	0.31	0.50
Locomotives	Diesel	0.80	0.26
Aircraft	Jet Fuel	0	0.30
	Aviation Gasoline	7.06	0.11
Agricultural Equipment[A]	Gasoline (2 stroke)	12.96	0.06
	Gasoline (4 stroke)	7.24	0.21
	Diesel	0.28	0.49
	LPG	2.19	0.39
Agricultural Offroad Trucks	Gasoline	7.24	0.21
	Diesel	0.13	0.49
Construction/Mining Equipment[B]	Gasoline (2 stroke)	12.42	0.07
	Gasoline (4 stroke)	5.58	0.20
	Diesel	0.20	0.47
	LPG	1.05	0.41
Construction/Mining Offroad Trucks	Gasoline	5.58	0.20
	Diesel	0.13	0.49
Lawn and Garden Equipment	Gasoline (2 stroke)	15.57	0.06
	Gasoline (4 stroke)	5.84	0.18
	Diesel	0.33	0.47
	LPG	0.35	0.41
Airport Equipment	Gasoline	2.58	0.25
	Diesel	0.17	0.49
	LPG	0.33	0.41
Industrial/Commercial Equipment	Gasoline (2 stroke)	15.14	0.06
	Gasoline (4 stroke)	5.48	0.20
	Diesel	0.23	0.47
	LPG	0.44	0.41
Logging Equipment	Gasoline (2 stroke)	12.03	0.08
	Gasoline (4 stroke)	6.71	0.18
	Diesel	0.10	0.49
Railroad Equipment	Gasoline	5.78	0.19
	Diesel	0.44	0.42
	LPG	1.20	0.41
Recreational Equipment	Gasoline (2 stroke)	7.81	0.03
	Gasoline (4 stroke)	8.45	0.19
	Diesel	0.41	0.41
	LPG	2.98	0.38

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. All values are calculated from Tables A-114 through A-115.

Notes:

[A] Includes equipment, such as tractors and combines, as well as fuel consumption from trucks that are used off-road in agriculture.

[B] Includes equipment, such as cranes, dumpers, and excavators, as well as fuel consumption from trucks that are used off-road in construction.

CALIFORNIA AIR RESOURCES BOARD

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Certified Pathways

Fuel Producer: Los Angeles County Sanitation Districts
Company ID: L375
Facility Name: Biogas Conditioning System Facility
Facility ID: F00308

Application for Tier 1 Pathway

Application # A0385

Pathway Number	Fuel Type	FeedStock	Applied Pathway Description	Applied CI(g/MJ)	Prov. Pathway	Pro. Start Date	Pro. End Date
A038501	Compressed Natural Gas (CNG)	Wastewater Sludge	Fuel Producer: Los Angeles County Sanitation Districts (L375); Facility Name: Biogas Conditioning System (F00308); RNG produced from the mesophillic anaerobic digestion of wastewater sludge at a POTW in Carson, California using grid-based electricity, and delivered to on-site CNG dispensing station.	20.43	Yes	08/20/2021	03/31/2023

Certified FPC	Certified CI (gCO2e/MJ)	FPC Start Date	FPC End Date	Certification Date	Certified Pathway Description	FPC Status	Comments	OP CI	Edit
CNG030A03850100	19.28	04/01/2021	12/31/2030	08/20/2021	Fuel Producer: Los Angeles County Sanitation District (L375); Facility Name: Biogas Conditioning System Facility (F00308); Biomethane produced from the mesophilic anaerobic digestion of wasterwater sludge; grid electricity; finished fuel is compressed and dispensed as CNG transportation fuel onsite. (Provisional)	Active	Certified Provisional	No	

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Appendix C: Landfill Fugitive Emissions

Collection Efficiencies of LACSD's LFG Systems

Measuring landfill gas collection efficiency is important for gauging emission control effectiveness and energy recovery opportunities. The Los Angeles County Sanitation Districts (LACSD) had developed a methodology for estimating collection efficiency using readily acquired integrated surface methane (ISM) concentration data and the US EPA's Industrial Source Complex (ISC) air dispersion model. This innovative methodology has been applied previously to estimate collection efficiency at Districts' Palos Verdes landfill (PVLF) (Huitric and Kong, 2006; Huitric, *et al.*, 2007). This approach is used here to estimate collection efficiencies at Districts' all six landfills.

Background:

Air dispersion mechanism, on which the US EPA's ISC model is based, indicated that the gas emission rate from an area source and the resulting surface gas levels are directly linear with one another. This linear relationship allows the usual definition of gas collection efficiency (i.e., the ratio of measured collected gases to an uncertain amount of generated gases) to be restated in terms of surface gas concentrations. Because methane is readily measured within surface gases and because it is proportionate to total gas emissions, it is used here for calculating collection efficiency.

The ISC model can be used to transform the amount of collected methane to an equivalent reduction in surface methane levels achieved by gas collection, ISM_r. Gas generation is then expressed as the sum of the modeled reduction in surface methane due to collection, ISM_r, and the measured surface methane due to emissions, ISM_e. Gas collection efficiency is then calculated by the following equation:

$$E = \frac{ISM_r}{ISM_r + ISM_e} \qquad (1)$$

where ISM_e is measured by the integrated surface methane (ISM) monitoring, and ISM_r is calculated by the ISC model. Details of the procedures of this methodology are presented in Huitric and Kong (2006), and Huitric, *et al.* (2007).

Approach:

There are three approaches that can be applied to estimate collection efficiencies. The first approach is the Grid-by-Grid Analysis, by which the collection efficiency is calculated by equation (1) on a grid by grid basis for each quarterly ISM monitoring for all the monitoring grids of each landfill. The second approach is the Averaged Grid Emission Analysis, by which collection efficiency calculation is based on the site-wide, rather than grid by grid, overall average surface emissions, ISM_e, and average modeled

surface emissions reduction, ISM_r. The third approach is the Weighted Average Analysis, by which a frequency analysis of the site meteorological data is made for hours corresponding to actual ISM monitoring. A frequency table is created using possible wind speed ranges (within which ISM monitoring was taken place) and six meteorological stability categories ("A" through "F"). For each combination of wind speed and stability category, a surface methane concentration reduction due to collection is predicted by the ISC model. The weighted overall average methane reduction due to collection, ISM_r, is calculated based on this frequency table of combinations of wind speed and stability category, as well as the corresponding surface methane reduction under each wind speed and stability category combination. Collection efficiency can then be estimated, according to equation (1), using this weighted average methane reduction, ISM_r, and the average of actual surface methane levels, ISM_e.

Among the three approaches, grid-by-grid analysis is the most accurate and detailed approach. However, extensive analyses of grid-by-grid ISM monitoring and meteorological data are required, and this approach generates exceedingly large model output files, making data analysis a difficult and tedious task. The average grid emission analysis is a simpler approach, with simplified analysis yet still generates large model output files. The weighted average analysis is the simplest approach among the three. It generates much smaller and more manageable ISC output files, enables a much easier analysis. Another significant advantage for this weighted average methodology, is that this approach, unlike the other two approaches, relies only on a fix combination of wind speed and stability category (the frequency table), thus does not require an extensive preprocessing of the meteorological data, that normally requires an outside expert's assistance and extensive upper air meteorological data gathering, for running the ISC model. Thus, as a result, significant time and efforts can be saved.

These three approaches have been previously applied to Districts' Palos Verdes landfill (Huitric and Kong, 2006). Collection efficiencies have been estimated by the three approaches using fiscal year 2001 ISM monitoring and the corresponding weather data. While the most accurate and complete grid-by-grid analysis estimated an average collection efficiency of 93.8% for the urban mode and 96.5% for the rural mode, the simpler averaged grid emission analysis yielded collection efficiencies of 93.2% and 96.4%, for urban and rural modes, respectively, and the simplest weighted average approach resulted in collection efficiencies of 92.8% and 96.1%, for urban and rural modes, respectively. This indicates that the weighted average approach is capable of not only saving time and efforts significantly, but also yielding fairly accurate and more conservative collection efficiency estimations. Therefore, the weighted average approach is used to estimate collection efficiencies at Districts' six landfills in this study.

Collection Efficiency Calculations:

Collection efficiency calculations are conducted for District's Calabasas landfill (CALF), Puente Hills landfill (PHLF), PVLF, Scholl Canyon landfill (SCLF), and Spadra landfill

(SPLF) using the sites' year 2006 ISM monitoring and weather data. Because Districts' Mission Canyon landfill (MCLF) is not required by regulations to conduct integrated surface methane (ISM) monitoring, no ISM monitoring data for year 2006 are available for MCLF. Alternatively, surface methane monitoring and corresponding weather data obtained during two separate surface methane monitoring events (in which, surface methane concentrations were recorded in a routing fashion covering the entire surface of the site) in June 1998 are used to estimate collection efficiencies for MCLF. Quarterly ISM monitoring, and the corresponding weather data are obtained for the entire year of 2006 for each landfill, except for MCLF, for which data from two monitoring events in June 1998 are used. To make the data files more manageable, a computer database algorithm has been developed to filter out unnecessary weather data and to retain only those weather data recorded in hours corresponding to times of ISM monitoring. This database algorithm assigns a stability category ("A" through "F") according to the method developed by Pasquill (1961) for each data point based on time and wind speed associated with this monitoring event. At the same time, this algorithm also records the number of occurrences for each combination of wind speed and stability category within each landfill dataset.

As a result, a site-specific frequency table counting percentage of occurrence of each wind speed and stability category combination can then be generated for each landfill. Subsequently, similar tables containing ISC model predicted surface methane reductions due to collection for each of the wind speed and stability category combinations can be generated for urban and rural modes, respectively. These tables of the ISC model results are generated based on results obtained from previous modeling work at PVLF (i.e., Huitric and Kong, 2006). Because the ISC model predicted surface methane reductions due to collection were generated in such manner that they are only corresponding to a given set of wind speed and stability category combinations, thus are independent of site-specific meteorological conditions. Therefore, these tables of ISC model results are applied to all landfill sites, in conjunction with each site-specific meteorological condition. The combination of the ISC results table and the site-specific (weather data) frequency table (in fact, the product of these two tables) yields a weighted average surface methane reduction due to collection for a landfill. This weighted average surface methane reduction value combines with the average actual ISM measurement leads to collection efficiency estimates for the landfill.

The US EPA's population guidance suggests that for a 3-km radius circle out from a facility, if the area is > 50% urban, then run the ISC model in the urban mode. Otherwise it's more appropriate to apply the model in rural mode. However, to get a better understanding of gas collection system's performance, results under both rural and urban modes are presented. Table 1 below shows quarterly collection efficiency estimates, based on year 2006 monitoring data and under rural and urban modes respectively, for Districts' all, but one, landfills. For MCLF, collection efficiency estimates, based on June 1998 monitoring data, are presented.

Table 1. Collection Efficiency Estimates for Districts' Landfills

Landfill	**Collection Efficiency**									
	Q1-2006		Q2-2006		Q3-2006		Q4-2006		***Annual Average***	
	Rural	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*
CALF	96.0%	91.8%	97.9%	95.6%	96.1%	93.9%	92.8%	86.1%	**95.7%**	**91.8%**
PHLF	97.0%	93.7%	97.8%	95.8%	96.9%	95.3%	97.4%	95.3%	**97.3%**	**95.0%**
PVLF	97.3%	94.4%	98.6%	97.3%	98.2%	97.2%	96.9%	94.1%	**97.7%**	**95.7%**
SCLF	98.8%	97.5%	99.7%	99.4%	99.4%	99.0%	99.8%	99.7%	**99.4%**	**98.9%**
SPLF	99.9%	99.9%	100%	100%	98.8%	98.0%	95.1%	90.9%	**98.5%**	**97.2%**
	June 02, 1998		June 18, 1998						***Average***	
MCLF	93.5%	87.8%	97.6%	95.2%					**95.5%**	**91.5%**

Discussions:

Because there is no year 2006 ISM monitoring data available for MCLF, surface methane monitoring and corresponding weather data collected in June 1998 were used to estimate collection efficiency at MCLF. Sample bags and OVA device were used during the June 1998 monitoring events, because the reading for the OVA device is analog rather than digital, as it's the case for more modern methane reading devices, roundup errors could have resulted. And these roundup errors could lead to higher methane readings than their actual levels. Lower collection efficiency values could be estimated as a result.

Collection efficiencies for PVLF had been estimated previously using Q2/2006 monitoring data (Huitric, *et al.*, 2007). In this previous study, a more accurate and detailed averaged grid emission analysis was used, and it estimated +99% collection efficiencies for PVLF under both rural and urban modes. As discussed earlier in this paper, the weighted average approach, used here in this study, tends to predict slightly lower collection efficiencies, thus its collection efficiency estimates tend to be more conservative. This is true not only for PVLF, but also for other landfills discussed in this paper.

At CALF, in order to improve collected gas quality for energy recovery, gas system's applied vacuum had been decreased about 40% from its previous level beginning in October 2006. This lowering applied vacuum level led to higher ISM level (but still much lower than the 50 ppm regulatory limit) for Q4/2006 as compared to those of the preceding quarters of the year. Consequently, lower collection efficiency values are estimated for Q4/2006.

Below background level of ISM has been measured for the second quarter of 2006 at SPLF, this resulted in a virtually 100% collection efficiency for Q2/2006.

Because the rules of Pasquill's in identifying stability categories of the weather data are vague and not straightforward, in developing and implementing the database algorithm to identify stability categories, the algorithm is designed that whenever there is a weather condition under which either one of the two neighboring stability categories (say, A or B) can be assigned, the algorithm will always choose the stability category that tends to be more unstable (in this case, category A). This would result in a smaller ISC model predicted surface methane reduction due to collection (ISM_r), and as a result, lower yet more conservative collection efficiency estimations are calculated.

In summary, applying simpler yet systematic and effective approach, collection efficiencies for Districts' landfills have been estimated. Even the estimates tend to be more on the conservative side, the results of this study indicate that all Districts' six landfills are having high efficiency LFG collection systems in operation.

References:

Huitric, R. and D. Kong (2006) "Measuring landfill gas collection efficiency using surface methane concentrations", Solid Waste Association of North America (SWANA) 29th Landfill Gas Symposium, St. Petersburg, FL.

Huitric, R., D. Kong, L. Scales, S. Maguin, and P. Sullivan (2007) "Field comparison of landfill gas collection efficiency measurements", Solid Waste Association of North America (SWANA) 30th Landfill Gas Symposium, Monterey, CA.

Pasquill, F. (1961) "The estimation of the dispersion of windborne material", The Meteorological Magazine, Vol. 90, No. 1063, pp.33-49.

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Appendix D: Refrigerants

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**	Cryogenics facility
Address:	24501 S Figueroa St	Carson	CA 90745
Mailing Address:	PO Box 4998	Whittier	CA 90607
Facility Representative:		**Sign:**	**Date:** 03/24/2021
Certified Auditor:	Ryan Hook	**Sign:** 	**Cert. #:** 926813064630

System Type:	Air Cooled Chiller	**Make:**	Carrier	**Model #:**	30GXN150-TF640NE
Serial #:	0301F57303	**Unit Tag:**	ch #CH29E-01A	**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair Leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
03/24/2021	Electronic leak detector	**Air Conditioning Solutions Inc** **2223 El Sol Ave** **Altadena, CA 91001**					

Determine the annual refrigerant leak:

Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%): 0.00

Notes:
134A

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501		**Bldg or area served:**	Cryogenics facility	
Address:	24501 S Figueroa St		Carson	CA	90745
Mailing Address:	PO Box 4998		Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**	03/24/2021
Certified Auditor:	Ryan Hook	**Sign:**		**Cert. #:**	926813064630

System Type:	NAAir Cooled Chiller	**Make:**	Carrier	**Model #:**	30GXN150-TF640NE
Serial #:	0301F57305	**Unit Tag:**	ch # RCH29E-01B	**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair Leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
03/24/2021	Electronic leak detector	**Air Conditioning Solutions Inc** **2223 El Sol Ave** **Altadena, CA 91001**	03/24/2021		0		

Determine the annual refrigerant leak:

Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant leak (%): 0.00

Notes:
134A

Chiller is down and is planned for replacement. Large coil leak circuit A1

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**		
Address:	24501 S Figueroa St	Carson	CA	90745
Mailing Address:	PO Box 4998	Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**
Certified Auditor:	Ryan Hook	**Sign:**		**Cert. #:**

System Type:		**Make:**		**Model #:**	
Serial #:		**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
		Air Conditioning Solutions Inc **2223 El Sol Ave** **Altadena, CA 91001**					

Determine the annual refrigerant leak:

Total Additional Refrigerant:

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%):

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**		
Address:	24501 S Figueroa St	Carson	CA	90745
Mailing Address:	PO Box 4998	Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**
Certified Auditor:	Ryan Hook	**Sign:**		**Cert.#:**

System Type:		**Make:**		**Model #:**	
Serial #:		**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
		Air Conditioning Solutions Inc 2223 El Sol Ave Altadena, CA 91001					

Determine the annual refrigerant leak:

Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%):

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501		**Bldg or area served:**	Roof	
Address:	24501 S Figueroa St		Carson	CA	90745
Mailing Address:	PO Box 4998		Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**	03/23/2021
Certified Auditor:	Nick Siperly	**Sign:**		**Cert. #:**	926813064630

System Type:	Gas Pack	**Make:**	Carrier	**Model #:**	48AJD030-D-611FF
Serial #:	3706U23227	**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair Leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
03/23/2021	Electronic leak detector	**Air Conditioning Solutions Inc 2223 El Sol Ave Altadena, CA 91001**					

Determine the annual refrigerant leak: Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%): 0.00

Notes:
R-22. No leaks found at this time

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**		
Address:	24501 S Figueroa St	Carson	CA	90745
Mailing Address:	PO Box 4998	Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**
Certified Auditor:	Nick Siperly	**Sign:**		**Cert. #:**

System Type:		**Make:**		**Model #:**	
Serial #:		**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair Leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
		Air Conditioning Solutions Inc 2223 El Sol Ave Altadena, CA 91001					

Determine the annual refrigerant leak:

Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant leak (%):

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**		
Address:	24501 S Figueroa St	Carson	CA	90745
Mailing Address:	PO Box 4998	Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**
Certified Auditor:	Nick Siperly	**Sign:**		**Cert. #:**

System Type:		**Make:**		**Model #:**	
Serial #:		**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
		Air Conditioning Solutions Inc **2223 El Sol Ave** **Altadena, CA 91001**					

Determine the annual refrigerant leak:

Total Additional Refrigerant:

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%):

SCAQMD RULE 1415 RECORDKEEPING FORM I

6563 - PM - M1202.03 - County Sanitation District

Facility Name:	County Sanitation District LAC** County Sanitation 24501	**Bldg or area served:**		
Address:	24501 S Figueroa St	Carson	CA	90745
Mailing Address:	PO Box 4998	Whittier	CA	90607
Facility Representative:		**Sign:**		**Date:**
Certified Auditor:	Nick Siperly	**Sign:**		**Cert.#:**

System Type:		**Make:**		**Model #:**	
Serial #:		**Unit Tag:**		**Refrigerant Type:**	

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

Date	Leak Test Method	Name & Address of contractor who repaired leak & performed test	Date Leak Detected (if any)	Date Leak Repaired (if any)	Total Days to Repair leak (if any)	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)
		Air Conditioning Solutions Inc 2223 El Sol Ave Altadena, CA 91001					

Determine the annual refrigerant leak:

Total Additional Refrigerant =

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant x 100 / Total Charge Capacity

Annual Refrigerant Leak (%):

SOUTH COAST AQMD RULE 1415 RECORDKEEPING FORM I

Name: County Sanitation 24501

: 24501 S Figueroa St, Carson, CA 90745

Address: PO Box 4998, Whittier, CA 90607

Representative:	**Customer Signature:** ~i:52:75~
d Auditor: Nick Siperly	**Cert. #:** 1660809483 **Signed:**

ype	Chiller - Water Cooled Screw	**Make**	Carrier	**Charge Capacity**	
#	3902Q02027	**Model #**	30HXC246RY	**Refrigerant**	R-

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

	Leak Test Method	Type of Leak or Malfunction	Date Leak Detected	Date Leak Repaired	Total Days to Repair Leak	Refrigerant Recovered (lbs)	Additional Refrigerant (lbs)	
	Electronic Leak Detector	None						

ine the annual refrigerant leak:

AL REFRIGERANT = Additional Refrigerant X 100

DETERMINATION Total Charge Capacity

Total Additional Refrigerant =

Annual Refrigerant Leak (%) =

an employee or representative of the owner of the system performed all work, then only write "OWNER" in column IV.

SOUTH COAST AQMD RULE 1415 RECORDKEEPING FORM I

Name: County Sanitation 24501

: 24501 S Figueroa St, Carson, CA 90745

Address: PO Box 4998, Whittier, CA 90607

Representative:	**Customer Signature:** ~i:52:75~
d Auditor: Nick Siperly	**Cert. #:** 1660809483

Signed: 7-1-16

ype	Chiller - Water Cooled Screw	**Make**	Carrier	**Charge Capacity**	
#	S2112Q20156	**Model #**	30HXC126PYE671AA-1	**Refrigerant**	R-

PLEASE REFER TO FORM II IF A REFRIGERATION LEAK OCCURRED

	Leak Test Method	**Type of Leak or Malfunction**	**Date Leak Detected**	**Date Leak Repaired**	**Total Days to Repair Leak**	**Refrigerant Recovered (lbs)**	**Additional Refrigerant (lbs)**	
	Electronic Leak Detector	None						

ine the annual refrigerant leak:

AL REFRIGERANT = Additional Refrigerant X 100
DETERMINATION Total Charge Capacity

Total Additional Refrigerant =

Annual Refrigerant Leak (%) =

an employee or representative of the owner of the system performed all work, then only write "OWNER" in column IV.

SCAQMD RULE 1415 REFRIGERANT ANNUAL AUDIT (FORM I)

Facility Name: LAS — Phone #: 714-614-1271

Address: 1955 Workman Mill RD Whittier CA 90601

Mailing Address:

Facility Representative: JAIME TALAVERA — 385339127930 — Sign: — Date: 7-1-2021

Certified Auditor: Garrett Black — ID#: [redacted]14 — Sign: — Date of Audit: 6-28-202

Total Capacity: 2550 lbs. | System Type | Refrigeration: Serial # _____ | A/C System: Serial # 4604Q69713 | Refrigerant: R (134A

Please check here if the system had a refrigerant leak: ☐ — PLEASE REFER TO FORM II IF A REFRIGERANT LEAK OCCURRED

Date	Leak Test Method	P/O # of Recycler	Name and Address of the CONTRACTOR who repaired leak & performed leak test	Date Leak Detected	Date Leak Repaired	Total Days to Repair Leak	Refrigerant Recovered (lbs)	Additional Refrigerants (lbs)
6/28/2021	Electronic		Carrier Corp 2478 Peck Rd COI, CA 90601					

Determine the annual refrigerant leak by use of this equation below:

ANNUAL REFRIGERANT LEAK DETERMINATION = Additional Refrigerant / Total Change Capacity X 100 < 5%

Total Additional Refrigerant = _____ lbs.

Annual Refrigerant Leak % = _____ %

NOTE: If an employee or representative of the owner of the system performed all work, then only write "OWNER" in column IV.

R1415 (FORM I) JB: (4/13/92) | Form Serial #: _____ | Triplicate Forms | WHITE - SOURCE | YELLOW - AUDITOR | PINK - SCAQMD

SCAQMD RULE 1415 REFRIGERANT ANNUAL AUDIT (FORM I)

Facility Name: LAS		**Phone #:** (714) 694-1271	
Address: 1955 Workman Mill Rd Whittier CA 90601			
Mailing Address:			
Facility Representative: JAIME TALAVERA	385339127930	**Sign:**	**Date:** 7-1-2021
Certified Auditor: Garrett Black	**ID#:** [redacted]	**Sign:**	**Date of Audit:** 6-28-2021

Total Capacity	2550 lbs.	**System Type**	Refrigeration: Serial # _____	A/C System: Serial # 4604Q69714	Refrigerant	R (134)A
Please check here if the system had a refrigerant leak:			**PLEASE REFER TO FORM II IF A REFRIGERANT LEAK OCCURRED**			

Date	Leak Test Method	P/O # of Recycler	Name and Address of the CONTRACTOR who repaired leak & performed leak test	Date Leak Detected	Date Leak Repaired	Total Days to Repair Leak	Refrigerant Recovered (lbs)	Additional Refrigerants (lbs)
6/28/2021	Electronic		Carrier Corp 2478 Peck Rd COI CA 90601					

Determine the annual refrigerant leak by use of this equation below:

ANNUAL REFRIGERANT LEAK DETERMINATION = $\frac{\text{Additional Refrigerant}}{\text{Total Change Capacity}}$ X 100 < 5%

Total Additional Refrigerant = _____ lbs.

Annual Refrigerant Leak % = _____ %

NOTE: If an employee or representative of the owner of the system performed all work, then only write "OWNER" in column IV.

R1415 (FORM I) JB: (4/13/92)	Form Serial #: _____	Triplicate Forms	WHITE - SOURCE YELLOW - AUDITOR PINK - SCAQMD

SCAQMD RULE 1415 REFRIGERANT ANNUAL AUDIT (FORM I)

Facility Name: LAS		**Phone #:** (714) 614-1271	
Address: 1955 Workman Mill Rd Whittier CA 90601			
Mailing Address:			
Facility Representative: JAIME TALAVERA	385339127930	**Sign:**	**Date:** 7-1-2021
Certified Auditor: Garrett Black	**ID#:** [redacted]	**Sign:**	**Date of Audit:** 6-28-2021

Total Capacity	750 lbs.	**System Type**	Refrigeration: Serial # _____	A/C System: Serial # 5298J59060	Refrigerant	R (134) A
Please check here if the system had a refrigerant leak:			**PLEASE REFER TO FORM II IF A REFRIGERANT LEAK OCCURRED**			

Date	Leak Test Method	P/O # of Recycler	Name and Address of the CONTRACTOR who repaired leak & performed leak test	Date Leak Detected	Date Leak Repaired	Total Days to Repair Leak	Refrigerant Recovered (lbs)	Additional Refrigerants (lbs)
6/28/2021	Electronic		Carrier Corp 2478 Peck Rd COF, CA 90601					

Determine the annual refrigerant leak by use of this equation below:

ANNUAL REFRIGERANT LEAK DETERMINATION = $\frac{\text{Additional Refrigerant}}{\text{Total Change Capacity}}$ X 100 < 5%

Total Additional Refrigerant = _____ lbs.

Annual Refrigerant Leak % = _____ %

NOTE: If an employee or representative of the owner of the system performed all work, then only write "OWNER" in column IV.

R1415 (FORM I) JB: (4/13/92)	**Form Serial #:** _____	**Triplicate Forms**	WHITE - SOURCE YELLOW - AUDITOR PINK - SCAQMD

VIC'S
MECHANICAL SERVICE CONTRACTORS
ESTABLISHED 1951

317 E. 5th Street
Holtville, CA 92250
(760) 356-4018
dispatch@vicsac.com

Invoice

DATE	04/28/2021
INVOICE#	85208
TERMS	Due on completion

BILL TO

County Sanitation Districts of LA cou4477
P.O. Box 4998
Whittier CA 90607
7608805605Michell

SERVICE LOCATION

6330 E Hwy 78 - MESQUITE REG LANDFILL
6330 E Hwy 78
Brawley CA 92227
(760) 880-5605

JOB#	DATE	PO/REF#	DESCRIPTION
6371	03/30/2021		**Completion Notes:** In. 8:30-- AC 10. Worne blower belt. A36, weak 15uf blower motor capacitor. Ac 9 found weak 10uf cfm capacitor. AC 7 found no issues on unit.. scale house window unit, need to be replaced, 2 ton , opening is 26 inches by 18 inches. AC 3 HEATER 2 pole 30 amp 24volt coil contactor is pitted need replacement, and a 10uf blower motor capacitor. AC 3 needs freon, R22. AC14 Found no issues on it. AC15 no issues found. Clock out 1:30 3/31/21 clock in= 8:30. AC5 found overheated 2 pole 30 amp 24volt coil contactor on heat strips. AC4 overheated 2 pole 30amp 24 volt contactor on heat strips. AC6A mini working properly. AC6B Wall pack compressor is shorted needs quote for new unit. Clock out= 10:15. We need to reschedule to finish. 4/27/21 AC 8 found pitted contactor (2pole 40aamp 24volt) . #11 didn't find any issues on unit. Replace blower belt. Unit 12. Found cfm blades dropped from motor, put it back check it, amps were fine. No issues found.

PO#1667294
RECEIVED 5/6/2021
MICHELE OCHS
WORK ORDER No. 0343355-14

Job Charges	Qty	Rate	Total
Contract - Commercial Commercial contract; includes material, tax and labor	1.00	$2,475.33	$2,475.33
Job Subtotal			**$2,475.33**
7.75% sales tax (2017)		7.75%	$0.00
Job Total			**$2,475.33**

OK TO PAY
TMO

PRE-WORK SIGNATURE

POST-WORK SIGNATURE

04/27/2021 01:24 pm

Signed By:

Signed By: Mesquite Regional Landfill CSDLA

EQUIPMENT SERVICED

PACKAGE HEAT PUMP: ICP PHH072H0A00AAA

S/N: G081240518

SKU:

Installed:

Location: Roof #9

Extended Warranty?: No

Warranty Expires:

Notes:

WALLPACK: BARD WA121-A05XP4XXJ

S/N: 158C072320128-01
SKU:
Installed:
Location: #6-B
Notes:

Extended Warranty?: No
Warranty Expires:

PACKAGE HEAT PUMP: ICP PHH072H0A00AAA

S/N: G081240517
SKU:
Installed:
Location: Roof#8
Notes:

Extended Warranty?: No
Warranty Expires:

PACKAGE HEAT PUMP: ICP PHH036H0A00AAA

S/N: G080220472
SKU:
Installed:
Location: Roof#11
Notes:

Extended Warranty?: No
Warranty Expires:

PACKAGE HEAT PUMP: DAY & NIGHT PHH150H0A000AA

S/N: 0586008522
SKU:
Installed:
Location: Roof#12
Notes:

Extended Warranty?: No
Warranty Expires:

CONDENSER - HP: DAY & NIGHT N4H318GKC100

S/N: E073412561
SKU:
Installed:
Location: Roof#13
Notes:

Extended Warranty?: No
Warranty Expires:

CUSTOMER MESSAGE

Terms: Due upon completion. Thank you for your business.

Invoice Total:	**$2,475.33**
Deposits (-):	**$0.00**
Payments (-):	**$0.00**
Total Due:	**$2,475.33**

Invoice

Vic's Air Conditioning & Electrical

P.O. Box 815
Holtville, CA 92250
760-356-4018

Date	Invoice #
8/19/2021	86849

Bill To
County Sanitation Districts of LA cou4477 P.O. Box 4998 Whittier, CA 90607

PO# 1667294 - REPAIRS
MESQUITE REGIONAL LANDFILL
RECEIVED 10/25/2021
MICHELE OCHS
WORK ORDER No 0343355-14

P.O. No.	Terms	Project
	Due on completion	6330 E Hwy 78 - MESQUITE...

Quantity	Description	Rate	Amount
	Job# 8247 Assigned Techs: Jorge Teran Completion Notes: AC 10 replace AX36 blower BELT, and 15uf blower capacitor. AC 9 replace 10uf cfm capacitor.. AC 8 Replace a 2 pole 40amp 24volt contactor. AC 3 replace a 2 pole 30amp 24volt coil contactor. AC 5 replace a 2 pole 30amp 24volt coil contactor. AC 4 replace a 2 pole 30amp 24volt coil contactor. AC8 4=16×16×2 FILTERS AC 9 4=16×16×2 FILTERS		
0	GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V CONTACTORS ARE SWITCHES THAT USE HIGH VOLTAGE TO HELP COMPONENTS IN YOUR UNIT. SINCE THEY ARE IN CONSTANT USE, THEY DO NEED TO BE REPLACED OCCASIONALLY.	0.00	0.00
1	PR-FR	98.93	98.93
1	L37-120 / GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V	33.24	33.24
0	10 MFD RUN CAPACITOR REPLACEMENT SIMILAR TO A BATTERY, CAPACITORS HELP START MOTORS BY STORING CURRENT. A DAMAGED CAPACITOR CAN DAMAGE THE MOTOR IF NOT SERVICED. REGULAR MAINTENANCE IS ENCOURAGED.	0.00	0.00
1	PR-FR	98.93	98.93
1	CR10X440 / 10 MFD RUN CAPACITOR	18.08	18.08
0	GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V CONTACTORS ARE SWITCHES THAT USE HIGH VOLTAGE TO HELP COMPONENTS IN YOUR UNIT. SINCE THEY ARE IN CONSTANT USE, THEY DO NEED TO BE REPLACED OCCASIONALLY.	0.00	0.00
1	PR-FR	98.93	98.93
1	L37-120 / GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V	33.24	33.24
0	GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V CONTACTORS ARE SWITCHES THAT USE HIGH VOLTAGE TO HELP COMPONENTS IN YOUR UNIT. SINCE THEY ARE IN CONSTANT USE, THEY DO NEED TO BE REPLACED OCCASIONALLY.	0.00	0.00
1	PR-FR	98.93	98.93
1	L37-120 / GENERIC CONTACTOR * 2 POLE 25 - 30 AMP 24V	33.24	33.24
0	GENERIC CONTACTOR * 2 POLE 35 - 40 AMP 24V CONTACTORS ARE SWITCHES THAT USE HIGH VOLTAGE TO HELP COMPONENTS IN YOUR UNIT. SINCE THEY ARE IN CONSTANT USE, THEY DO NEED TO BE REPLACED OCCASIONALLY.	0.00	0.00
1	PR-FR	98.93	98.93

	Total

Invoice

Vic's Air Conditioning & Electrical

P.O. Box 815
Holtville, CA 92250
760-356-4018

Date	Invoice #
8/19/2021	86849

Bill To
County Sanitation Districts of LA cou4477 P.O. Box 4998 Whittier, CA 90607

P.O. No.	Terms	Project
	Due on completion	6330 E Hwy 78 - MESQUITE...

Quantity	Description	Rate	Amount
1	L36-860 / GENERIC CONTACTOR * 2 POLE 35 - 40 AMP 24V	103.50	103.50
1	MISC.5 / MISCELLANEOUS .50	2.50	2.50
0	10 MFD RUN CAPACITOR REPLACEMENT SIMILAR TO A BATTERY, CAPACITORS HELP START MOTORS BY STORING CURRENT. A DAMAGED CAPACITOR CAN DAMAGE THE MOTOR IF NOT SERVICED. REGULAR MAINTENANCE IS ENCOURAGED.	0.00	0.00
1	PR-FR	98.93	98.93
1	CR10X440 / 10 MFD RUN CAPACITOR	18.08	18.08
0	26.5-56 IN FAN BELT WITHOUT BLOWER REPAIRS IT IS A GOOD MAINTENANCE PRACTICE TO REPLACE A BELT WHEN SERVICING A UNIT IF THE BELT IS CRACKED OR WORN.	0.00	0.00
1	PR-FR	98.93	98.93
1	A56 / 26.5 - 56 IN FAN BELT WITH BLOWER REPAIRS	45.90	45.90
0	15 MFD RUN CAPACITOR REPLACEMENT SIMILAR TO A BATTERY, CAPACITORS HELP START MOTORS BY STORING CURRENT. A DAMAGED CAPACITOR CAN DAMAGE THE MOTOR IF NOT SERVICED. REGULAR MAINTENANCE IS ENCOURAGED.	0.00	0.00
1	PR-FR	98.93	98.93
1	CR15X440 / 15 MFD RUN CAPACITOR	24.92	24.92
	7.75% Sales Tax [2017]	7.75%	0.00

	Total	$1,104.14

OK TO PAY
NKO

VIC'S
MECHANICAL SERVICE CONTRACTORS
ESTABLISHED 1951

Vic's Air Conditioning & Electrical
517 E. 5th Street, Holtville, CA 92250
(760) 356-4018
dispatch@vicsac.com

Invoice

DATE	10/07/2021
INVOICE#	87697
TERMS	Due on completion

BILL TO

County Sanitation Districts of LA County
P.O. Box 4998
Whittier CA 90607
7608805605Michell

SERVICE LOCATION

6330 E Hwy 78 - MESQUITE REG LANDFILL
6330 E Hwy 78
Brawley CA 92227
(760) 880-5605

JOB#	DATE	PO/REF#	DESCRIPTION
9695	09/28/2021	PO# 1737578	**Completion Notes:** SCALE HOUSE window unit To replace existing 24,000 BTU window unit.

Job Charges	Qty	Rate	Total
Contract - Commercial INSTALLATION LG window unit 24,000 BTU 203/208v 20a Commercial contract; includes material, tax and labor	1.00	$1,724.55	$1,724.55
Job Subtotal			**$1,724.55**
Job Total			**$1,724.55**

PRE-WORK SIGNATURE

Signed By:

POST-WORK SIGNATURE

Signed By:

CUSTOMER MESSAGE

Terms: Due upon completion. Thank you for your business.

Invoice Total:	**$1,724.55**
Deposits (-):	**$0.00**
Payments (-):	**~~$0.00~~**
Total Due:	**$1,724.55**

OK TO PAY
TKO

PO# 1737578
RECEIVED 10/12/21
MICHELE OCHS
WORK ORDER NO 0343355-14

Niizawa, Warisa

From: Reece, Jerry
Sent: Tuesday, February 22, 2022 2:44 PM
To: Niizawa, Warisa
Cc: Watson, Mathew; Gonzalez, Jeanine; Vasquez, Alfonso; Chang, Joseph
Subject: FW: REFRIGERANT TOTALS - GW RICHARDSON - LANCASTER / PALMDALE

Good afternoon, Warisa,

Here are the totals that they put in at Palmdale and Lancaster for last year. They did not measure any refrigerant that was removed during the leak checks. When they do the leak checks they remove all refrigerant and fill with nitrogen to check for leaks and then refill after the repairs are made. The totals below reflect how much was put back in after repairs. Not sure if we need to change the way this procedure is done so we get a more accurate account for actual lost refrigerant. If so please let me know and we will make sure that happens.

Thank you,

Jerry Reece
Supervisor of Electrical and Instrumentation Repair | Water Reclamation Plants
562-908-4288 ext. 6703 | c 661-505-3782
jerryreece@lacsd.org

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources
Website | Facebook | Twitter | Instagram | YouTube

From: cassiew@gwrichardsonac.com <cassiew@gwrichardsonac.com>
Sent: Tuesday, February 22, 2022 1:22 PM
To: Reece, Jerry <JerryReece@lacsd.org>
Subject: REFRIGERANT TOTALS - GW RICHARDSON - LANCASTER / PALMDALE

Hi Jerry

Thank you for your patience.

I have an approximate total of 23.5 lbs of R410a refrigerant at Palmdale and 80.5 lbs at Lancaster site. Please let me know if you need anything else from me.

Thank you again and have a great day Jerry

Cassie Williams
Office Manager / Human Resources Asst.
GW Richardson Heating and Air Conditioning, Inc.
28231 Avenue Crocker, #100

Appendix E: Indirect Emissions

Table 6 Electricity

eGRID Subregion	Total Output Emission Factors			Non-Baseload Emission Factors		
	CO_2 Factor (lb / MWh)	CH_4 Factor (lb / MWh)	N_2O Factor (lb / MWh)	CO_2 Factor (lb / MWh)	CH_4 Factor (lb / MWh)	N_2O Factor (lb / MWh)
AKGD (ASCC Alaska Grid)	1,039.6	0.082	0.011	1,262.5	0.110	0.015
AKMS (ASCC Miscellaneous)	525.1	0.024	0.004	1,528.3	0.068	0.012
AZNM (WECC Southwest)	1,022.4	0.077	0.011	1,435.3	0.097	0.014
CAMX (WECC California)	496.5	0.034	0.004	929.5	0.047	0.006
ERCT (ERCOT All)	931.7	0.066	0.009	1,261.0	0.083	0.012
FRCC (FRCC All)	931.8	0.066	0.009	1,123.9	0.068	0.009
HIMS (HICC Miscellaneous)	1,110.7	0.118	0.018	1,535.7	0.139	0.022
HIOA (HICC Oahu)	1,669.9	0.180	0.027	1,682.1	0.159	0.025
MROE (MRO East)	1,678.0	0.169	0.025	1,634.3	0.149	0.022
MROW (MRO West)	1,239.8	0.138	0.020	1,764.3	0.192	0.027
NEWE (NPCC New England)	522.3	0.082	0.011	931.0	0.086	0.011
NWPP (WECC Northwest)	639.0	0.064	0.009	1,575.1	0.148	0.021
NYCW (NPCC NYC/Westchester)	596.4	0.022	0.003	1,067.6	0.022	0.002
NYLI (NPCC Long Island)	1,184.2	0.139	0.018	1,320.3	0.040	0.005
NYUP (NPCC Upstate NY)	253.1	0.018	0.002	931.5	0.043	0.005
RFCE (RFC East)	716.0	0.061	0.008	1,242.6	0.091	0.013
RFCM (RFC Michigan)	1,312.6	0.129	0.018	1,748.9	0.171	0.024
RFCW (RFC West)	1,166.1	0.117	0.017	1,828.3	0.179	0.026
RMPA (WECC Rockies)	1,273.6	0.123	0.018	1,542.6	0.120	0.017
SPNO (SPP North)	1,163.2	0.124	0.018	1,945.5	0.201	0.029
SPSO (SPP South)	1,166.6	0.091	0.013	1,603.5	0.118	0.017
SRMV (SERC Mississippi Valley)	854.6	0.055	0.008	1,137.6	0.069	0.010
SRMW (SERC Midwest)	1,664.2	0.185	0.027	1,907.0	0.204	0.030
SRSO (SERC South)	1,027.9	0.081	0.012	1,413.7	0.107	0.015
SRTV (SERC Tennessee Valley)	1,031.5	0.097	0.014	1,644.3	0.149	0.021
SRVC (SERC Virginia/Carolina)	743.3	0.067	0.009	1,422.6	0.128	0.018
US Average	947.2	0.085	0.012	1,432.3	0.117	0.017

Source: EPA eGRID2018, March 2020

Note: Total output emission factors can be used as default factors for estimating GHG emissions from electricity use when developing a carbon footprint or emissions inventory. Annual non-baseload output emission factors should not be used for those purposes, but can be used to estimate GHG emissions reductions from reductions in electricity use.

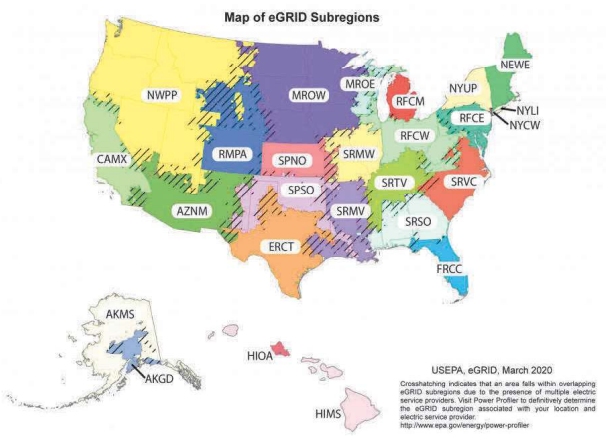

Table 7 Steam and Heat

	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)
Steam and Heat	66.33	1.250	0.125

Note: Emission factors are per mmBtu of steam or heat purchased. These factors assume natural gas fuel is used to generate steam or heat at 80 percent thermal efficiency.

Scope 3 Emission Factors

Scope 3 emission factors provided below are aligned with the Greenhouse Gas Protocol Technical Guidance for Calculating Scope 3 Emissions, version 1.0 (Scope 3 Calculation Guidance). Where applicable, the specific calculation method is referenced. Refer to the Scope 3 Calculation Guidance for more information (http://www.ghgprotocol.org/scope-3-technical-calculation-guidance).

Table 8 Scope 3 Category 4: Upstream Transportation and Distribution and Category 9: Downstream Transportation and Distribution

These factors are intended for use in the distance-based method defined in the Scope 3 Calculation Guidance. If fuel data are available, then the fuel-based method should be used, with factors from Tables 2 through 5.

Vehicle Type	CO_2 Factor (kg / unit)	CH_4 Factor (g / unit)	N_2O Factor (g / unit)	Units
Medium- and Heavy-Duty Truck	1.387	0.013	0.033	vehicle-mile
Passenger Car [A]	0.335	0.009	0.008	vehicle-mile
Light-Duty Truck [B]	0.461	0.012	0.010	vehicle-mile
Medium- and Heavy-Duty Truck	0.207	0.0020	0.0046	ton-mile
Rail	0.021	0.0017	0.0005	ton-mile
Waterborne Craft[C]	0.040	0.0122	0.0017	ton-mile
Aircraft	1.265	0	0.0389	ton-mile

Source:
CO_2, CH_4, and N_2O emissions data for road vehicles are from Table 2-13 of the U.S. Greenhouse Gas Emissions and Sinks: 1990–2018 (Feb. 2020).
Vehicle-miles and passenger-miles data for road vehicles are from Table VM-1 of the Federal Highway Administration Highway Statistics 2018.
CO_2e emissions data for non-road vehicles are based on Table A-124 of the U.S. Greenhouse Gas Emissions and Sinks: 1990–2018, which are distributed into CO_2, CH_4, and N_2O emissions based on fuel/vehicle emission factors.
Freight ton-mile data for non-road vehicles are from Table 1-50 of the Bureau of Transportation Statistics, National Transportation Statistics for 2019 (Data based on 2017).

Notes:
Vehicle-mile factors are appropriate to use when the entire vehicle is dedicated to transporting the reporting company's product. Ton-mile factors are appropriate when the vehicle is shared with products from other companies.
[A] Passenger car: includes passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches).
[B] Light-duty truck: includes full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches).
[C] Waterborne Craft: updates due to a methodology change.

U.S. Energy Information Administration

Frequently Asked Questions (FAQs)

What are Ccf, Mcf, Btu, and therms? How do I convert natural gas prices in dollars per Ccf or Mcf to dollars per Btu or therm?

Btu—British thermal unit(s)
Ccf—the volume of 100 cubic feet (cf)
M—one thousand (1,000)
MM—one million (1,000,000)
Mcf—the volume of 1,000 cubic feet
MMBtu—1,000,000 British thermal units
Therm—One therm equals 100,000 Btu, or 0.10 MMBtu

In the United States, natural gas can be priced in units of dollars per therm, dollars per MMBtu, or dollars per cubic feet.[1] The heat content of natural gas per physical unit (such as Btu per cubic foot) is needed to convert these prices from one price basis to another. In 2020, the U.S. annual average heat content of natural gas delivered to consumers was about 1,037 Btu per cubic foot. Therefore, 100 cubic feet (Ccf) of natural gas equals 103,700 Btu, or 1.037 therms. One thousand cubic feet (Mcf) of natural gas equals 1.037 MMBtu, or 10.37 therms.

You can convert natural gas prices from one price basis to another with these formulas (assuming a heat content of natural gas of 1,037 Btu per cubic foot):
$ per Ccf divided by 1.037 equals $ per therm
$ per therm multiplied by 1.037 equals $ per Ccf
$ per Mcf divided by 1.037 equals $ per MMBtu
$ per Mcf divided by 10.37 equals $ per therm
$ per MMBtu multiplied by 1.037 equals $ per Mcf
$ per therm multiplied by 10.37 equals $ per Mcf

The heat content of natural gas may vary by location and by type of natural gas consumer, and it may vary over time. Consumers and analysts should contact natural gas distribution companies or natural gas suppliers for information on the heat content of the natural gas they supply to their customers. Some natural gas distribution companies or utilities may provide this information on customers' bills.

[1] The U.S. Energy Information Administration reports natural gas in volumes of cubic feet through 1964 at a pressure base of 14.65 psia (pounds per square inch absolute) at 60° Fahrenheit. Beginning in 1965, the pressure base is 14.73 psia at 60° Fahrenheit.

Learn more:
Average annual and monthly heat content of natural gas consumed by state
Newly released heat content data allow for state-to-state natural gas comparisons
Natural gas conversion calculator

Last updated: June 1, 2021

Other FAQs about Natural Gas

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Didn't find the answer to your question?

Ask an energy expert

Emission Factors for Greenhouse Gas Inventories

Last Modified: 26 March 2020

Red text indicates an update from the 2018 version of this document.

Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Gases are converted to CO_2e by multiplying by their global warming potential (GWP). The emission factors listed in this document have not been converted to CO_2e. To do so, multiply the emissions by the corresponding GWP listed in the table below.

Gas	100-Year GWP
CH_4	25
N_2O	298

Source: Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4), 2007. See the source note to Table 11 for further explanation.

Table 1 Stationary Combustion

Fuel Type	Heat Content (HHV)	CO_2 Factor	CH_4 Factor	N_2O Factor	CO_2 Factor	CH_4 Factor	N_2O Factor
	mmBtu per short ton	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per short ton	g CH_4 per short ton	g N_2O per short ton
Coal and Coke							
Anthracite Coal	25.09	103.69	11	1.6	2,602	276	40
Bituminous Coal	24.93	93.28	11	1.6	2,325	274	40
Sub-bituminous Coal	17.25	97.17	11	1.6	1,676	190	28
Lignite Coal	14.21	97.72	11	1.6	1,389	156	23
Mixed (Commercial Sector)	21.39	94.27	11	1.6	2,016	235	34
Mixed (Electric Power Sector)	19.73	95.52	11	1.6	1,885	217	32
Mixed (Industrial Coking)	26.28	93.90	11	1.6	2,468	289	42
Mixed (Industrial Sector)	22.35	94.67	11	1.6	2,116	246	36
Coal Coke	24.80	113.67	11	1.6	2,819	273	40
Other Fuels - Solid							
Municipal Solid Waste	9.95	90.70	32	4.2	902	318	42
Petroleum Coke (Solid)	30.00	102.41	32	4.2	3,072	960	126
Plastics	38.00	75.00	32	4.2	2,850	1,216	160
Tires	28.00	85.97	32	4.2	2,407	896	118
Biomass Fuels - Solid							
Agricultural Byproducts	8.25	118.17	32	4.2	975	264	35
Peat	8.00	111.84	32	4.2	895	256	34
Solid Byproducts	10.39	105.51	32	4.2	1,096	332	44
Wood and Wood Residuals	17.48	93.80	7.2	3.6	1,640	126	63
	mmBtu per scf	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per scf	g CH_4 per scf	g N_2O per scf
Natural Gas							
Natural Gas	0.001026	53.06	1.0	0.10	0.05444	0.00103	0.00010
Other Fuels - Gaseous							
Blast Furnace Gas	0.000092	274.32	0.022	0.10	0.02524	0.000002	0.000009
Coke Oven Gas	0.000599	46.85	0.48	0.10	0.02806	0.000288	0.000060
Fuel Gas	0.001388	59.00	3.0	0.60	0.08189	0.004164	0.000833
Propane Gas	0.002516	61.46	3.0	0.60	0.15463	0.007548	0.001510
Biomass Fuels - Gaseous							
Landfill Gas	0.000485	52.07	3.2	0.63	0.025254	0.001552	0.000306
Other Biomass Gases	0.000655	52.07	3.2	0.63	0.034106	0.002096	0.000413
	mmBtu per gallon	kg CO_2 per mmBtu	g CH_4 per mmBtu	g N_2O per mmBtu	kg CO_2 per gallon	g CH_4 per gallon	g N_2O per gallon
Petroleum Products							
Asphalt and Road Oil	0.158	75.36	3.0	0.60	11.91	0.47	0.09
Aviation Gasoline	0.120	69.25	3.0	0.60	8.31	0.36	0.07
Butane	0.103	64.77	3.0	0.60	6.67	0.31	0.06
Butylene	0.105	68.72	3.0	0.60	7.22	0.32	0.06
Crude Oil	0.138	74.54	3.0	0.60	10.29	0.41	0.08
Distillate Fuel Oil No. 1	0.139	73.25	3.0	0.60	10.18	0.42	0.08
Distillate Fuel Oil No. 2	0.138	73.96	3.0	0.60	10.21	0.41	0.08
Distillate Fuel Oil No. 4	0.146	75.04	3.0	0.60	10.96	0.44	0.09
Ethane	0.068	59.60	3.0	0.60	4.05	0.20	0.04
Ethylene	0.058	65.96	3.0	0.60	3.83	0.17	0.03
Heavy Gas Oils	0.148	74.92	3.0	0.60	11.09	0.44	0.09
Isobutane	0.099	64.94	3.0	0.60	6.43	0.30	0.06
Isobutylene	0.103	68.86	3.0	0.60	7.09	0.31	0.06
Kerosene	0.135	75.20	3.0	0.60	10.15	0.41	0.08
Kerosene-Type Jet Fuel	0.135	72.22	3.0	0.60	9.75	0.41	0.08
Liquefied Petroleum Gases (LPG)	0.092	61.71	3.0	0.60	5.68	0.28	0.06
Lubricants	0.144	74.27	3.0	0.60	10.69	0.43	0.09
Motor Gasoline	0.125	70.22	3.0	0.60	8.78	0.38	0.08
Naphtha (<401 deg F)	0.125	68.02	3.0	0.60	8.50	0.38	0.08
Natural Gasoline	0.110	66.88	3.0	0.60	7.36	0.33	0.07
Other Oil (>401 deg F)	0.139	76.22	3.0	0.60	10.59	0.42	0.08
Pentanes Plus	0.110	70.02	3.0	0.60	7.70	0.33	0.07
Petrochemical Feedstocks	0.125	71.02	3.0	0.60	8.88	0.38	0.08
Petroleum Coke	0.143	102.41	3.0	0.60	14.64	0.43	0.09
Propane	0.091	62.87	3.0	0.60	5.72	0.27	0.05
Propylene	0.091	67.77	3.0	0.60	6.17	0.27	0.05
Residual Fuel Oil No. 5	0.140	72.93	3.0	0.60	10.21	0.42	0.08
Residual Fuel Oil No. 6	0.150	75.10	3.0	0.60	11.27	0.45	0.09
Special Naphtha	0.125	72.34	3.0	0.60	9.04	0.38	0.08
Unfinished Oils	0.139	74.54	3.0	0.60	10.36	0.42	0.08
Used Oil	0.138	74.00	3.0	0.60	10.21	0.41	0.08
Biomass Fuels - Liquid							
Biodiesel (100%)	0.128	73.84	1.1	0.11	9.45	0.14	0.01
Ethanol (100%)	0.084	68.44	1.1	0.11	5.75	0.09	0.01
Rendered Animal Fat	0.125	71.06	1.1	0.11	8.88	0.14	0.01
Vegetable Oil	0.120	81.55	1.1	0.11	9.79	0.13	0.01
Biomass Fuels - Kraft Pulping Liquor, by Wood Furnish							
North American Softwood		94.4	1.9	0.42			
North American Hardwood		93.7	1.9	0.42			
Bagasse		95.5	1.9	0.42			
Bamboo		93.7	1.9	0.42			
Straw		95.1	1.9	0.42			

Source:
Federal Register EPA; 40 CFR Part 98; e-CFR, June 13, 2017 (see link below). Table C-1, Table C-2, Table AA-1.
https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1

Note: Emission factors are per unit of heat content using higher heating values (HHV). If heat content is available from the fuel supplier, it is preferable to use that value. If not, default heat contents are provided.

Appendix F: Biogas-to-Energy

2019 AVERT Emission Factors

National Emission Factors

National Weighted Averages (lb/MWh)						
	Onshore Wind	*Offshore Wind*	*Utility PV*	*Distributed PV*	*Portfolio EE*	*Uniform EE*
Avoided CO_2 Rate	1,429	1,361	1,456	1,570	1,562	1,550
Avoided NO_x Rate	0.78	0.68	0.84	0.91	0.89	0.85
Avoided SO_2 Rate	0.85	0.76	0.84	0.90	0.91	0.92
Avoided $PM_{2.5}$ Rate	0.10	0.10	0.10	0.11	0.11	0.11

National factors presented here reflect a weighted average of the avoided emission rates of AVERT's 14 regions. Averages are weig

Regional Emission Factors

Avoided CO2 Rate (lb/MWh)						
	Onshore Wind	*Offshore Wind*	*Utility PV*	*Distributed PV*	*Portfolio EE*	*Uniform EE*
California	966	972	980	1,071	1,073	1,061
Carolinas	1,529	1,537	1,562	1,676	1,706	1,664
Central	1,676	-	1,661	1,790	1,785	1,800
Florida	988	-	1,044	1,126	1,112	1,087
Mid-Atlantic	1,420	1,422	1,460	1,576	1,567	1,540
Midwest	1,732	-	1,718	1,850	1,850	1,860
New England	1,022	1,023	1,038	1,120	1,126	1,104
New York	1,005	1,004	1,039	1,121	1,127	1,090
Northwest	1,487	1,487	1,539	1,691	1,631	1,636
Rocky Mountains	1,752	-	1,728	1,886	1,883	1,904
Southeast	1,416	-	1,504	1,619	1,599	1,563
Southwest	1,404	-	1,392	1,519	1,547	1,544
Tennessee	1,348	-	1,419	1,537	1,530	1,479
Texas	1,199	-	1,242	1,315	1,298	1,282

Avoided SO2 Rate (lb/MWh)						
	Onshore Wind	*Offshore Wind*	*Utility PV*	*Distributed PV*	*Portfolio EE*	*Uniform EE*
California	0.05	0.05	0.05	0.06	0.07	0.06
Carolinas	0.58	0.58	0.60	0.64	0.68	0.64
Central	1.30	-	1.19	1.28	1.28	1.36
Florida	0.20	-	0.25	0.27	0.25	0.23
Mid-Atlantic	1.06	1.07	1.12	1.20	1.19	1.18
Midwest	1.58	-	1.49	1.60	1.63	1.67
New England	0.08	0.08	0.11	0.12	0.12	0.09
New York	0.17	0.17	0.17	0.18	0.20	0.17
Northwest	0.69	0.68	0.71	0.78	0.75	0.75
Rocky Mountains	0.54	-	0.52	0.57	0.57	0.58
Southeast	0.31	-	0.33	0.35	0.35	0.34

Appendix G: Food Waste Diversion

Waste Reduction Model (WARM) -- Results

Total GHG Emissions from Baseline MSW Generation and Management ($MTCO_2E$):	38,702.33
Total GHG Emissions from Alternative MSW Generation and Management ($MTCO_2E$):	(3,241.45)
Incremental GHG Emissions ($MTCO_2E$):	(41,943.78)

$MTCO_2E$ = metric tons of carbon dioxide equivalent

Per Ton Estimates of GHG Emissions for Baseline and Alternative Management Scenarios

Material	GHG Emissions per Ton of Material Produced ($MTCO_2E$)	GHG Emissions per Ton of Material Source Reduced ($MTCO_2E$)	GHG Emissions per Ton of Material Recycled ($MTCO_2E$)	GHG Emissions per Ton of Material Landfilled ($MTCO_2E$)	GHG Emissions per Ton of Material Combusted ($MTCO_2E$)	GHG Emissions per Ton of Material Composted ($MTCO_2E$)	GHG Emission per Ton of Material Anaerobically Digested ($MTCO_2E$)
Corrugated Containers	5.58	(5.58)	(3.14)	0.18	(0.49)	NA	NA
Magazines/third-class mail	8.57	(8.57)	(3.07)	(0.43)	(0.35)	NA	NA
Newspaper	4.68	(4.68)	(2.71)	(0.85)	(0.56)	NA	NA
Office Paper	7.95	(7.95)	(2.86)	1.13	(0.47)	NA	NA
Phonebooks	6.17	(6.17)	(2.62)	(0.85)	(0.56)	NA	NA
Textbooks	9.02	(9.02)	(3.10)	1.13	(0.47)	NA	NA
Mixed Paper (general)	6.07	(6.07)	(3.55)	0.07	(0.49)	NA	NA
Mixed Paper (primarily residential)	6.00	(6.00)	(3.55)	0.02	(0.49)	NA	NA
Mixed Paper (primarily from offices)	7.37	(7.37)	(3.58)	0.11	(0.45)	NA	NA
Food Waste	3.66	(3.66)	NA	0.50	(0.13)	(0.12)	(0.04)
Food Waste (non-meat)	0.76	(0.76)	NA	0.50	(0.13)	(0.12)	(0.04)
Food Waste (meat only)	15.10	(15.10)	NA	0.50	(0.13)	(0.12)	(0.04)
Beef	30.09	(30.09)	NA	0.50	(0.13)	(0.12)	(0.04)
Poultry	2.45	(2.45)	NA	0.50	(0.13)	(0.12)	(0.04)
Grains	0.62	(0.62)	NA	0.50	(0.13)	(0.12)	(0.04)
Bread	0.66	(0.66)	NA	0.50	(0.13)	(0.12)	(0.04)
Fruits and Vegetables	0.44	(0.44)	NA	0.50	(0.13)	(0.12)	(0.04)
Dairy Products	1.75	(1.75)	NA	0.50	(0.13)	(0.12)	(0.04)
Yard Trimmings	NA	NA	NA	(0.20)	(0.17)	(0.05)	(0.09)
Grass	NA	NA	NA	0.12	(0.17)	(0.05)	0.00
Leaves	NA	NA	NA	(0.53)	(0.17)	(0.05)	(0.14)
Branches	NA	NA	NA	(0.54)	(0.17)	(0.05)	(0.22)
HDPE	1.42	(1.42)	(0.76)	0.02	1.29	NA	NA
LDPE	1.80	(1.80)	NA	0.02	1.29	NA	NA
PET	2.17	(2.17)	(1.04)	0.02	1.24	NA	NA
LLDPE	1.58	(1.58)	NA	0.02	1.29	NA	NA
PP	1.52	(1.52)	(0.79)	0.02	1.29	NA	NA
PS	2.50	(2.50)	NA	0.02	1.65	NA	NA
PVC	1.93	(1.93)	NA	0.02	0.66	NA	NA
Mixed Plastics	1.87	(1.87)	(0.93)	0.02	1.26	NA	NA
PLA	2.45	(2.45)	NA	(1.64)	(0.63)	(0.09)	NA
Desktop CPUs	20.86	(20.86)	(1.49)	0.02	(0.66)	NA	NA
Portable Electronic Devices	29.83	(29.83)	(1.06)	0.02	0.65	NA	NA
Flat-Panel Displays	24.19	(24.19)	(0.99)	0.02	0.03	NA	NA
CRT Displays	NA	NA	(0.57)	0.02	0.45	NA	NA
Electronic Peripherals	10.32	(10.32)	(0.36)	0.02	2.08	NA	NA
Hard-Copy Devices	7.65	(7.65)	(0.56)	0.02	1.20	NA	NA
Mixed Electronics	NA	NA	(0.79)	0.02	0.39	NA	NA
Aluminum Cans	4.80	(4.80)	(9.13)	0.02	0.03	NA	NA
Aluminum Ingot	7.48	(7.48)	(7.20)	0.02	0.03	NA	NA
Steel Cans	3.03	(3.03)	(1.83)	0.02	(1.59)	NA	NA
Copper Wire	6.72	(6.72)	(4.49)	0.02	0.03	NA	NA
Mixed Metals	3.65	(3.65)	(4.39)	0.02	(1.02)	NA	NA
Glass	0.53	(0.53)	(0.28)	0.02	0.03	NA	NA
Asphalt Concrete	0.11	(0.11)	(0.08)	0.02	NA	NA	NA
Asphalt Shingles	0.19	(0.19)	(0.09)	0.02	(0.35)	NA	NA
Carpet	3.68	(3.68)	(2.38)	0.02	1.10	NA	NA
Clay Bricks	0.27	(0.27)	NA	0.02	NA	NA	NA
Concrete	NA	NA	(0.01)	0.02	NA	NA	NA
Dimensional Lumber	2.13	(2.13)	(2.66)	(0.92)	(0.58)	NA	NA
Drywall	0.22	(0.22)	0.03	(0.06)	NA	NA	NA
Fiberglass Insulation	0.38	(0.38)	NA	0.02	NA	NA	NA
Fly Ash	NA	NA	(0.87)	0.02	NA	NA	NA
Medium-density Fiberboard	2.41	(2.41)	NA	(0.85)	(0.58)	NA	NA
Structural Steel	1.67	(1.67)	(1.93)	0.02	NA	NA	NA
Vinyl Flooring	0.58	(0.58)	NA	0.02	(0.31)	NA	NA
Wood Flooring	4.03	(4.03)	NA	(0.86)	(0.74)	NA	NA
Tires	4.30	(4.30)	(0.38)	0.02	0.50	NA	NA
Mixed Recyclables	NA	NA	(2.85)	0.03	(0.42)	NA	NA
Mixed Organics	NA	NA	NA	0.18	(0.15)	(0.09)	(0.06)
Mixed MSW	NA	NA	NA	0.31	0.01	NA	NA

GHG Emissions from Baseline Management of Municipal Solid Wastes

Material	Baseline Generation of Material (Tons)	Baseline Recycling (Tons)	GHG Emissions from Recycling ($MTCO_2E$)	Baseline Landfilling (Tons)	GHG Emissions from Landfilling ($MTCO_2E$)	Baseline Combustion (Tons)	GHG Emissions from Combustion ($MTCO_2E$)	Baseline Composting (Tons)	GHG Emissions from Composting ($MTCO_2E$)	Baseline Anaerobic Digestion (Tons)	GHG Emissions from Anaerobic Digestion (MTCO2E)	Total GHG Emissions ($MTCO_2E$)
Corrugated Containers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Magazines/third-class mail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Newspaper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Office Paper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Phonebooks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Textbooks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (general)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (primarily residential)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (primarily from offices)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Food Waste	77,794.00	NA	NA	77,794.00	38,702.33	0.00	0.00	0.00	0.00	0.00	0.00	38,702.33
Food Waste (non-meat)	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Food Waste (meat only)	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beef	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poultry	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grains	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bread	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fruits and Vegetables	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dairy Products	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yard Trimmings	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grass	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaves	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Branches	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HDPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
LDPE	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
LLDPE	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PS	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PVC	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PLA	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00
Desktop CPUs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Portable Electronic Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Flat-Panel Displays	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
CRT Displays	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Electronic Peripherals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Hard-Copy Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Electronics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Aluminum Cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Aluminum Ingot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Steel Cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Copper Wire	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Metals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Asphalt Concrete	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Asphalt Shingles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Carpet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Clay Bricks	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Concrete	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Dimensional Lumber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Drywall	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Fiberglass Insulation	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Fly Ash	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Medium-density Fiberboard	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Structural Steel	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Vinyl Flooring	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Wood Flooring	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Tires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Recyclables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Organics	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mixed MSW	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Total	77,794.00	0.00	0.00	77,794.00	38,702.33	0.00	0.00	0.00	0.00	0.00	0.00	38,702.33

GHG Emissions from Alternative Management of Municipal Solid Wastes

Material	Baseline Generation of Material (Tons)	Alternative Source Reduction (Tons)	GHG Emissions from Source Reduction ($MTCO_2E$)	Alternative Recycling (Tons)	GHG Emissions from Recycling ($MTCO_2E$)	Alternative Landfilling (Tons)	GHG Emissions from Landfilling ($MTCO_2E$)	Alternative Combustion (Tons)	GHG Emissions from Combustion ($MTCO_2E$)	Alternative Composting (Tons)	GHG Emissions from Composting ($MTCO_2E$)	Alternative Anaerobic Digestion (Tons)	GHG Emissions from Anaerobic Digestion (MTCO2E)	Total GHG Emissions ($MTCO_2E$)
Corrugated Containers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Magazines/third-class mail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Newspaper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Office Paper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Phonebooks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Textbooks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (general)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (primarily residential)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Paper (primarily from offices)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Food Waste	77,794.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	77,794.00	(3,241.45)	(3,241.45)
Food Waste (non-meat)	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Food Waste (meat only)	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beef	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poultry	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grains	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bread	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fruits and Vegetables	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dairy Products	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yard Trimmings	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grass	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leaves	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Branches	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HDPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
LDPE	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
LLDPE	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PS	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PVC	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Plastics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
PLA	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00
Desktop CPUs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Portable Electronic Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Flat-Panel Displays	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
CRT Displays	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Electronic Peripherals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Hard-Copy Devices	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Electronics	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Aluminum Cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Aluminum Ingot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Steel Cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Copper Wire	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Metals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Asphalt Concrete	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Asphalt Shingles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Carpet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Clay Bricks	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Concrete	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Dimensional Lumber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Drywall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Fiberglass Insulation	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Fly Ash	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Medium-density Fiberboard	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Structural Steel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Vinyl Flooring	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Wood Flooring	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Tires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Recyclables	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Mixed Organics	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mixed MSW	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00	NA	NA	NA	NA	0.00
Total	77,794.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77,794.00	(3,241.45)	(3,241.45)

Appendix H: Water Recycling

Mojave/Metropolitan Water Storage Program

In 2003, Metropolitan entered into a demonstration agreement with Mojave Water Agency. The agreement allows for the exchange of SWP water on the basis of one acre-foot of return water for each acre-foot of water previously delivered to Mojave. A 2011 amendment extended the agreement to 2035 and reduced program costs. Metropolitan did not store or recover water from the Mojave program during FY 2020/21, leaving 18,812 AF in the exchange account as of June 30, 2021.

Water Transfers and Exchanges

San Gabriel Valley Municipal Water District Exchange

A 2013 purchase and exchange agreement with San Gabriel Valley Municipal Water District meant that during FY 2020/21, Metropolitan developed 1,629 AF of additional supply by exchange.

Colorado River Resources

Acquisitions and exchanges made possible by the 2003 Quantification Settlement Agreement continued during FY 2020/21. Figure 3-2 illustrates annual water supplies managed through the CRA since CY 2012. In CY 2020, Metropolitan managed a total of about 1,154,000 AF of water supplies through the Colorado River system. Of this volume, 687,000 AF was conveyed into Metropolitan's service area. Metropolitan also stored 338,000 AF of Intentionally Created Surplus in Lake Mead and stored or exchanged more than 128,000 AF of supplies outside Metropolitan's service area. On January 2021, Metropolitan's ICS storage in Lake Mead reached a record high level of 1,293,029 AF. For the remainder of CY 2021, due to dry conditions on the State Water Project, Metropolitan planned to divert approximately 1,068,000 AF of Colorado River supplies, including 70,000 AF of ICS, while keeping more than 1.2 MAF in Lake Mead for later use.

Figure 3-3 illustrates the storage levels of lakes Mead and Powell through FY 2020/21. While peak snowpack conditions were near average in 2021, a dry fall and significantly below-average spring

Niizawa, Warisa

From: Hartling, Earle
Sent: Friday, January 28, 2022 2:25 PM
To: Niizawa, Warisa
Subject: RE: Recycled Water Volume for 2021

Hey Warisa,

I'm still missing the official groundwater recharge numbers for December, as well as the December flows for the Lakewood and Central Basin MWD systems and Palmdale agriculture. However, my best estimate for calendar year is about 112,500 acre-feet.

If you'd like, I can give you updates as new data is received.

Earle

From: Niizawa, Warisa <warisaniizawa@lacsd.org>
Sent: Thursday, January 27, 2022 2:20 PM
To: Hartling, Earle <EHartling@lacsd.org>
Subject: Recycled Water Volume for 2021

Good Afternoon Earle,

I am working on the 2021 GHG Inventory Report and need the recycled water volume for the year. I understand that you may not have all the data available yet as it is still early in the year. However, I was wondering if there is any preliminary number that I can use?

Thank you in advance for your help,
Warisa

State Water Project Resources

Metropolitan holds a contract with DWR that provides for SWP participation rights and an allocation of 1,911,500 AF annually, subject to availability. The two-year period from 2020 through 2021 ranked as the second driest two-year period in the historical record, exceeded only by 1976-77. This dry sequence resulted in a 20 percent allocation of SWP contract supplies in CY 2020 and a 5 percent allocation for CY 2021. Below-average snowpack and dry soil conditions in 2021 reduced runoff in the Feather River watershed to near-record lows. In FY 2020/21, Metropolitan managed 685,000 AF through the SWP system (Fig. 3-1), about 790,000 AF less water than in the previous fiscal year (FY 2020/21 deliveries and storage are subject to final reconciliation). During FY 2020/21, Metropolitan exercised options under its SWP water management programs to ensure delivery capability under these dry-year conditions. These included drafting more than 34,000 AF from San Joaquin Valley storage accounts, 117,000 AF from flexible storage accounts in Castaic Lake and Lake Perris, and supplying the Mills Water Treatment Plant with 9,500 AF of supplies from Diamond Valley Lake to offset State Water Project demands.

Metropolitan's net SWP payments during FY 2020/21 were $521.8 million (Table 3-1) on a modified accrual basis. Metropolitan also administered existing storage programs outside its service area along the SWP system, as described on the following pages.

Water Storage Programs

Semitropic/Metropolitan Water Banking and Exchange Program

Metropolitan's 1994 groundwater storage agreement with Semitropic Water Storage District in Kern County allows storage of up to 350,000 AF. During FY 2020/21, Semitropic delivered 12,223 AF in the second half of the fiscal year. The total water in storage on June 30, 2021 was 253,072 AF.

Table 4-13
Single Agency Perspectives

	IEUA	Ontario	San Diego	Los Angeles
Additional Tertiary Recycled Water Available in 2005[1]	43,705 AFY	8,682 AFY (included in IEUA)	23,512 AFY	24,650 AFY
Energy Intensity of TERTIARY Recycled Water[2]	333 kWh/AF (Distribution Energy only)	333 kWh/AF (Distribution Energy only)	1,150 kWh/AF[10] (Treatment & Distribution Energy)	600 kWh/AF[3] (Treatment & Distribution Energy)
Marginal Water Supply	SWP (E.Branch) via MWD	SWP (E.Branch) &/OR City Groundwater	SWP & Co.River via SDCWA/MWD	SWP & Co.River via MWD
Energy Intensity of Marginal Water Supply[4]	3,224 kWh/AF	2,054 kWh/AF (average SWP @ 3,224 & G.W. @ 884)[5]	3,140 kWh/AF (assume 50/50, SWP and Colorado River)	2,666 kWh/AF (avg. 2,917 SWP & 2,415 Co. River)
Incremental R.Water (5 years, 2011-2015]	218,525 AF[6]	43,410 AF	117,560 AF	123,250 AF
Cumulative 5 Year Impact[7]				
Marginal Water Supply	742,985 MWH	89,164 MWH	369,138 MWH	328,585 MWH
Recycled Water	72,769 MWH	14,456 MWH	135,194 MWH	73,950 MWH
Est. Energy Savings	631,756 MWH	74,708 MWH	233,944 MWH	254,635 MWH
Avoided N.Gas (CCGT, MMBTUs)[8]	4,544,219 MMBTUs	537,375 MMBTUs	1,682,759 MMBTUs	1,831,590 MMBTUs
Reduced GHG (CCGT, metric tons)[9]	241,114 metric tons	28,513 metric tons	89,286 metric tons	97,183 metric tons

Notes:

[1] From Table 4-3. Recycled Water Opportunity Profiles of Four Southern California Water Agencies. The San Diego estimate includes secondary effluent being discharged to the ocean that could be treated to tertiary standards with existing treatment plant capacity.

[2] The energy intensity of each agency's recycled water is the ***incremental energy*** needed to treat and deliver wastewater effluent for its intended beneficial use. For IEUA and Ontario, since wastewater must be treated to tertiary standards before disposal, the recycled water energy intensity is the amount of incremental distribution energy only. Correctly computed, the amount of recycled water distribution would be computed as the amount of energy needed to deliver recycled water from its source (wastewater treatment plant), less the amount of distribution energy needed to deliver the marginal water supply(s) the recycled water is displacing. For simplicity and conservatism, we assumed that all recycled water distribution was "incremental." For San Diego and Los Angeles, however, since advanced primary and secondary effluent is allowed to be discharged to the ocean without further treatment, the energy intensity of recycled water is computed as the sum of the incremental energy needed to treat wastewater effluent to tertiary standards, plus the incremental amount of distribution energy needed to use the recycled water.

[3] Incremental energy needed to treat secondary effluent to tertiary was estimated by LADWP at 100 kWh/AF. Recycled water distribution energy was not available. However, distribution energy for potable water supplies (imported and from the Los Angeles Aqueduct) was estimated by LADWP at 387 kWh/AF. For conservatism, we used an estimate of 500 kWh/AF for recycled water distribution and did not make any adjustment for distribution energy that would be incurred in any case to deliver marginal water supplies to end users.

3.0 METROPOLITAN BASELINE FACILITIES AND OPERATIONS

Metropolitan's net energy use and costs are dominated by the pumping (transport) of water over the CRA and SWP systems. For the period of 2013-2018, approximately 93 percent of Metropolitan's annual electricity costs were for the SWP and CRA systems, and the remaining 7 percent of energy costs were associated with retail electricity purchases for water treatment plants and other Metropolitan facilities (Figure 3-1).

During this period, 75 percent of Metropolitan's total annual energy expenditures were associated with the SWP, which accounted for approximately 55 percent of total annual energy consumption to pump water into Southern California. This disproportionate energy cost is attributed to a higher unit price for electricity to pump water along the SWP, as compared to the unit price of electricity for the CRA (which includes low cost federal hydropower from Hoover and Parker Dams). Additionally, the large energy cost is also due to the higher energy intensity of SWP supplies (approximately 3,300 kWh/acre-foot [AF]) compared to CRA supplies (approximately 2,000 kWh/AF).

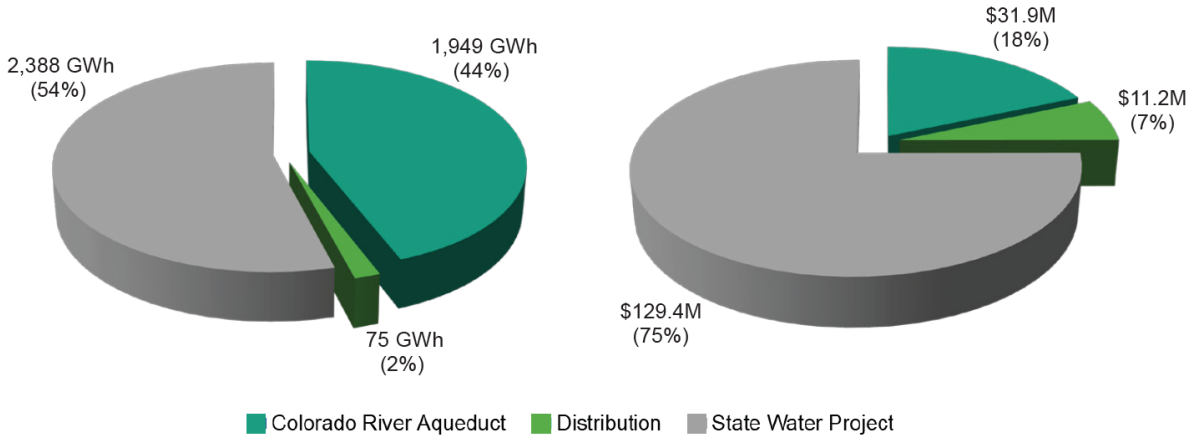


Figure 3-1 Metropolitan's overall electricity requirements and cost (average 2013-2018)

Given Metropolitan does not have direct control over operations of the SWP, the remainder of this section will focus exclusively on the energy use and cost for CRA operations (wholesale power) and for Metropolitan's treatment, distribution and office facilities (retail power).

For wholesale power, Metropolitan has proactively maintained several power contracts with various suppliers that have contract prices and terms set to help Metropolitan and its member agencies maintain a favorable overall low cost for wholesale electricity related to transporting water via the CRA. Today, Metropolitan has existing advantageous contracts with the U.S. Department of Interior, Bureau of Reclamation (USBR), Western Area Power Administration (WAPA) and others. Details on these contracts are discussed in the following sections. Annual costs for wholesale electricity have varied widely due to a variety of factors, including pumping volume, the utilization of energy banking provisions, and the volatility in the energy markets. Additionally, California's cap-and-trade program established in 2013 resulted in an added cost to market prices for energy with GHG emissions, including imported electricity, and affects Metropolitan's wholesale energy cost. Due to this embedded cost of carbon, Metropolitan's carbon footprint is evaluated as a continuing future factor in higher

1. Subregion Output Emission Rates (eGRID2018)

eGRID subregion acronym	eGRID subregion name	Total output emission rates lb/MWh							Non-baseload output emission rates lb/MWh							Grid Gross Loss (%)
		CO_2	CH_4	N_2O	CO_2e	Annual NO_x	Ozone Season NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	Annual NO_x	Ozone Season NO_x	SO_2	
AKGD	ASCC Alaska Grid	1,039.6	0.082	0.011	1,045.0	5.5	5.4	1.1	1,262.5	0.110	0.015	1,269.6	6.5	6.4	1.1	5.12%
AKMS	ASCC Miscellaneous	525.1	0.024	0.004	527.0	7.7	7.8	0.7	1,528.3	0.068	0.012	1,533.6	22.8	23.0	2.0	5.12%
AZNM	WECC Southwest	1,022.4	0.077	0.011	1,027.5	0.7	0.7	0.3	1,435.3	0.097	0.014	1,441.8	1.0	0.9	0.3	4.80%
CAMX	WECC California	496.5	0.034	0.004	498.7	0.5	0.4	0.0	929.5	0.047	0.006	932.5	0.8	0.7	0.0	4.80%
ERCT	ERCOT All	931.7	0.066	0.009	936.1	0.5	0.6	0.8	1,261.0	0.083	0.012	1,266.5	0.8	0.8	1.1	4.87%
FRCC	FRCC All	931.8	0.066	0.009	936.1	0.4	0.4	0.3	1,123.9	0.068	0.009	1,128.3	0.4	0.4	0.4	4.88%
HIMS	HICC Miscellaneous	1,110.7	0.118	0.018	1,119.1	7.6	7.6	4.0	1,535.7	0.139	0.022	1,545.8	11.8	11.5	5.0	5.14%
HIOA	HICC Oahu	1,669.9	0.180	0.027	1,682.6	3.5	3.8	8.0	1,682.1	0.159	0.025	1,693.6	4.2	4.2	8.4	5.14%
MROE	MRO East	1,678.0	0.169	0.025	1,689.7	0.9	0.9	0.9	1,634.3	0.149	0.022	1,644.5	0.9	1.0	1.0	4.88%
MROW	MRO West	1,239.8	0.138	0.020	1,249.2	1.0	1.0	1.4	1,764.3	0.192	0.027	1,777.0	1.5	1.4	1.8	4.88%
NEWE	NPCC New England	522.3	0.082	0.011	527.6	0.4	0.4	0.1	931.0	0.086	0.011	936.5	0.5	0.4	0.3	4.88%
NWPP	WECC Northwest	639.0	0.064	0.009	643.4	0.6	0.6	0.4	1,575.1	0.148	0.021	1,585.2	1.4	1.4	0.8	4.80%
NYCW	NPCC NYC/Westchester	596.4	0.022	0.003	597.8	0.3	0.2	0.0	1,067.6	0.022	0.002	1,068.9	0.5	0.5	0.1	4.88%
NYLI	NPCC Long Island	1,184.2	0.139	0.018	1,193.1	0.9	0.8	0.2	1,320.3	0.040	0.005	1,322.8	1.0	0.9	0.4	4.88%
NYUP	NPCC Upstate NY	253.1	0.018	0.002	253.9	0.1	0.1	0.1	931.5	0.043	0.005	934.0	0.5	0.5	0.5	4.88%
RFCE	RFC East	716.0	0.061	0.008	720.0	0.3	0.3	0.5	1,242.6	0.091	0.013	1,248.6	0.7	0.6	0.8	4.88%
RFCM	RFC Michigan	1,312.6	0.129	0.018	1,321.2	0.8	0.8	1.3	1,748.9	0.171	0.024	1,760.3	1.2	1.2	2.1	4.88%
RFCW	RFC West	1,166.1	0.117	0.017	1,174.0	0.8	0.7	0.9	1,828.3	0.179	0.026	1,840.5	1.4	1.1	1.4	4.88%
RMPA	WECC Rockies	1,273.6	0.123	0.018	1,281.9	0.7	0.7	0.4	1,542.6	0.120	0.017	1,550.7	0.8	0.8	0.4	4.80%
SPNO	SPP North	1,163.2	0.124	0.018	1,171.6	0.6	0.7	0.3	1,945.5	0.201	0.029	1,959.2	1.2	1.3	0.7	4.88%
SPSO	SPP South	1,166.6	0.091	0.013	1,172.8	0.8	0.9	1.2	1,603.5	0.118	0.017	1,611.5	1.3	1.3	1.9	4.88%
SRMV	SERC Mississippi Valley	854.6	0.055	0.008	858.4	0.6	0.7	1.0	1,137.6	0.069	0.010	1,142.2	0.9	0.9	1.4	4.88%
SRMW	SERC Midwest	1,664.2	0.185	0.027	1,676.8	1.1	0.8	2.5	1,907.0	0.204	0.030	1,920.9	1.1	0.9	2.7	4.88%
SRSO	SERC South	1,027.9	0.081	0.012	1,033.5	0.5	0.4	0.3	1,413.7	0.107	0.015	1,420.9	0.8	0.7	0.5	4.88%
SRTV	SERC Tennessee Valley	1,031.5	0.097	0.014	1,038.1	0.6	0.5	0.6	1,644.3	0.149	0.021	1,654.4	0.8	0.8	0.9	4.88%
SRVC	SERC Virginia/Carolina	743.3	0.067	0.009	747.5	0.4	0.4	0.3	1,422.6	0.128	0.018	1,430.9	0.9	0.8	0.5	4.88%
U.S.		**947.2**	**0.085**	**0.012**	**952.9**	**0.6**	**0.6**	**0.7**	**1,432.3**	**0.117**	**0.017**	**1,440.1**	**1.0**	**0.9**	**1.0**	**4.87%**

Created: 3/9/2020

Appendix I: Tulare Lake Compost

Composting

Unit Processes & Inputs	Inputs & Daily Emissions	Default Input (Optional)
Feedstock Input		
Material type	sludge	
Quantity of sludge going to composting (Mg/day-wet)	100	
Solids content (%)	28.0%	
Quantity of sludge going to composting (Mg/day-dry)	28.1	
Sludge density (kg/m^3)	950	950
Volume of sludge going to composting (m^3/day)	106	
Has the sludge been digested prior to composting?	yes	no
Total nitrogen (%-dry weight)	5.0%	5.0%
Total phosphorus (%-dry weight)	1.9%	1.9%
Total volatile solids - TVS (%-dry weight)	51.0%	51.0%
Organic carbon (%-dry weight)	29.0%	29%
Will compost use replace commercial fertilizer use where it is applied?	yes	yes
Volumetric ratio of amendment to sludge (m^3 amendment:m^3 sludge, as is)*	3	3
Amendment grinding on-site?	yes	yes
Volume of sludge in compost (%)	25%	
Volume of amendment in compost (%)	75%	
Density of amendment (kg/m^3)**	250	250
Quantity of amendment going to composting (Mg/day-wet)	79	
Blended Feedstock Characteristics		
C:N	22	22
Solids content (%)	43%	43%
Type of composting operation	ASP	
Are active composting piles covered or is the air from them treated through a biofilter?	yes	yes
Fuel Use		
Grinding (L-diesel fuel/day)		261
Setting up and breaking down piles (L-diesel fuel/day)		448
Total fuel use for composting equipment (L-diesel fuel/day)	710	710
Applying compost to land (L-diesel fuel/day)	68	68
CO_2 Emissions from Diesel used (Mg/day)	**2.15**	
Electricity Use		
Electricity requirements of composting system (kWh/day)	5,053	5,053
CO_2 Emissions from Electricity used (Mg/day)	**0.92**	
Methane Emissions		
CH_4 emitted from compost pile (Mg/day)	0.00	
CO_2 Emissions equivalents from released CH_4 (Mg/day)	**0.00**	
Nitrous Oxide Emissions		
N_2O emitted from compost pile (Mg/day)	0.033	
N_2O emitted from applying compost to soils (Mg/day)	0.0110	
CO_2 Emissions equivalents from released N_2O (Mg/day)	**10.26**	
Carbon Sequestration		
From compost applied to soil (Mg CO_2/day)	**-7.02**	
Fertilizer Off-set Credits		
From nitrogen applied to soil (Mg CO_2/day)	**-5.61**	
From phosphorus applied to soil (Mg CO_2/day)	**-1.07**	

CO_2 equivalents (Mg/year)	**-136**
Scope 1	**1,968**
Scope 2	**334**
Scopes 1 & 2	**2,303**
Scope 3	**-2,439**
Biomass combustion	**-**

Instructions and Notes

General: Enter data for all solids that were composted. Whenever possible use data from local measurements.

*For this row, if entering a local value, enter in both the blue and orange cells.
**Default is for density of sawdust.

Key	
Input	0
Default from reference values	0
Data used to calculate default (for information only)	0
Process output	**0**

Appendix J: Biogas-to-Vehicle Fuel

Last Updated 1/7/2022 **Total Number of Applications (2.0) or Pathways (3.0)** 1240

App/Pathway #	Class	Calculator Version	Applicant & Pathway Description	Facility Location	Feedstock	Fuel Type	Current Certified FPC	Current Certified CI	Certification Date
A038501	Tier 1	3.0	Fuel Producer: Los Angeles County Sanitation District (L375); Facility Name: Biogas Conditioning System Facility (F00308); Biomethane produced from the mesophilic anaerobic digestion of wasterwater sludge; grid electricity; finished fuel is compressed and dispensed as CNG transportation fuel onsite. (Provisional)	California	Wastewater Sludge (030)	Compressed Natural Gas (CNG)	CNG030A03850100	19.28	8/20/2021

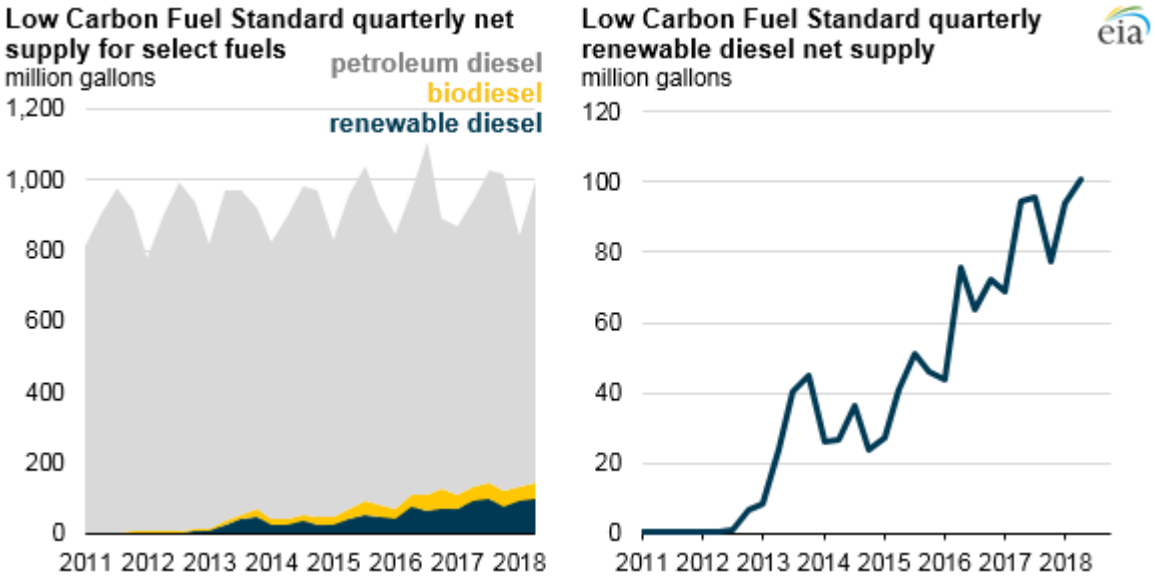
U.S. Energy Information Administration

Skip to sub-navigation

Today in Energy

November 13, 2018

Renewable diesel is increasingly used to meet California's Low Carbon Fuel Standard



Source: U.S. Energy Information Administration, based on California Air Resources Board

Renewable diesel net supply to California's fuel market has increased since the state's Low Carbon Fuel Standard (LCFS) program went into effect in 2011, reaching 100 million gallons during the second quarter of 2018, or 10.1% of the total diesel supplied to California that quarter. The LCFS program, which is administered by the California Air Resources Board, sets standards to incrementally decrease the carbon intensity of motor gasoline and diesel fuel by at least 10% by 2020 relative to a 2010 baseline.

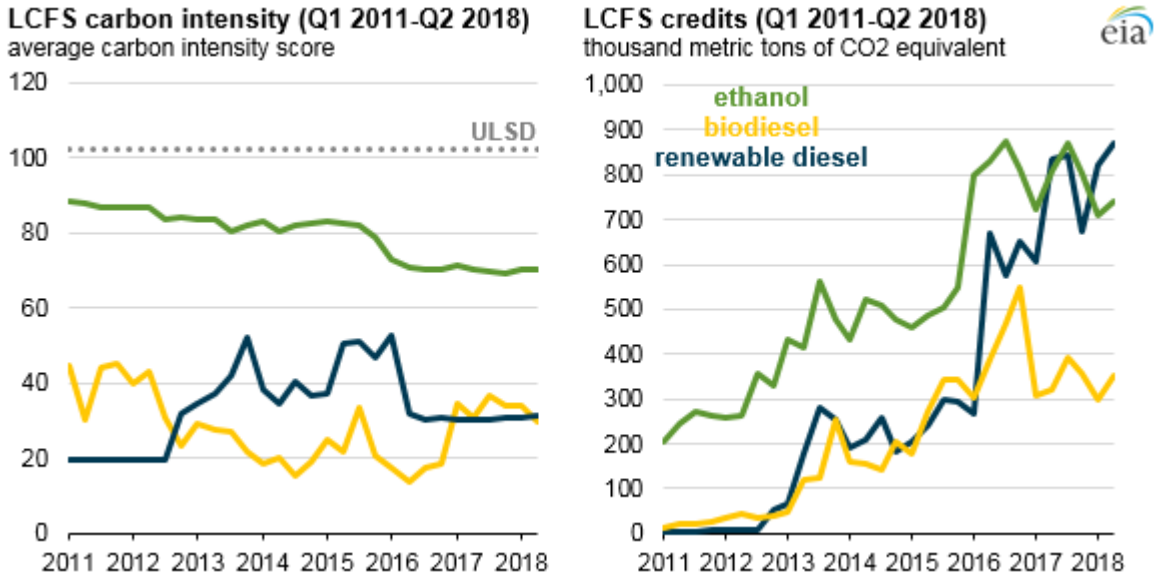
Renewable diesel is an alternative fuel that is chemically similar to petroleum diesel and nearly identical in its performance characteristics. Renewable diesel shares the same fat, oil, and grease feedstocks as biodiesel, but renewable diesel can be blended into petroleum diesel at higher blend levels compared with biodiesel blends. Renewable diesel is often produced either through hydrotreating at a biorefinery or co-processing at a petroleum refinery.

To comply with the LCFS, petroleum refiners, importers of motor gasoline and diesel, and wholesalers of motor transportation fuel are required to either produce low carbon fuels or purchase credits to demonstrate compliance. The mechanism used to regulate the LCFS is a measurement called carbon intensity, which is an estimate of a fuel's lifecycle greenhouse gas emissions. Transportation fuels with a carbon intensity lower than the annual standard earn credits, while transportation fuels with a carbon intensity higher than the annual standard earn deficits. Regulated parties trade credits through the online LCFS Reporting Tool and Credit Bank & Transfer System.

As carbon intensity requirements have become progressively more stringent, prices for LCFS credits have increased. Throughout most of the program's history, LCFS credits averaged lower than $100/metric ton (mt). During 2017, LCFS credits averaged $89/mt, growing to $164/mt through the first 10 months of 2018, suggesting an increasing difficulty for refiners, importers, and wholesalers in meeting annual carbon intensity targets.

Source: U.S. Energy Information Administration, based on Argus Media

The credits generated by renewable diesel producers have some of the lowest carbon intensities of any of the LCFS-approved liquid fuel pathways. The average carbon intensity of renewable diesel, measured in grams of carbon dioxide equivalent per megajoule (gCO2e/MJ), has been about 30 gCO2e/MJ since spring 2016. Much of this low carbon intensity fuel is made from used cooking oil feedstock. Compared with other liquid transportation fuels, renewable diesel's carbon intensity is approximately 20 gCO2e/MJ lower than ethanol and about equal to the average carbon intensity of biodiesel. Ultra-low sulfur diesel, which accounts for most of the diesel supplied in California, has a carbon intensity of 102 gCO2e/MJ.



Source: U.S. Energy Information Administration, based on California Air Resources Board

Under the LCFS program, renewable diesel generates a large number of credits relative to other fuels because it has some of the largest lifecycle greenhouse gas reductions compared with other fuels. The total volume of LCFS credits associated with renewable diesel exceeded that of fuel ethanol for the first time in 2018, reaching about 870,000 mt of carbon dioxide equivalent during the second quarter of 2018.

While renewable diesel imports from Singapore remain significant, planned renewable diesel production capacity additions during the next several years have the potential to increase the share of domestic renewable diesel in the California market. A number of LCFS amendments are slated to go into effect in 2019, including an extension of the program to increase the total reduction in carbon intensity to at least 20% by 2030.

Principal contributors: Steve Hanson, Neil Agarwal

Energy Density and Conversion Facros

Fuel (units)	*Energy Density and Conversion Factors*
CARBOB (gal)	119.53 (MJ/gal)
CaRFG (gal)	115.83 (MJ/gal)
Diesel fuel (gal)	134.47 (MJ/gal)
CNG (scf)	105.5 (MJ/Therm)
LNG (gal)	78.83 (MJ/gal)
Electricity (KWh)	3.60 (MJ/KWh)
Hydrogen (kg)	120.00 (MJ/kg)
Undenatured Anhydrous Ethanol (gal)	80.53 (MJ/gal)
Denatured Ethanol (gal)	81.51 (MJ/gal)
FAME Biodiesel (gal)	126.13 (MJ/gal)
Renewable Diesel (gal)	129.65 (MJ/gal)
Alternative Jet Fuel (gal)	126.37 (MJ/gal)
Renewable Naphtha	117.66 (MJ/gal)
Propane (gal)	89.63 (MJ/gal)

Source: CARB's Quarterly Fuel Usage Spreadsheet
https://ww3.arb.ca.gov/fuels/lcfs/dashboard/quarterlysummary/quarterlysummary_103119.xlsx

RNG CI			**Diesel**		
RNG CI	19.28	gCO2e/MJ	RNG CI	102.00	gCO2e/MJ
Energy in Diesel	134.47	MJ/gal	Energy in Diesel	134.47	MJ/gal
RNG CI	2.59	CO2e/gallon	RNG CI	13.72	CO2e/gallon

ESA

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

April 8, 2022

Mr. Mathew Watson P.E.
Supervising Engineer
Los Angeles County Sanitation Districts
1955 Workman Mill Road
Whittier, CA 90601

Subject: Positive Verification Opinion for Greenhouse Gas Emissions and Reductions for Emissions Year 2021

Dear Mr. Watson:

Environmental Science Associates (ESA) is pleased to provide the following Positive Verification Opinion for Greenhouse Gas (GHG) Emissions and GHG Reductions for Emissions Year 2021 based on information within the Draft 2021 GHG Emissions Inventory Report (Report) compiled by Los Angeles County Sanitation Districts (LACSD) and submitted to ESA on March 15, 2022.

Based on verification analysis conducted that is generally consistent with California's Global Warming Solutions Act methods and in accordance with standards within ISO 14064-3, ESA concludes, with the assurances detailed below, that the 2021 GHG inventory and GHG reduction statements in the Report are free of material errors and a fair representation of the GHG data and information; and prepared in accordance with the best practices related to GHG quantification, monitoring, and reporting.

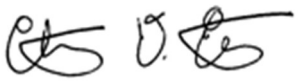
This statement is made with the following assurances. In ESA's limited review of data collected from emissions sources, individual facilities and the organization, ESA verified evidence that LACSD's 2021 GHG emissions and the GHG reductions were:

- Materially correct and a fair representation of the GHG data and information; and generally prepared in accordance with the best practices related to GHG quantification, monitoring, and reporting, and
- Based on data checks conducted, ESA has determined, with limited assurance, that there is low risk for material misstatement from GHG calculations and data aggregation at the organizational level.

Based on the GHG emissions and reductions data provided within the Report, LACSD has demonstrated carbon neutrality.

Thank you for engaging ESA to complete this verification. If you have any questions about our verification statement, or the underlying analysis, please feel free to contact me at ceaster@esassoc.com or 925.900.3675.

Sincerely,



Christopher Easter
Air Quality & GHG Director
CARB Lead GHG Verifier Accreditation #CARB H-21-039

Copy: David Rothbart (LACSD)
Warisa Niizawa (LACSD)
Jeff Caton (ESA)
Tim Sturtz (ESA)

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

July 8, 2022

Thuy Hua
Los Angeles County
Department of Regional Planning
320 W. Temple St. 13th Floor
Los Angeles, CA 90012
Sent by Email: climate@planning.lacounty.gov

RE: Los Angeles County 2045 Climate Action Plan
Notice of Draft Program Environmental Impact Report (PEIR)

Dear Thuy Hua:

Thank you for coordinating with the Los Angeles County Metropolitan Transportation Authority (Metro) regarding the proposed Los Angeles County 2045 Climate Action Plan (Plan) located in the Unincorporated areas of Los Angeles County (County). Metro's mission is to provide a world-class transportation system that enhances quality of life for all who live, work, and play within Los Angeles County. As the County's mass transportation planner, builder and operator, Metro is constantly working to deliver a regional system that supports increased transportation options and associated benefits, such as improved mobility options, air quality, health and safety, and access to opportunities.

Per Metro's area of statutory responsibility pursuant to sections 15082(b) and 15086(a) of the Guidelines for Implementation of the California Environmental Quality Act (CEQA: Cal. Code of Regulations, Title 14, Ch. 3), the purpose of this letter is to provide the County with specific detail on the scope and content of environmental information that should be included in the Program Environmental Impact Report (PEIR) for the Project. Effects of a project on transit systems and infrastructure are within the scope of transportation impacts to be evaluated under CEQA.[1]

Project Description
The Project includes approval of the Draft 2045 in CAP, which consists of: an updated greenhouse gas (GHG) emissions inventory for 2018; new emissions forecasts for 2030, 2035, and 2045; new GHG emissions targets for 2030 and 2035, and an aspirational goal of carbon neutrality for 2045; a revised suite of GHG emissions reduction strategies, measures, and actions in response to public comments to be more clear, specific, feasible, and quantifiable; a technical modeling appendix to explain the Draft 2045 CAP's GHG emissions reduction estimates; consideration of environmental justice and equity

concerns; new development review consistency checklist to allow projects to streamline CEQA compliance by using the Draft 2045 CAP, per CEQA Guidelines Section 15183.5.

Recommendations for PEIR Scope and Content

Transit Services and Facilities
The Plan and PEIR should include and reference updated information on existing and planned transit services and facilities within the Plan area. In particular, Metro's NextGen Bus Plan (completed in December 2021) should be used as a resource to determine the location of high-frequency bus services and stops within the Plan area. For more information, visit the NextGen Bus Plan's website at https://www.metro.net/projects/nextgen/. Please also refer to Metro's 2020 Long Range Transportation Plan and Measure M Expenditure Plan.

Specific LA County 2045 CAP Comments

1. Page 3-5, T6
    a. Recommend that the County collaborate with Metro on Metro's recently approved EV Master Plan.
2. Page 3-25, Measure T3 Performance Objective
    a. The performance objective to increase bikeway miles by 500% neglects the quality of the facility which is critical to their utilization. This is important insofar as the 2012 County Bicycle Plan includes extensive miles of Class III facilities, many of those in remote mountain or desert areas, which would be most often used for sport/recreation purposes in areas that do not connect to key destinations.
3. Page 3-26, Measure T4.2
    a. The performance objective to install signal priority and bus lanes on 100% of transit routes appears incongruent with Measure T4.2, which suggests such improvements will only take place on "major thoroughfares." Recommend County review Metro's NextGen Bus Plan and collaborate with LA Metro and other transit providers to determine feasibility of this objective.
4. Page 3-26, T4.5
    a. "projects" is not defined here. Presumably this would apply to land use or development projects, but is unclear as drafted.
5. Page 3-26, T-4.9
    a. Metro is actively working on a VMT Mitigation program for Highway projects, which includes development of a VMT Bank or Exchange. Metro would welcome further discussion with the County if/when this measure advances.

Specific PEIR Comments

1. Page ES-2, Air Quality Action ES-1.2

   a. Revise "Develop a policy" to "develop a countywide policy"
2. Page ES-2, Energy ES1.1
   a. Add "utilities" to "Collaborate with other local jurisdictions"
3. Page ES-2, Energy ES3.6
   a. Add new strategy "Streamline and prioritize permitting for solar/solar + battery storage projects"
4. Page ES-3, Energy ES4.4
   a. Add "study opportunities for partnerships"
5. Page ES-5, Transportation T4.1
   a. Add requirement that new forms of transit are low to zero emissions
6. Page ES-5, Transportation T4.6
   a. Revise to “Offer free or discounted in transit passes...”
7. Page ES-5, Air Quality T6.1
   a. This plan and planning process should collaborate with other regional agencies/jurisdictions to share infrastructure.
8. Page ES-5, Air Quality T6.1
   a. Revise to “Develop a policy or ordinance to expand electric options for active transportation.”
9. Page ES-11, Water E5.2
   a. Add landscaping irrigation
10. Page ES-12, Water E6.3
   a. Add California native plants
11. Page ES-12, Water E6.4
   a. Add conservation, not just efficiency
12. Page ES-12, Hazards W1.2
   a. Recommend the enforcement of styrofoam ban

Transit Supportive Planning: Recommendations and Resources
Considering the Plan area’s inclusion of several Metro stations and key bus lines, Metro would like to identify the potential synergies associated with transit-oriented development:

1. Transit Supportive Planning Toolkit: Metro strongly recommends that the County review and promote the Transit Supportive Planning Toolkit which identifies 10 elements of transit-supportive places and, applied collectively, has been shown to reduce vehicle miles traveled by establishing community-scaled density, diverse land use mix, combination of affordable housing, and infrastructure projects for pedestrians, bicyclists, and people of all ages and abilities. This resource is available at https://www.metro.net/about/funding-resources/.

2. Land Use: Metro supports development of commercial and residential properties near transit stations and understands that increasing development near stations represents a mutually beneficial opportunity to increase ridership and enhance transportation options for the users of developments. Metro encourages the County to be mindful of the Metro Stations within the Plan area and include strategies to orient pedestrian pathways towards the Stations.

3. Transit Connections and Access: Given the Plan area's proximity to the L Line (Gold), C Line (Green), A Line (Blue), and Metrolink Stations, the Plan should include policies and/or design standards to accommodate transfer activity between bus and rail customers that will occur along the sidewalks and public spaces. Metro completed the Metro Transfers Design Guide, a best practice document on transit improvements. This can be accessed online at https://www.metro.net/about/station-design-projects/.

4. Walkability: Metro strongly encourages the installation of wide sidewalks, pedestrian lighting, a continuous canopy of shade trees, enhanced crosswalks with ADA-compliant curb ramps, and other amenities along all public street frontages of the development site to improve pedestrian safety and comfort to access the L Line (Gold), C Line (Green), A Line (Blue), and Metrolink Stations. The County should consider requiring the installation of such amenities as part of the conditions of approval of projects within the Plan area.

5. Access: The Plan should address first-last mile connections to transit, encouraging development that is transit accessible with bicycle and pedestrian-oriented street design connecting transportation with housing and employment centers. For reference, please view the First Last Mile Strategic Plan, authored by Metro and the Southern California Association of Governments (SCAG), available on-line at:
http://media.metro.net/docs/sustainability_path_design_guidelines.pdf

6. Active Transportation: Metro encourages the County to promote bicycle use through adequate short-term bicycle parking, such as ground-level bicycle racks, as well as secure and enclosed long-term bicycle parking, such as bike lockers or a secured bike room, for guests, employees, and residents. Bicycle parking facilities should be designed with best practices in mind, including: highly visible siting, effective surveillance, easy to locate, and equipment installed with preferred spacing dimensions, so they can be conveniently accessed. Additionally, the Plan should help facilitate safe and convenient connections for pedestrians, people riding bikes, and transit users to/from the destinations within the Plan area.

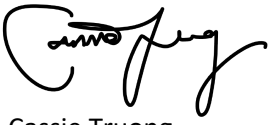
10. Parking: Metro encourages the incorporation of transit-oriented, pedestrian-oriented parking provision strategies such as the reduction or removal of minimum parking requirements for

specific areas and the exploration of shared parking opportunities. These strategies could be pursued to reduce automobile-orientation in design and travel demand.

Metro looks forward to continuing to collaborate with the County to effectuate policies and implementation activities that promote transit oriented communities. If you have any questions regarding this letter, please contact me by phone at 213.418.3484 by email at DevReview@metro.net, or by mail at the following address:

Metro Development Review
One Gateway Plaza
MS 99-22-1
Los Angeles, CA 90012-2952

Sincerely,



Cassie Truong
Transportation Planner, Development Review Team
Transit Oriented Communities

Ventura County
Air Pollution
Control District

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Ventura, California 93003

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www.vcapcd.org

Ali Reza Ghasemi, PE
Air Pollution Control Officer

VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT
Memorandum

TO: Thuy Hua, Supervising Regional Planner

DATE: July 7, 2022

FROM: Nicole Collazo, Air Quality Specialist, VCAPCD Planning Division

SUBJECT: Notice of Availability of a Draft Environmental Impact Report for the Los Angeles County 2045 Climate Action Plan (RMA 22-001-1)

Ventura County Air Pollution Control District (APCD) staff has reviewed the subject Notice of Availability (NOA) of a draft programmatic environmental impact report (DPEIR) of the Los Angeles County's (County) 2045 Climate Action Plan (CAP, project). The project would require a General Plan Amendment to replace the County's 2020 CAP, which is an implementing component of the Air Quality Element of the County's General Plan. The Project location encompasses the unincorporated portions of Los Angeles County. The Lead Agency for the project is the Los Angeles County Department of Regional Planning. APCD's jurisdiction shares a common border with Los Angeles County and our air basin receives some of the County's air pollution, therefore, we feel we are within our interests to comment on the project.

General Comments

Item 1. Page 2-3. Proposed Policy AQ 2.1 should define what "within proximity" is intended to be. For example, if the policy is to be in line with existing California Air Resources Board guidelines to avoid siting sensitive uses within 500 feet of a major freeway (*CARB Land Use Handbook, 2005*), the policy should state this setback distance.

Item 2. Page 2-3. Proposed Policy AQ 2.3 appears to contradict proposed Policy AQ 2.1 in that it would encourage siting development near High Quality Transit Areas, which may include freeways. We recommend re-wording this proposed policy to include language that would be consistent with proposed Policy AQ 2.1.

Item 3. Page 3.4-57. We thank the County for its efforts in implanting new policies that would reduce toxic impacts to sensitive receptors for stationary sources and future discretionary projects within the County's jurisdiction. We have been recommending the same policy in our environmental reviews for discretionary projects and this would help set a new precedent in our region. We also would like to recommend you codify these proposed mitigation measures through your County's zoning ordinances or environmental review guideline policies.

Item 4. This is just a note regarding the CAP's Measures that none of them have a timeline, deadline or timeframe for implementation. APCD has reviewed several CAP for our cities, county , and other jurisdictions and believes having a target year for each CAP measure, policy or program would produce an enforceable and attainable plan in addition to meeting the CAP's Project Objective 3- Provide a road map to achieve GHG reductions to meet GHG emission reduction targets. The DEIR contains a section on implementation of the CAP in phases (Page 2-28) for actions between 2023-2025, 2025-2035, and 2035-2045. However, we could not locate what actions correspond to what phases in the DEIR and the CAP Measures summary table in the Executive Summary does not contain the implementation phases either.

Thank you for the opportunity to comment on the project. If you have any questions, you may contact me at nicole@vcapcd.org.