

Amador County

Community-Wide and Municipal-Operations 2010 Gas Emissions Inventories With 2005 Baseline Comparison



Final Report

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Executive Summary

This report documents the results of the 2010 greenhouse gas (GHG) emissions inventories for community-wide activities and sources, and the municipal operations of Amador County. This report also compares 2010 GHG emissions to 2005 baseline emissions. The Executive Summary presents a general overview of the GHG emissions attributed to community activities and sources within Amador County, and the County's municipal operations in 2010 and 2005 for comparison purposes. More detailed discussion of each inventory is provided in the Community-Wide Inventory Results and Municipal-Operations Inventory Results sections, respectively.

With the support of Pacific Gas and Electric Company (PG&E), and guidance from County staff, Sierra Business Council (SBC) completed all emissions estimates following the Local Government Operations Protocol (LGOP) and the United States Community Protocol (USCP). More information on the inventory boundaries and the protocols used to develop the inventories is provided in the baseline reports and the Improvements to Inventory Methodologies section of this report. The baseline inventories have been updated to match current best practices as detailed in Appendix M.

This report is intended to serve as a guidepost to local GHG emissions reduction efforts, to provide a comparison to 2005 GHG emissions and for use in demonstrating progress in reducing emissions. Through these efforts and others, the County can achieve benefits beyond reducing emissions, including saving community members' and tax payers' money and improving the County's economic vitality and ultimately increasing the quality of life for residents and other community members.

2010 Community-Wide GHG Emissions Summary

In 2010, Amador County's residents and businesses emitted an estimated 272,817 metric tons carbon dioxide equivalent (CO_{2e}) as reported in the community-wide inventory. This is an 8.9% reduction in GHG emissions from the 299,430 metric tons CO_{2e} reported for 2005. Carbon dioxide equivalent is calculated using the Global Warming Potential (GWP) of each gas, which is an estimate of the amount of warming a GHG causes over a 100-year time horizon, measured against the warming caused by carbon dioxide. Converting all emissions to equivalent carbon dioxide units allows for the straightforward comparison of different greenhouse gases. As recommended by the USCP, the Local Government Significant Influence framework was used to determine the emissions included in the community-wide inventory. This framework includes emissions that the County has the ability to influence through outreach, education, incentives or regulatory programs and policies.

Figure ES-1 summarizes the community-wide GHG emissions that Amador County has the greatest potential to influence. As can be seen in Figure ES-1, the largest contributor to community emissions in the inventory is community

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transportation, which includes on-road passenger, freight and public transit vehicles as well as off-road vehicles, equipment and local aviation. Community-wide GHG emissions are categorized as source emissions or activity emissions, following USCP guidance. Sources include physical processes that occur within the jurisdiction’s boundary that release GHG emissions. Activity emissions are produced due to the activities of community members, such as the use of energy, materials or services, and may occur within or outside of the community boundaries.

Figure ES-1: 2010 Community-Wide GHG Emissions Summary

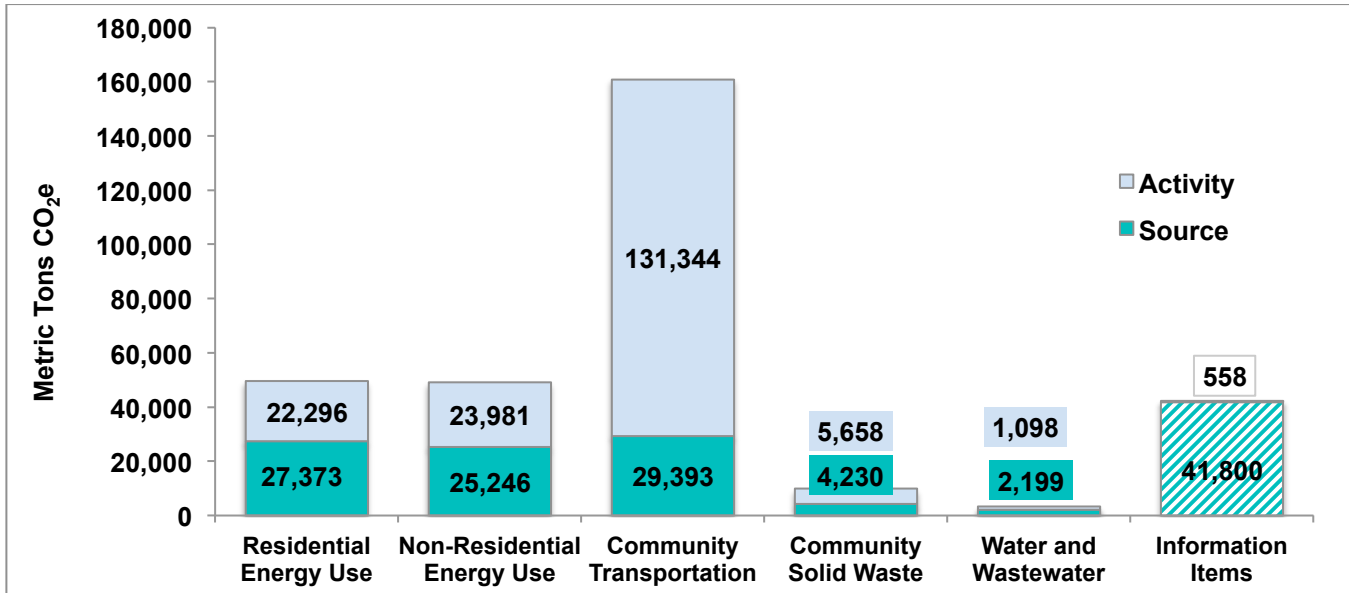


Table ES-1 presents the 2010 community-wide GHG emissions in more detail, including Information Items that are not included in the community-wide GHG emissions total, though are reported here for additional context.

Information Items are GHG emissions that are reported separately from the community total either to avoid overlap with other reported emissions or because they are excluded from GHG inventories by USCP guidance. For this community-wide inventory, Information Items include:

- Emissions associated with the collection and transportation of community-generated solid waste (which are included in community transportation emissions),
- Emissions from the use of on-road electric vehicles (included in residential and non-residential electricity use emissions), and
- Biogenic CO₂ emissions from the combustion of wood for home-heating. Biogenic CO₂ is not included in GHG inventories because the same CO₂ would be produced if the wood was left to decompose naturally and can be considered part of the natural carbon cycle.

Table ES-1: 2010 Community-Wide GHG Emissions Summary

Sector	2010 Metric Tons CO ₂ e	Source / Activity
Residential Energy Use		
Residential Electricity Use	20,258	Activity
Residential Stationary Fuel Combustion	27,373	Source
Residential Electricity Transmission and Distribution (T&D) Losses	2,038	Activity
Residential Energy Use	49,668	
Non-Residential Energy Use		
Non-Residential Electricity Use	21,824	Activity
Non-Residential Natural Gas Combustion	25,246	Source
Non-Residential Electricity T&D Losses	2,158	Activity
Non-Residential Energy Use	49,227	
Community Transportation		
On-Road Transportation Fuel Combustion	130,938	Activity
Off-Road Vehicles and Equipment Fuel Combustion	29,393	Source
Aviation Fuel	406	Activity
Community Transportation	160,737	
Community Solid Waste		
Community-Generated Solid Waste	5,658	Activity
Solid Waste Landfills and Dumps	4,230	Source
Community Solid Waste	9,888	
Community Potable Water and Wastewater Treatment		
Potable Water Electricity Use and T&D Losses	722	Activity
Wastewater Treatment Electricity Use and T&D Losses	121	Activity
Septic Systems	2,199	Source
Central Wastewater Treatment	254	Activity
Potable Water and Wastewater	3,297	
Total Community Emissions	272,817	
Information Items		
Biogenic Emissions from Residential Wood Combustion	41,800	Source
On-Road All Electric	6	Activity
Collection and Transportation of Community-Generated Solid Waste	553	Activity

2010 Municipal-Operations GHG Emissions Summary

In 2010, Amador County’s municipal operations generated an estimated 6,314 metric tons CO₂e within the municipal-operations inventory. This is a 73% decrease in GHG emissions from the 23,234 metric tons CO₂e reported for 2005. As recommended by the LGOP, the Operational Control framework was used to determine the emissions included in the municipal-operations inventory. The Operational Control framework includes emissions sources and activities for which the County has full authority to introduce and implement operational policies. The municipal-operations inventory also includes two sectors for which Amador County has less control: emissions from employee-generated solid waste and emissions from employees’ personal commutes to work. Including these optional sources is recommended strongly by the LGOP even though the County does not have full operational control.

Figure ES-2 summarizes the municipal-operations GHG emissions by sector. As shown, the Solid Waste sector (primarily the Buena Vista Landfill) was the largest source of emissions within the municipal-operations inventory in 2010. The decrease in emissions is primarily the result of lower emissions every subsequent year from the Buena Vista Landfill, which has not received new waste since 2004, and the completion of the landfill gas collection system to cover 100% of the landfill.

Figure ES-2: 2010 Municipal-Operations GHG Emissions Summary

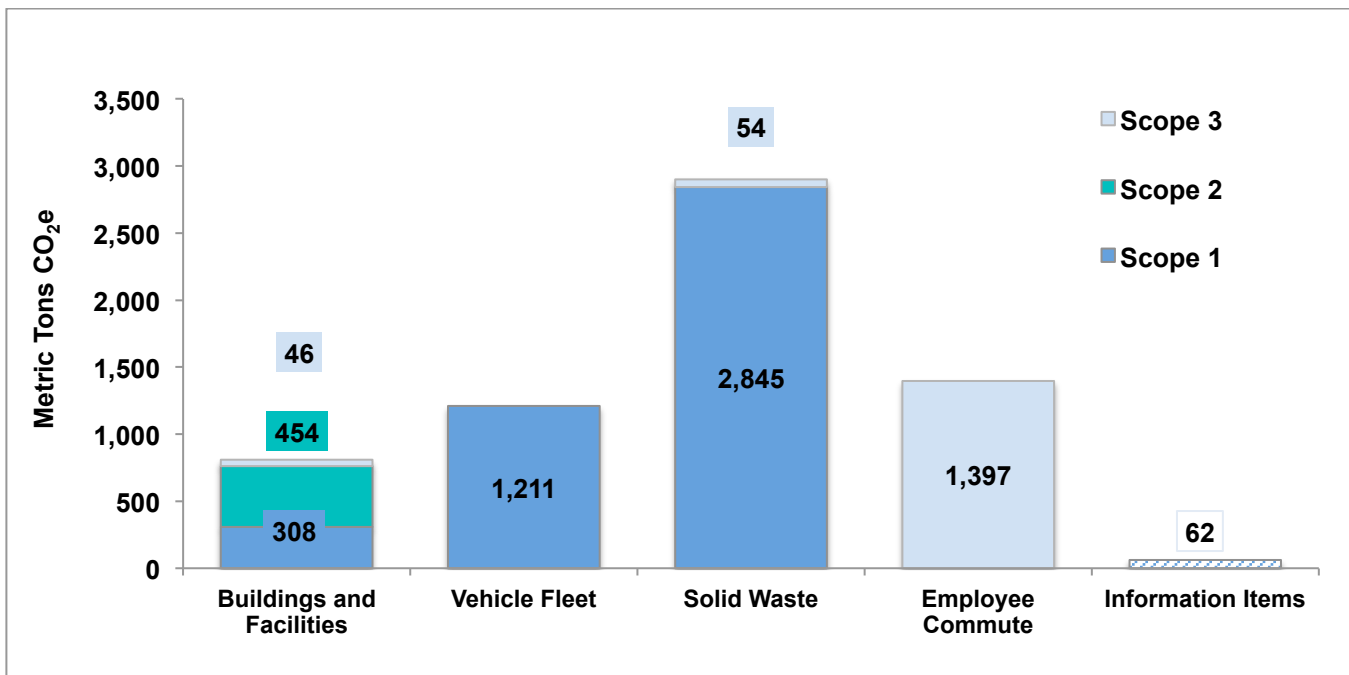


Table ES-2 presents the municipal-operations GHG emissions in more detail. Following LGOP guidance, municipal-operations emissions are reported by Scope to prevent double counting. Scope 1 includes emissions from direct stationary and mobile fuel combustion, and fugitive and process emissions. Scope 2 includes emissions from the use of electricity, purchased steam, and district heating or cooling. Scope 3 emissions include all other indirect or embodied emissions not covered in Scope 2. In addition to the categories in the scopes framework, emissions may be reported as Information Items. Information Items are GHG emissions that are reported separately from the municipal-operations

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total either to avoid overlap with other reported emissions or because they are excluded from GHG inventories by LGOP guidance. The Information Items presented in Table ES-2 include: PG&E owned and operated LS-1 streetlights, Community-generated solid waste collected by the County (but not generated by municipal operations) and R-12 refrigerants (ozone depleting substances currently being phased out worldwide).

Table ES-2: 2010 Municipal-Operations GHG Emissions Summary

Sector	2010 Metric Tons CO ₂ e	Reporting Scope
Buildings and Facilities		
Electricity Use	454	Scope 2
Stationary Fuel Combustion	308	Scope 1
Electricity Transmission and Distribution (T&D) Losses	46	Scope 3
Total Buildings and Facilities	808	
Vehicle Fleet		
Gasoline Fuel Combustion	893	Scope 1
Diesel Fuel Combustion	255	Scope 1
Leaked Refrigerants	63	Scope 1
Total Vehicle Fleet	1,211	
Government-Generated Solid Waste		
Solid Waste Emissions	54	Scope 3
Total Government-Generated Solid Waste	54	
Solid Waste Landfill		
Buena Vista Landfill Fugitive Methane	2,845	Scope 1
Total Solid Waste Management	2,845	
Employee Commute		
Employee Commute Emissions	1,397	Scope 3
Total Employee Commute	1,397	
Total Municipal-Operations Emissions	6,314	
Information Items		
PG&E owned and operated LS-1 Lighting Electricity and T&D Losses	0.6	
Community-Generated Solid Waste Collected by County from Parks	2	
Ozone depleting R-12 refrigerants.	59	
Total Information Items Emissions	62	

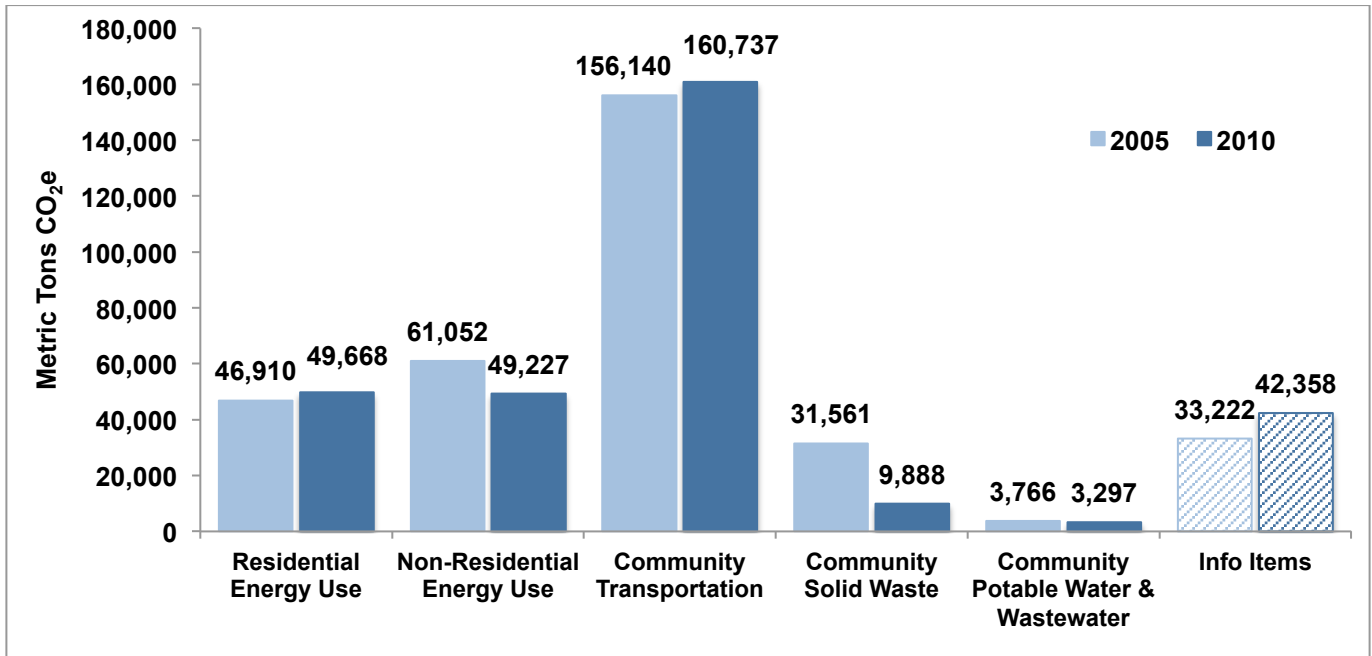
Comparison to Baseline GHG Inventories

The baseline 2005 municipal operations GHG inventory was completed for Amador County in 2009 by Amador Citizens for Energy Conservation (ACEC). Sierra Business Council completed the baseline 2005 community-wide inventory in 2013 with updates made by AECOM. Since the inventories were completed, improved methodologies have become available. The improved methodologies have been used for the 2010 inventories and were used to update the original 2005 baseline inventories. Details on the updates to the 2005 baseline inventories are explained in the Improvements to Inventory Methodologies section and detailed in Appendix M. This section of the report compares 2010 GHG emissions to the updated 2005 baseline GHG emissions.

Figures ES-3 summarizes the comparison of 2010 GHG emissions to the 2005 baseline GHG emissions for the community-wide inventory. In summary:

- Total reported community-wide GHG emissions decreased 8.9% from 2005 to 2010, primarily from decreased commercial natural gas use, decreased solid waste emissions from the Buena Vista Landfill and lower PG&E electricity emissions factors.
- Over this time, population increased 1.5%, per capita emissions decreased by 10%, and per household emissions decreased by 14%.

Figure ES-3: 2005 Baseline and 2010 Community-Wide GHG Emissions



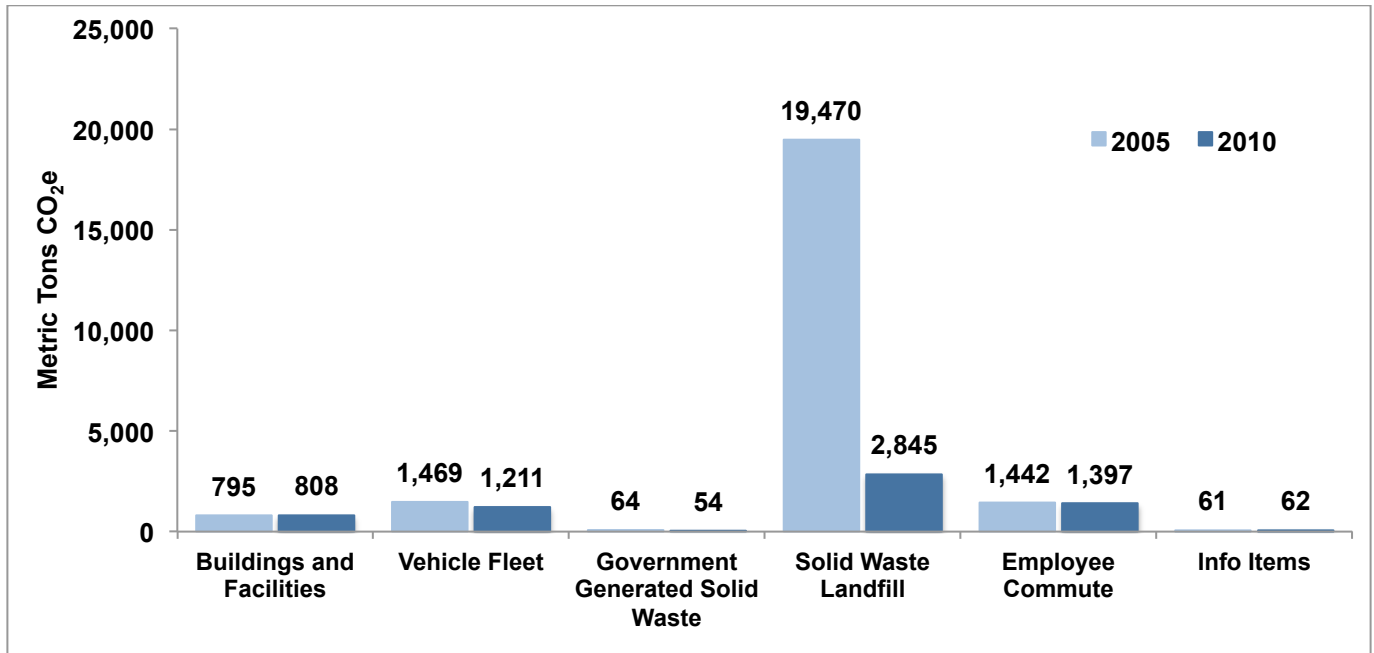
Figures ES-4 summarizes the comparison of 2010 GHG emissions to the 2005 baseline GHG emissions for the municipal-operations inventory. In summary:

- Total municipal-operations GHG emissions decreased 73% from 2005 to 2010.
- Over this time, the County’s number of employees decreased from 415 to 402.

Amador County 2010 GHG Emissions Inventories

- The Solid Waste Landfill sector GHG emissions decreased 85% from 2005 to 2010 due to decreasing emissions from the Buena Vista Landfill as the existing waste decomposed, and no new waste was added, and the completion of the landfill gas collection system to cover 100% of the landfill.

Figure ES-4: 2005 Baseline and 2010 Municipal-Operations GHG Emissions



Introduction

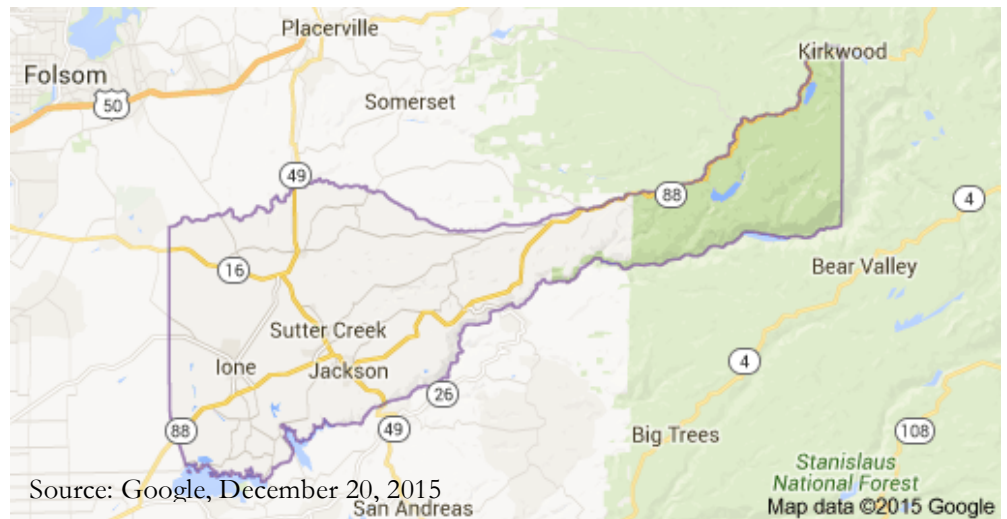
Amador County is located east of Sacramento and covers over 605 square miles. It spans from Sacramento County well into the El Dorado National Forest. The elevation ranges from 250 to over 9,000 feet. The unincorporated county had an estimated 2010 population of 21,816 people. Every day, Amador County plays host to a variety of activities necessary for ensuring a properly functioning and robust community. These activities include generating electricity, burning fuel for transportation, collecting and treating solid waste and wastewater, and lighting, heating and cooling buildings. These activities and others contribute either directly or indirectly to the addition of carbon dioxide and other greenhouse gases (GHGs) into the environment.

In California governments, businesses and the general public are placing increasing focus on quantifying and reducing GHG emissions. Additionally, California's legislature and regulatory agencies have established policies relating to GHG emissions reductions. Due to these drivers and other motivations, the County directed the Sierra Business Council, with the support of PG&E, to conduct 2010 inventories of GHG emissions resulting from both community activities and sources, and Amador County's municipal operations. This report documents the findings and methodologies of the 2010 community-wide and municipal-operations inventories and provides a comparison to baseline 2005 GHG emission.

Figure 1: Amador County - 2015 Jurisdictional Boundary

Pacific Gas and Electric Company-Sponsored Inventory Project

This project was made possible by PG&E's Government and Community Partnerships Program with funding from California utility customers under the auspices of the



California Public Utilities Commission. The Government and Community Partnerships Program assists local governments by providing easy-to-understand information, technical expertise, and financial resources to support local climate action planning. The Government and Community Partnerships Program is designed to help local governments and communities achieve GHG reduction goals while simultaneously reducing energy costs and improving air quality.

Improvements to Inventory Methodologies

This section provides information on the specific improvements to inventory methodologies from the 2005 baseline GHG inventories. Unless noted here, inventory methods are consistent with the baseline GHG inventories.

U.S. Community Protocol

The U.S. Community Protocol (USCP) was released by ICLEI in October 2012, and represents the current national standard in guidance for community-wide GHG emissions inventories. The baseline inventory used the previous standard International Local Government GHG Emissions Analysis Protocol. The USCP established additional reporting requirements for community-wide GHG emissions inventories and provided improved accounting guidance for quantifying GHG emissions. The State of California Governor's Office of Planning and Research recommends that California local governments follow the USCP when undertaking their greenhouse gas emissions inventories. The improvements to inventory methodologies from the USCP include the addition of electricity transmission and distribution losses, the delineation of community wastewater and potable water energy use emissions, improved methods to estimate residential non-utility fuel use emissions and improved methods to estimate wastewater process emissions.

Greenhouse Gas Global Warming Potential

Greenhouse gas emissions are commonly aggregated and reported in terms of equivalent carbon dioxide units, or CO₂e. This standard is based on the Global Warming Potential (GWP) of each gas, which is a measure of the amount of warming a GHG may cause over a 100-year time horizon, measured against the amount of warming caused by carbon dioxide. Converting all emissions to equivalent carbon dioxide units allows for the consideration of different GHGs in comparable terms. Table 1 presents the GWPs of the commonly occurring GHGs according to the Intergovernmental Panel on Climate Change's 4th Assessment Report,¹ and the previous 2nd assessment values.

Table 1: Greenhouse Gas Global Warming Potential

Greenhouse Gas	Chemical Formula	2 nd Assessment GWP	4 th Assessment GWP
Carbon Dioxide	CO ₂	1	1
Methane	CH ₄	21	25
Nitrous Oxide	N ₂ O	310	298
Hydrofluorocarbons	Various	12–11,700	38-12,200
Perfluorocarbons	Various	6,500–9,200	9,500-18,200
Sulfur Hexafluoride	SF ₆	23,900	32,600

¹ http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

Sources and Activities

The USCP defines a community’s greenhouse gas emissions in two categories: 1) GHG emissions that are produced by “sources” located within the community boundary, and 2) GHG emissions produced as a consequence of community “activities” and may be produced within or outside of the community boundary.

Table 2: Source vs. Activity

Source	Activity
<p>Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere (for example, natural gas combusted at homes and business)</p>	<p>The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions that may be outside of the community boundaries (for example, electricity used at homes and business)</p>

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A purely source-based emissions inventory could be summed to estimate total emissions released within the community’s jurisdictional boundary. In contrast, a purely activity-based emissions inventory could provide perspective on the efficiency of the community, even when the associated emissions occur outside the jurisdictional boundary. Sometimes an emissions category could be considered a source and an activity, for example, fuel used for heating is both a source of emissions within the community as well as a community activity. In cases such as this, the emissions are considered a source because the emissions are known to have originated from within the community. The division of emissions into sources and activities for community-wide inventories replaces the scopes framework that is used in municipal-operations inventories.

Statewide Energy Efficiency Collaborative

The Statewide Energy Efficiency Collaborative (SEEC) provides support to cities and counties to help them reduce GHG emissions and save energy. SEEC is an alliance between three statewide non-profit organizations and California’s four Investor-Owned Utilities. SEEC provides education and tools at no cost to representatives of local governments within California, as well as state and regional government agencies, districts and school districts. This inventory leveraged the expertise and tools provided by SEEC. All SEEC tools are available at no cost to California local governments and their representatives at www.californiaSEEC.org.

ClearPath California

To facilitate efforts to measure GHG emissions as a first step towards reducing them, ICLEI, on behalf of SEEC, developed ClearPath California in order to provide a no-cost, easy-to-use online tool for California local governments to calculate, monitor, and forecast community-wide and municipal-operations GHG emissions. ClearPath was developed to assist in the preparation of USCP and LGOP-compliant GHG inventories. The baseline GHG inventories were updated using ClearPath California.

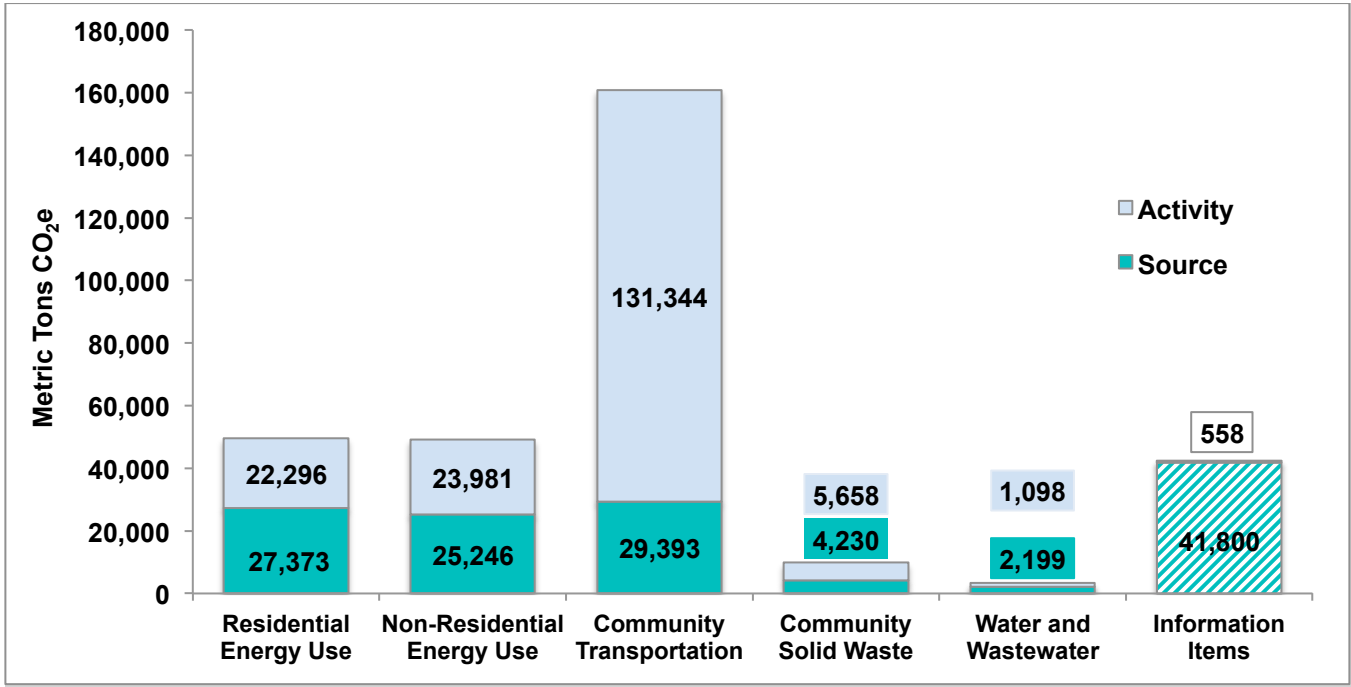
Community-Wide Inventory Results

The community-wide inventory includes estimates of Amador County's greenhouse gas (GHG) emissions resulting from activities and sources in the community as a whole in 2010. The community-wide inventory was conducted under the Local Government Significant Influence framework of the U.S. Community Protocol (USCP). This framework is designed to highlight emissions sources and activities that Amador County has the greatest ability to influence through education, outreach, incentives or regulatory policies and programs. For more information on the Local Government Significant Influence framework and specific inventory methods please refer to the Improvements to Inventory Methodologies section of this report and the USCP.

Emissions Summary

In 2010, Amador County's residents and businesses emitted an estimated 272,817 metric tons CO₂e within the community-wide inventory. This is an 8.9% decrease in GHG emissions from the 2005 baseline inventory's 299,430 metric tons CO₂e. This is primarily the result of decreased commercial natural gas use, decreased direct access electricity use and lower PG&E electricity emissions factors, which offset increases in residential stationary combustion emissions. There were also substantial reductions in the solid waste sector, specifically the Buena Vista Landfill as the existing waste decomposed, and no new waste was added, and the completion of the landfill gas collection system to cover 100% of the landfill. Reductions from the installation of solar photovoltaic systems in the community have not been quantified but are reflected in the reductions in utility electricity use. Figure 2 summarizes the community-wide GHG emissions which the County has the greatest potential to influence. As can be seen in Figure 2, the largest contributor to community emissions in the inventory is community transportation, which includes on-road passenger, freight and public transit vehicles as well as off-road vehicles and equipment and local aviation fuel.

Figure 2: 2010 Community-Wide GHG Emissions Summary



Community-wide GHG emissions are categorized as source emissions or activity emissions. Source emissions are produced within the community boundaries. Activity emissions are produced due to the activities of community members, and can occur within or outside of the community boundaries. The most common example of activity emissions are those from electricity use, where the electricity is consumed within the community though the emissions are produced at power plants spread throughout the region.

Table 3 presents the community-wide GHG emissions in more detail, including Information Items that are not included in the emissions total though are reported here for additional context. Information Items are emissions that are reported separately in GHG inventories either to prevent double counting with other included emissions or by protocol guidance. For the community-wide inventory, Information Items include:

- Emissions associated with electric vehicles (included in residential and non-residential electricity emissions),
- Collection and transportation of community-generated solid waste (included in transportation totals), and
- Biogenic CO₂ emissions from the combustion of wood used for home heating. Biogenic CO₂ is not included in GHG emissions inventories because the same CO₂ would be produced if the wood or other organic material were left to decompose naturally.

Biogenic CO₂ emissions from the combustion of wastewater treatment digester gas are *de minimis* and not included. Values presented in tables and figures may not sum to totals because of rounding.

Table 3: 2010 Community-Wide GHG Emissions Summary

Sector	2010 Metric Tons CO ₂ e	Source / Activity
Residential Energy Use		
Residential Electricity Use	20,258	Activity
Residential Stationary Fuel Combustion	27,373	Source
Residential Electricity Transmission and Distribution (T&D) Losses	2,038	Activity
Residential Energy Use	49,668	
Non-Residential Energy Use		
Non-Residential Electricity Use	21,824	Activity
Non-Residential Natural Gas Combustion	25,246	Source
Non-Residential Electricity T&D Losses	2,158	Activity
Non-Residential Energy Use	49,227	
Community Transportation		
On-Road Transportation Fuel Combustion	130,938	Activity
Off-Road Vehicles and Equipment Fuel Combustion	29,393	Source
Aviation Fuel	406	Activity
Community Transportation	160,737	
Community Solid Waste		
Community-Generated Solid Waste	5,658	Activity
Solid Waste Landfills and Dumps	4,230	Source
Community Solid Waste	9,888	
Community Potable Water and Wastewater Treatment		
Potable Water Electricity Use and T&D Losses	722	Activity
Wastewater Treatment Electricity Use and T&D Losses	121	Activity
Septic Systems	2,199	Source
Central Wastewater Treatment	254	Activity
Potable Water and Wastewater	3,297	
Total Community Emissions	272,817	
Information Items		
Biogenic Emissions from Residential Wood Combustion	41,800	Source
On-Road Transportation - All Electric Vehicles	6	Activity
Collection and Transportation of Community-Generated Solid Waste	553	Activity

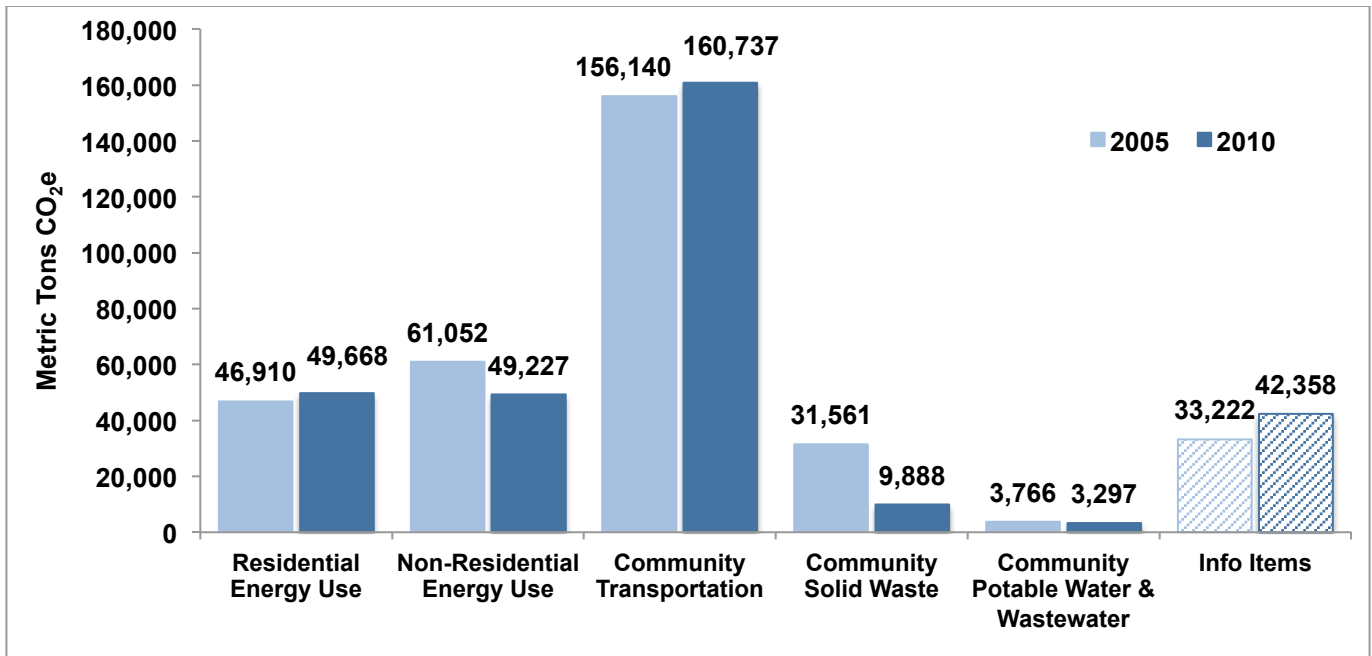
Comparison to Baseline Community-Wide Inventory

A 2005 baseline GHG inventory was completed for Amador County in 2012, with updates by AECOM. Since the inventory was most recently updated, improved methodologies have become available. The improved methodologies have been used for the 2010 inventory and were used to update the most recent 2005 baseline results. Details on the updates to the 2005 baseline community-wide inventory are explained in the Improvements to Inventory Methodologies section and detailed in Appendix M. This section of the report compares 2010 GHG emissions to the updated 2005 baseline GHG emissions. In summary:

- Total reported community-wide GHG emissions decreased 8.9% from 2005 to 2010, primarily from decreased commercial natural gas use, decreased solid waste emissions at the Buena Vista Landfill and lower PG&E electricity emissions factors.
- Over this time, population increased 1.5%, per capita emissions decreased by 10%, and per household emissions decreased by 14%.

Figures 3 summarize the comparison of 2010 GHG emissions to the 2005 baseline GHG emissions for the community-wide inventory.

Figure 3: 2005 Baseline and 2010 Community-Wide GHG Emissions



Residential Energy Use

Amador County’s residential energy use generated an estimated 49,688 metric tons CO₂e in 2010. This is a 6% increase in GHG emissions from the 46,910 metric tons CO₂e reported for 2005. This is primarily the result of increases in home heating fuel use, natural gas use and transmissions and distribution losses. Electricity consumption decreased, as did the PG&E electricity emissions factors. These emissions were calculated using 2005 and 2010 electricity and natural

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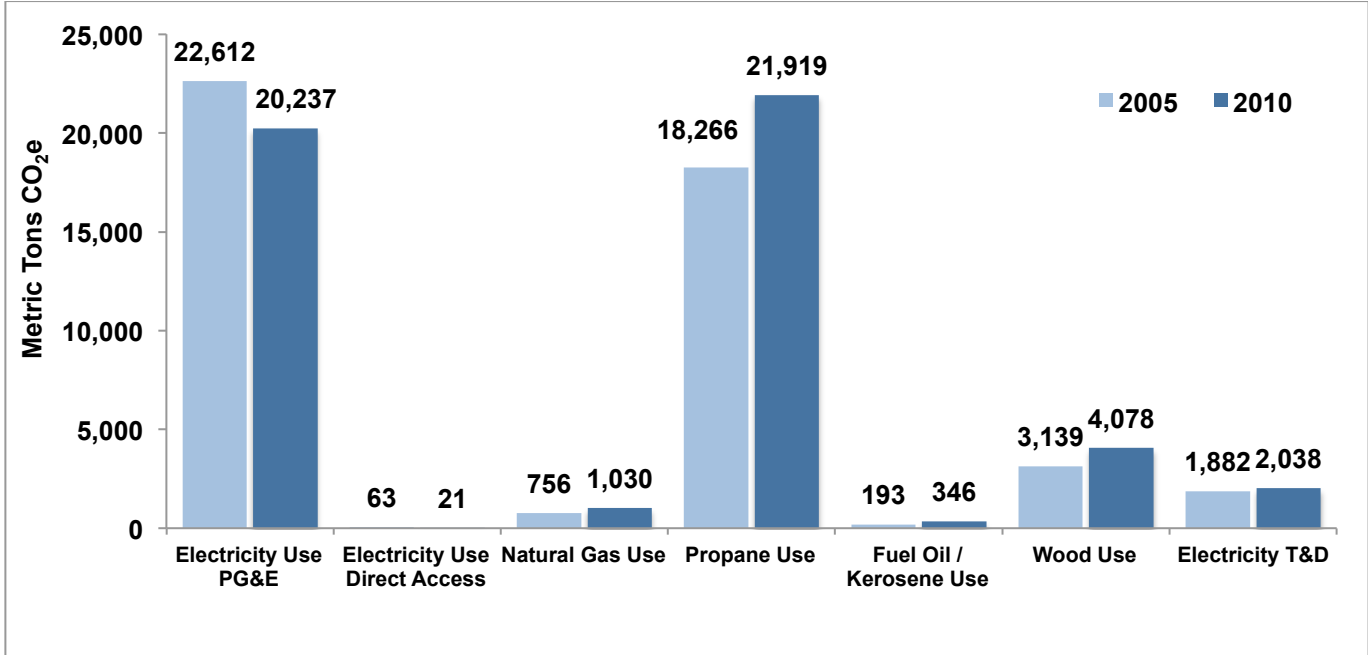
gas consumption data provided by PG&E and the California Energy Commission, and estimates of non-utility fuel use based on U.S. Census Bureau data and California average per household fuel use by fuel type. Natural gas, propane (LPG), fuel oil, kerosene and wood are commonly used in residences as a fuel for home heating, water heating, and cooking. Biogenic emissions from wood combustion are reported as an Information Item. Appendix B provides detailed residential energy use data, emissions factors and calculation methods. Table 4 and Figure 4 illustrate the breakdown of residential energy use GHG emissions.

Data on fuel used specifically for residential emergency generators and other equipment, such as lawnmowers, was not available. Emissions resulting from this fuel use are included in the off-road equipment emissions estimates in the Transportation Sector. GHG emissions associated with residential transportation, solid waste and wastewater are accounted for in the community transportation, community solid waste and community wastewater treatment emissions totals, respectively.

Table 4: 2005 Baseline and 2010 Residential Energy Use Emissions Summary

Residential Energy Use	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Electricity Use – PG&E	22,612	20,237	-11%
Electricity Use – Direct Access	63	21	-67%
Stationary Fuel Combustion – Natural Gas	756	1,030	36%
Stationary Fuel Combustion – Propane (LPG)	18,266	21,919	20%
Stationary Fuel Combustion – Fuel Oil / Kerosene	193	346	79%
Stationary Fuel Combustion – Wood	3,139	4,078	30%
Electricity Transmission and Distribution Losses	1,882	2,038	8%
Total Residential Energy Use	46,910	49,668	6%
Information Items			
Biogenic Emissions from Wood Combustion	32,170	41,800	30%

Figure 4: 2005 Baseline and 2010 Residential Energy Use Emissions Summary



Non-Residential Energy Use

Amador County’s non-residential energy use generated an estimated 49,227 metric tons CO₂e in 2010. This is a 19% decrease in GHG emissions from the 61,052 metric tons CO₂e reported for 2005.

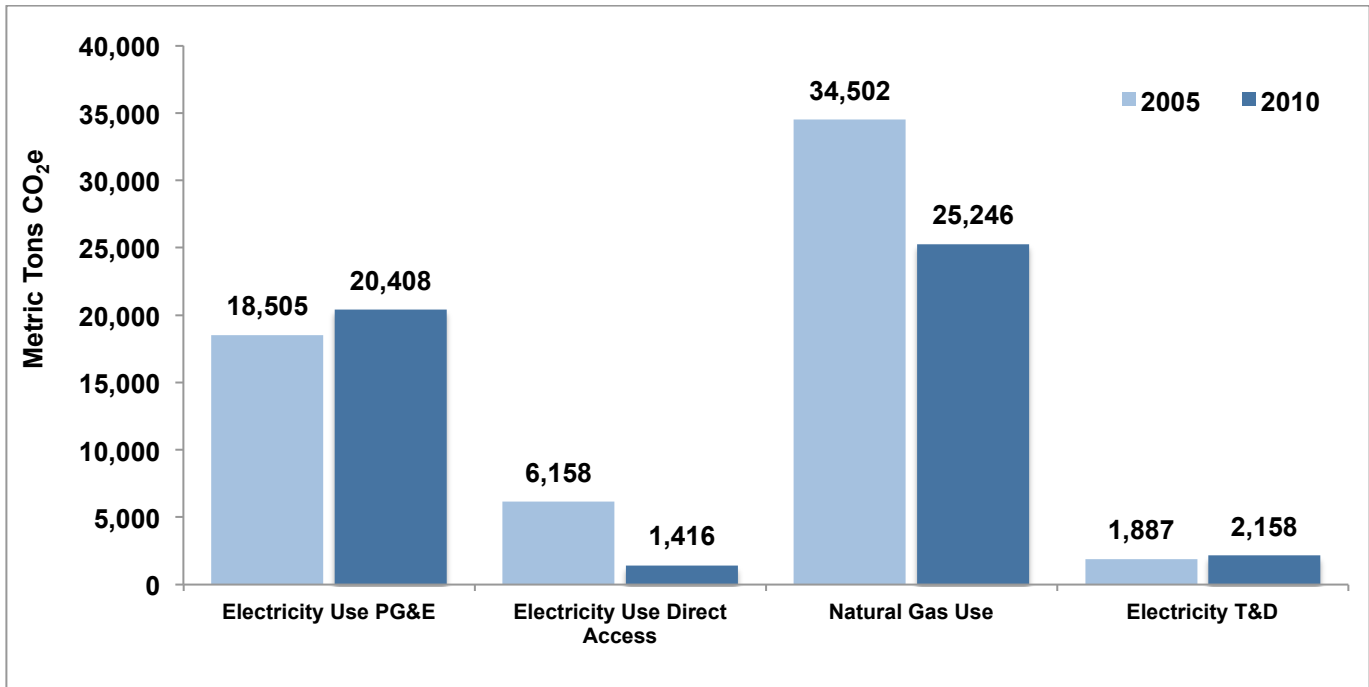
This is primarily the result of reductions in natural gas use and direct access electricity use by the non-residential community, and decreased PG&E electricity emissions factors for 2010 which offset increased electricity use. The emissions were calculated using electricity and natural gas consumption data provided by PG&E. The PG&E electricity data includes electricity used within the unincorporated County associated with potable water management and wastewater treatment. Under guidance from the USCP and to provide additional context on the water-energy connection, emissions from energy used for potable water service and treatment of wastewater produced by the community are reported separately, and are located in the potable water and wastewater treatment section of this report. Appendix C provides detailed non-residential energy use data, emissions factors and calculation methods. Table 5 and Figure 5 illustrate the breakdown of the non-residential energy use GHG emissions.

Data was not available for small-scale non-residential, non-utility fuel use (e.g. commercial propane) which could therefore not be included in this inventory. However, emissions associated with non-residential mobile equipment (e.g. generators, forklifts and grounds keeping equipment) are included in the off-road equipment emissions estimates in the community transportation sector. GHG emissions associated with non-residential transportation, solid waste and wastewater are accounted for in the community transportation, community solid waste and potable water and wastewater treatment emissions totals, respectively.

Table 5: 2005 Baseline and 2010 Non-Residential Energy Use Emissions Summary

Non-Residential Energy Use	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Electricity Use – PG&E	18,505	20,408	10%
Electricity Use – Direct Access	6,158	1,416	-77%
Stationary Fuel Combustion – Natural Gas	34,502	25,246	-27%
Electricity Transmission and Distribution Losses	1,887	2,158	14%
Total Non-Residential Energy Use	61,052	49,227	-19%

Figure 5: 2005 Baseline and 2010 Non-Residential Energy Use Emissions Summary



Community Transportation

Amador County’s community transportation generated an estimated 160,737 metric tons CO₂e in 2010. This is a 3% increase in GHG emissions from the 156,140 metric tons CO₂e reported for 2005.

The community transportation analysis includes emissions from passenger and freight vehicle use in the region as well as from off-road vehicles and equipment within the jurisdiction and local aviation fuel used at the Amador County airport. The annual VMT by the community were estimated from the Amador County Travel Demand Model and provided by AECOM. Off-road vehicles and equipment use within jurisdiction are estimated by California ARB’s OFFROAD 2007 model. Community transportation VMT increased between 2005 and 2010. Off-road vehicles and equipment fuel emissions also increased. Appendix D provides detailed community transportation data, emissions factors and

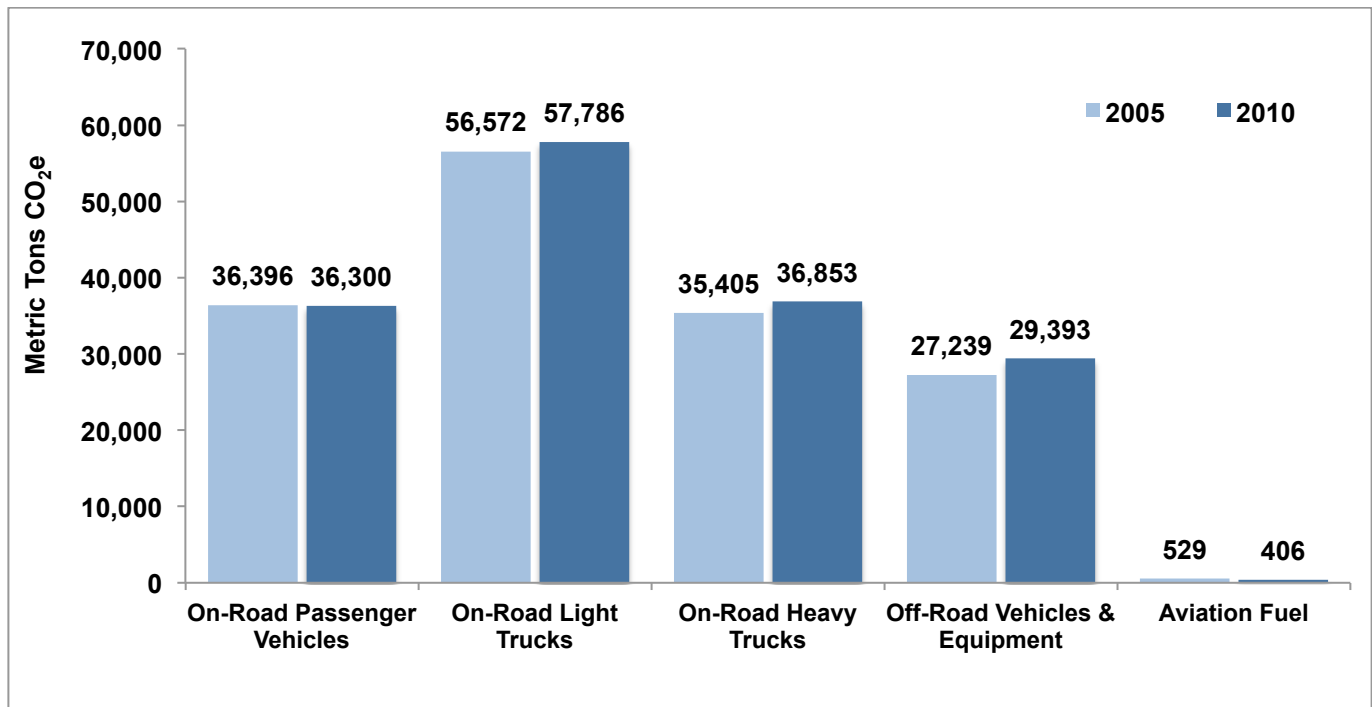
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calculation methods. Table 6 and Figure 6 illustrate the breakdown of community transportation GHG emissions. Emissions from passenger rail and air travel of County residents were not included in the transportation sector analysis.

Table 6: 2005 Baseline and 2010 Community Transportation Emissions Summary

Community Transportation	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
On-Road Passenger Vehicles	36,396	36,300	-0.3%
On-Road Light Duty Trucks and SUVs	56,572	57,786	2%
On-Road Heavy Duty Trucks	35,405	36,853	4%
Off-Road Vehicles and Equipment	27,239	29,393	8%
Aviation Fuel Use	529	406	-23%
Total Community Transportation	156,140	160,737	3%
Information Items			
On-Road Electric Vehicle Use	8	6	-27%

Figure 6: 2005 Baseline and 2010 Community Transportation Emissions Summary



Community Solid Waste

Amador County's community-generated solid waste resulted in an estimated 9,888 metric tons CO₂e emissions in 2010. This is a 69% decrease in GHG emissions from the 31,561 metric tons CO₂e reported for 2005. This is primarily the result of declining emissions from the closed Buena Vista landfill due to the completion of the landfill gas collection

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system to cover 100% of the landfill, and from a reported reduction in community-generated solid waste volumes. Many areas in California reported some reduction in waste volumes between 2005 and 2010 due to increased recycling efforts.

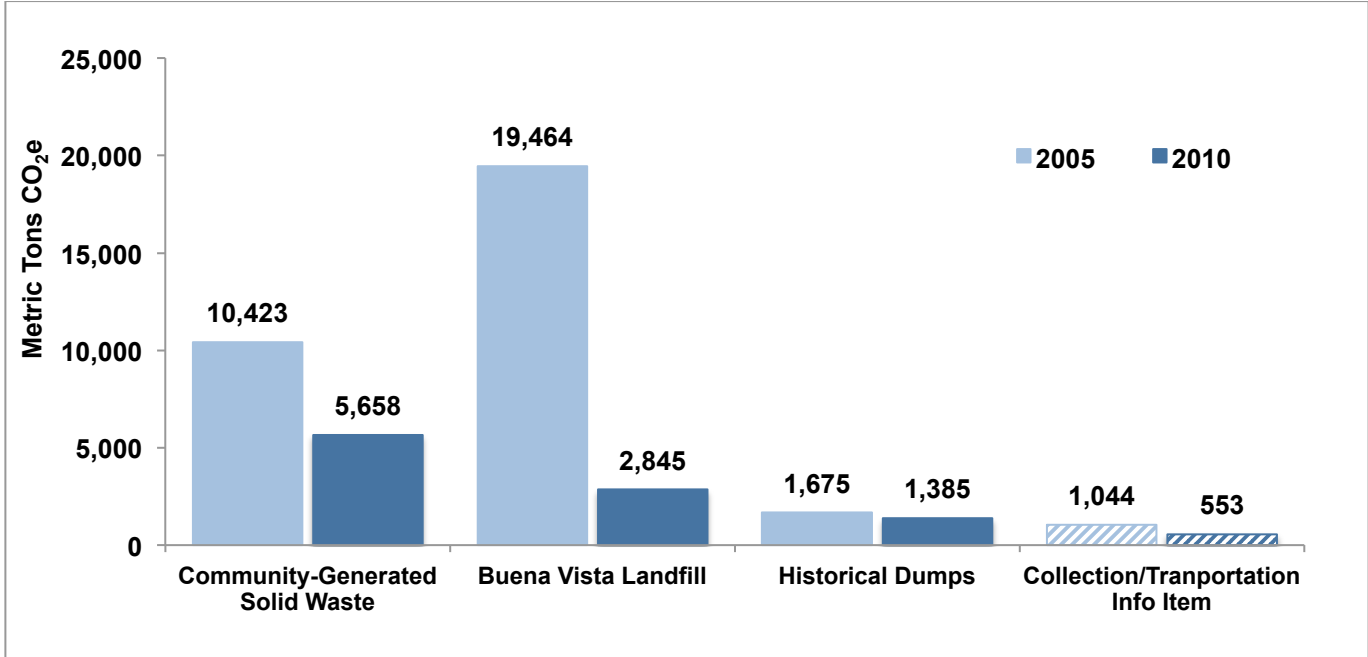
Solid waste emissions are an estimate of methane generation from the anaerobic decomposition of organic wastes (e.g. paper, food scraps, wood.) that are deposited in a landfill. This inventory reports the future emissions from solid waste generated by the community in 2005 and 2010 that will decompose over the next 100 years at regional landfills. Additional fugitive emissions are reported from the closed Buena Vista Landfill and historical dumps within the jurisdiction, methane that is emitted in the inventory years by waste deposited in the past, since the facilities opened, and not related to waste generated by the community in the inventory years. Additionally, emissions from the collection and transportation of solid waste are provided as an Information Item, to provide additional context. They are not included in the solid waste emissions totals because of the overlap with community transportation emissions. Table 7 and Figure 7 detail community solid waste emissions. Appendix E provides detailed community solid waste data, emissions factors and calculation methods.

It is important to acknowledge the benefits of recycling and composting programs that lower waste volumes and lower emissions. When waste volumes are reduced, collection and transportation emissions are likewise reduced, and when incoming organic waste is diverted, landfill emissions are also reduced. Finally, upstream emissions from materials manufacturing are reduced when recycled materials displace virgin materials.

Table 7: 2005 Baseline and 2010 Community Solid Waste Emissions Summary

Community Solid Waste	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Community-Generated Solid Waste	10,423	5,658	-46%
Buena Vista Landfill	19,464	2,845	-85%
Historical Dumps	1,675	1,385	-17%
Total Community Solid Waste	31,561	9,888	-69%
Information Items			
Collection and Transportation of Community Solid Waste	1,044	553	-47%

Figure 7: 2005 Baseline and 2010 Community Solid Waste Emissions Summary



Community Potable Water and Wastewater Treatment

This section includes energy use, process and fugitive emissions from potable water and wastewater treatment facilities serving Amador County’s residents and community members. The potable water sector includes the energy used for water extraction, conveyance, treatment and distribution to County residents and community members. Wastewater treatment includes the energy use associated with collection, treatment and disposal of community-generated wastewater as well as the process and fugitive emissions associated with wastewater treatment in private septic systems and centralized facilities.

Energy used by Amador County’s potable water and wastewater infrastructure within the unincorporated County boundary was subtracted from PG&E’s non-residential energy use to prevent double counting, and is reported here to provide context. Potable water generated an estimated 722 metric tons CO₂e in 2010. This is a 41% decrease in GHG emissions from the 1,220 metric tons CO₂e reported for 2005. This is primarily the result of decreased per-capita water consumption reported by the Amador Water Agency. This can reflect a variety of causes, for example conservation efforts or weather-related changes. Potable water emissions were calculated using Amador Water Agency energy use, energy intensity, water processed and population served by the facility and PG&E electricity emissions factors. Reported Amador Water Agency water use decreased from 178 to 114 gallons per person per day between 2005 and 2010. Table 8 and Figure 8 detail potable water and wastewater treatment emissions. Appendix F provides detailed potable water activity data, operating processes, emissions factors and calculation methods.

Amador County’s wastewater treatment generated an estimated 2,575 metric tons CO₂e in 2010. This is a 1% increase in GHG emissions from the 2,546 metric tons CO₂e reported for 2005. Wastewater process and fugitive emissions were

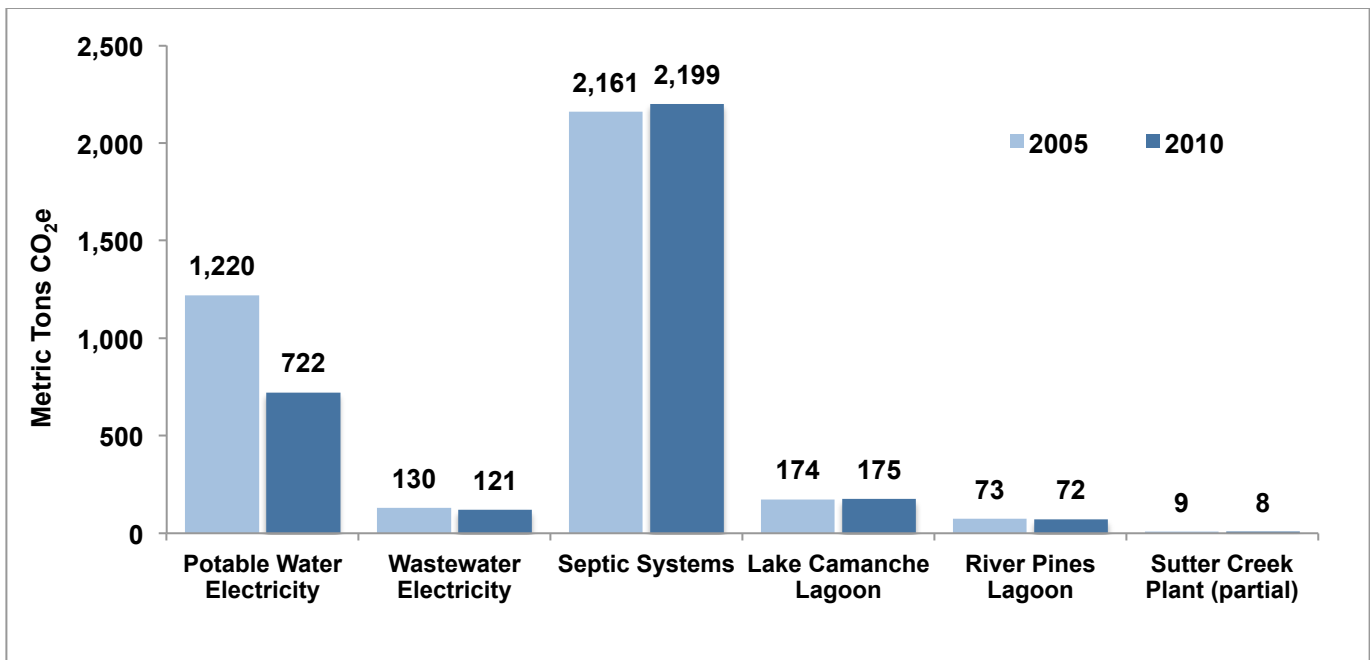
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calculated using site-specific operating process information, population-based data and standard emissions factors. Electricity use at each facility was collected from the facility operators. Appendix G provides detailed wastewater treatment activity data, site-specific operating processes, emissions factors and calculation methods.

Table 8: 2005 Baseline and 2010 Community Potable Water and Wastewater Treatment Emissions Summary

Community Potable Water and Wastewater Treatment	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Potable Water Electricity Use	1,127	656	-42%
Potable Water Electricity Transmission and Distribution Losses (T&D)	94	66	-30%
Total Community Potable Water Service	1,220	722	-41%
Wastewater Electricity Use	120	110	-8%
Wastewater Electricity T&D	10	11	12%
Septic CH ₄ Emissions	2,161	2,199	2%
Lake Camanche Lagoon (~90% CH ₄) and Effluent (N ₂ O) Emissions	174	175	0.4%
River Pines Lagoon (~90% CH ₄) and Effluent (N ₂ O) Emissions	73	72	-2%
Sutter Creek Plant, Effluent (N ₂ O) & Digester Gas (CH ₄ and N ₂ O) Emissions	9	8	-7%
Total Community Wastewater Treatment	2,546	2,575	1%
Total Potable Water and Wastewater Treatment	3,766	3,297	-12%

Figure 8: 2005 Baseline and 2010 Community Potable Water and Wastewater Treatment Emissions Summary



Amador County Community-Wide Emissions Efficiency Metrics

Community-wide efficiency metrics can be useful for measuring progress in reducing GHGs and for comparing one community’s emissions with neighboring cities, counties or regional and national averages.² That said, due to differences in emissions inventory methods, it can be difficult to get directly comparable metrics, and one must be very careful when comparing figures. All efforts were made to estimate a community-wide emissions total and per capita emissions metric that will be comparable to other community inventories using the Significant Influence framework of the USCP.

Table 9 presents baseline 2005 and 2010 community efficiency metrics calculated as part of this inventory. These metrics only include emissions directly tied to community-wide activities and sources: residential and non-residential energy use, on-road and off-road transportation, community-generated solid waste and landfill emissions, potable water and wastewater energy, process and fugitive emissions from wastewater treatment and the transmission and distribution losses associated with community-wide electricity use. Amador County’s GHG emissions per resident decreased 10% and GHG emissions per household decreased 14% from the 2005 baseline to 2010. This is primarily the result of reductions in the non-residential and solid waste sectors.

Table 9: 2005 Baseline and 2010 Community-Wide GHG Emissions Efficiency Metrics

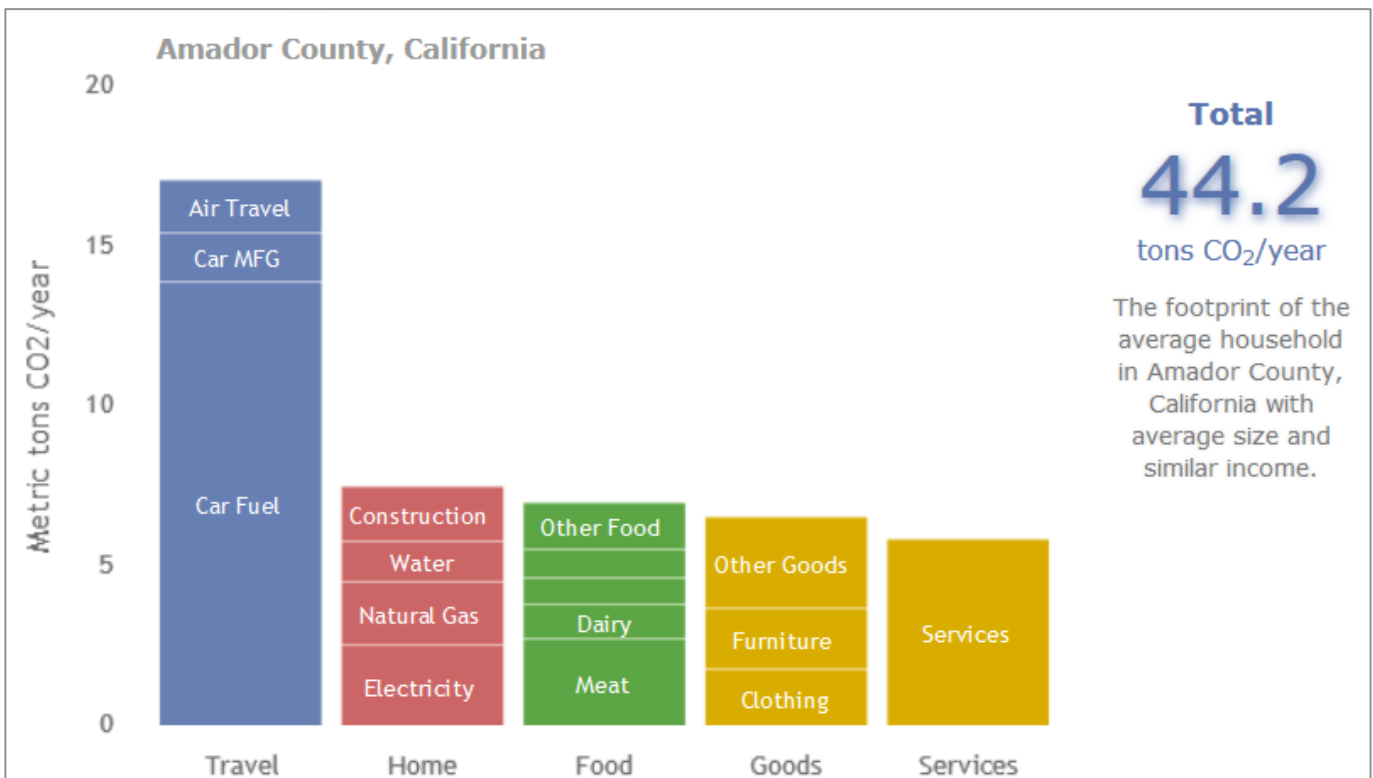
Community-Wide Emissions Efficiency Metrics			
Inventory Year	2005	2010	Change from Baseline
Estimated Population	21,488	21,816	1.5%
Estimated Households	8,861	9,390	6.0%
Community GHG Emissions (Metric Tons CO₂e)	299,430	272,817	-8.9%
GHG Emissions / Resident (Metric Tons CO₂e)	13.9	12.5	-10%
GHG Emissions / Household (Metric Tons CO₂e)	33.8	29.1	-14%

² Per capita CO₂e emissions were 24.3 metric tons per year for the United States and 13.0 metric tons per year for California. World Resources Institute: http://www.laedc.org/sclc/documents/Global_AB32Challenge.pdf.

Cool California Household Consumption GHG Estimates

It is important to understand that efficiency metrics are not the same as the carbon footprint of the average individual or household living in Amador County, which includes other activities not measured in this inventory, such as upstream emissions from the consumption of goods and services by community members. For comparison purposes, Figure 9 presents an estimated household consumption-based GHG emissions metric for Amador County for 2010 produced by Cool California and available at www.coolcalifornia.org. Additionally, Cool California allows residents and businesses to develop a simplified consumption-based GHG inventory to calculate their individual carbon footprint and learn ways to reduce their personal carbon footprint while saving money in the process.

Figure 9: 2010 Cool California Household Consumption-Based GHG Estimate³



³ Household consumption estimate developed using Cool California Calculator. Available at: www.coolcalifornia.org/calculator

Municipal-Operations Inventory Results

This section presents a detailed analysis of emissions resulting from Amador County's municipal operations. The municipal-operations emissions are a subset of community-wide emissions and should not be added to community emissions totals since they are already included in the community-wide data. The municipal-operations emissions included in this inventory were determined using the operational control framework. The operational control framework includes emissions sources and activities for which the County has the full authority to introduce and implement operating policies. The municipal-operations inventory also includes two additional emissions sectors for which the County has limited control: emissions from employee-generated solid waste and emissions from employees' personal commutes to work. Including these optional sources is recommended strongly by the LGOP even though the County does not have full operational control.

Emissions Summary

In 2010, Amador County's municipal operations generated 6,314 metric tons CO_{2e} reported in this inventory. This is a 73% decrease in GHG emissions from the 23,234 metric tons CO_{2e} reported for the 2005 baseline inventory. This is primarily the result of lower emissions every subsequent year from the Buena Vista Landfill and the completion of the landfill gas collection system to cover 100% of the landfill. Figure 10 summarizes the municipal-operations GHG emissions by Scope. Reductions from the installation of solar electricity by the County have not been directly quantified for this inventory but are reflected in reduced electricity emissions. As shown, the Buena Vista Landfill was the largest source of emissions within the municipal-operations inventory in 2010.

Figure 10: 2010 Municipal-Operations GHG Emissions Summary

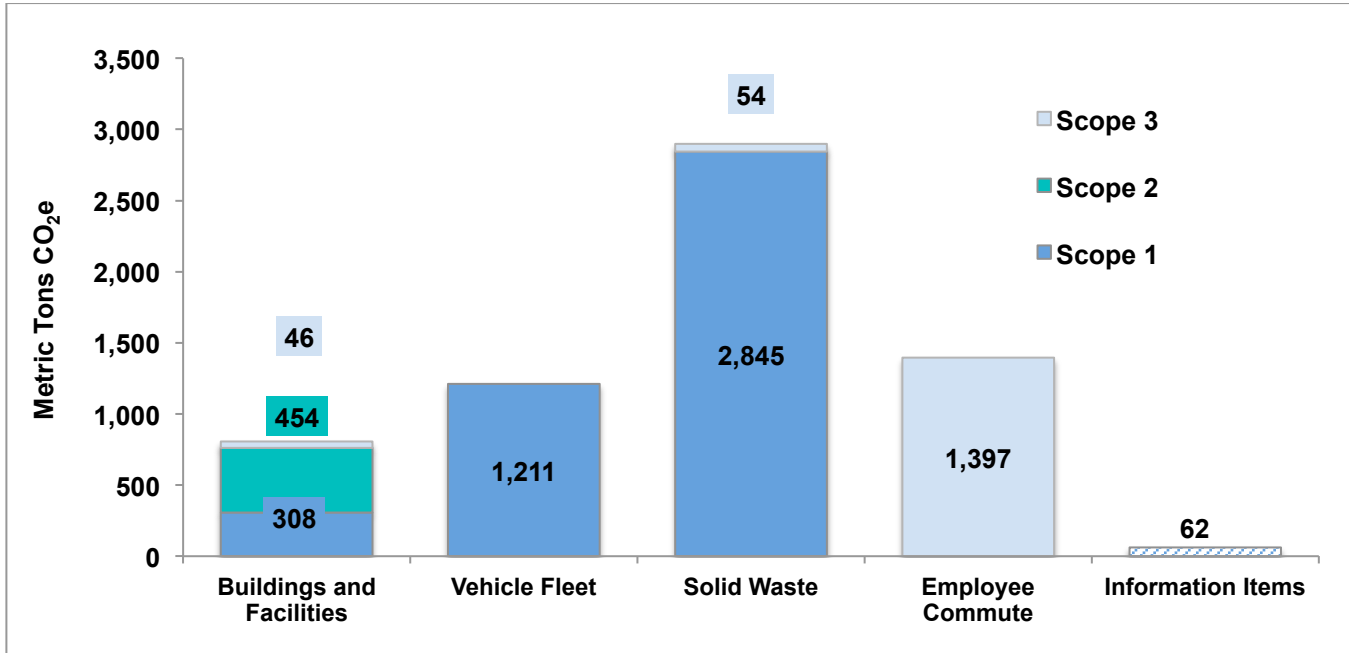


Table 10 presents the municipal-operations GHG emissions with more detail, including Information Items. Information Items are GHG emissions that are either reported separately from municipal-operations emissions totals to avoid overlap with other reported emissions or excluded from GHG inventories by LGOP guidance. The Information Items presented in Table 10 include:

- R-12 refrigerants (ozone depleting substances currently being phased out worldwide),
- PG&E owned and operated LS-1 lighting, and
- Community-generated solid waste collected by the County as service, but not generated by municipal operations.

Table 10: 2010 Municipal-Operations GHG Emissions Summary by Scope

Sector	2010 Metric Tons CO ₂ e	Reporting Scope
Buildings and Facilities		
Electricity Use	454	Scope 2
Stationary Fuel Combustion	308	Scope 1
Electricity Transmission and Distribution (T&D) Losses	46	Scope 3
Total Buildings and Facilities	808	
Vehicle Fleet		
Gasoline Fuel Combustion	893	Scope 1
Diesel Fuel Combustion	255	Scope 1
Leaked Refrigerants	63	Scope 1
Total Vehicle Fleet	1,211	
Government-Generated Solid Waste		
Solid Waste Emissions	54	Scope 3
Total Government-Generated Solid Waste	54	
Solid Waste Landfill		
Buena Vista Landfill Fugitive Methane	2,845	Scope 1
Total Solid Waste Management	2,845	
Employee Commute		
Employee Commute Emissions	1,397	Scope 3
Total Employee Commute	1,397	
Total Municipal-Operations Emissions	6,314	
Information Items		
PG&E owned and operated LS-1 Lighting Electricity Use and T&D Losses	0.6	
Community-Generated Solid Waste Collected by County from Parks	2	
Leaked Ozone Depleting R-12 Refrigerants	59	
Total Information Items Emissions	62	

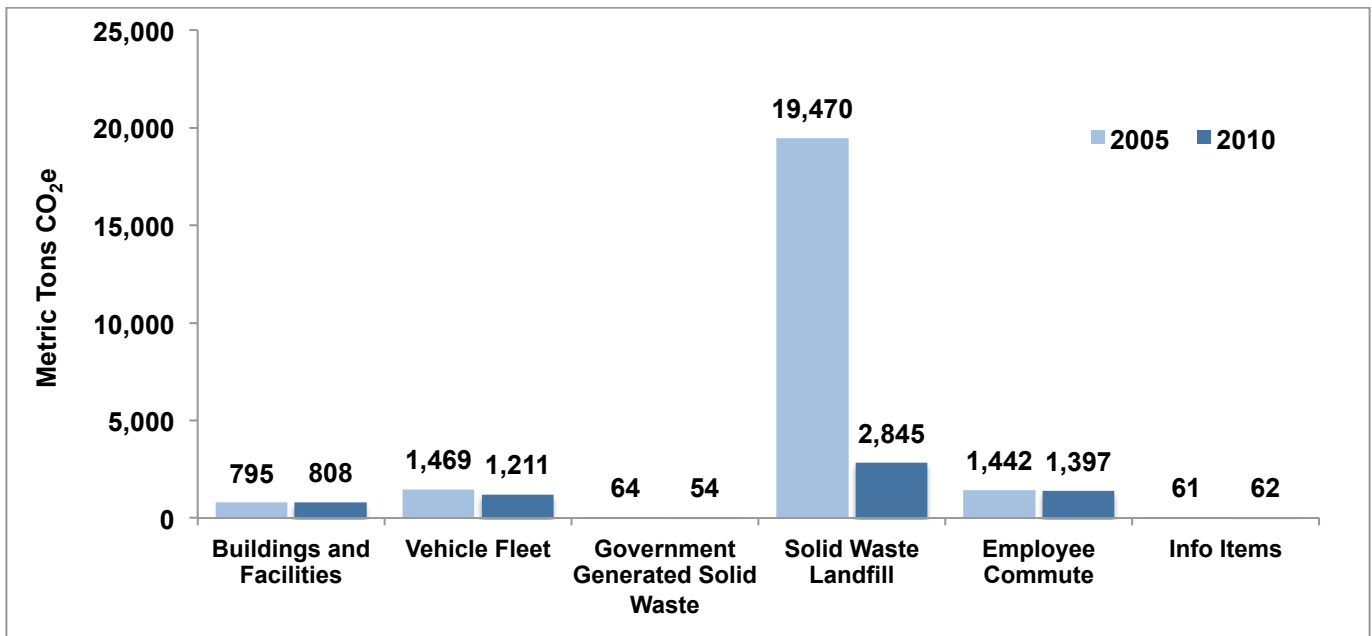
Comparison to Baseline Municipal-Operations Inventory

A 2005 baseline inventory was completed for Amador County in 2009 by the Amador Citizen’s for Energy Conservation. Since the inventory was completed, improved methodologies have become available. The improved methodologies are incorporated into the 2010 inventory and were used to update the original baseline results. Details on the updates to the baseline municipal-operations inventory are explained in the Improvements to Inventory Methodologies section and detailed in Appendix M. This section of the report compares 2010 GHG emissions to the 2005 baseline GHG emissions. In summary:

- Total municipal-operations GHG emissions decreased 73% from 2005 to 2010.
- Over this time, the County’s number of employees decreased from 415 to 402.
- The solid waste landfill sector GHG emissions decreased 85% from 2005 to 2010 due to decreasing emissions from the Buena Vista Landfill as the existing waste decomposed and no new waste was added and the completion of the landfill gas collection system to cover 100% of the landfill.

Figure 11 compares 2010 GHG emissions to the 2005 Baseline GHG emissions for the municipal-operations inventory.

Figure 11: 2005 Baseline and 2010 Municipal-Operations GHG Emissions Summary



Emissions Sources and Activities

Identifying the major emissions sources and activities can help target reduction strategies that will have the greatest impact. Buena Vista Landfill emissions decreased 85% between 2005 and 2010. A significant portion of the landfill was not covered with a landfill gas collection system in 2005 though the landfill gas collection system was completed by 2010 to cover 100% of the landfill. Gasoline combustion emissions are the next greatest source of emissions, from both the vehicle fleet and employee commuting. Emissions from electricity transmission & distribution losses increased 21%

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between 2005 and 2010. Natural gas fuel use emissions also increased 2%. Table 11 presents the 2010 municipal-operations emissions by source / activity and a comparison to 2005 baseline emissions.

Table 11: 2005 Baseline and 2010 Municipal-Operations GHG Emissions by Source / Activity

Source / Activity	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Electricity Use	454	454	0%
Electricity Transmission & Distribution Losses	38	46	21%
Natural Gas Combustion	266	270	2%
Propane Combustion	38	38	0%
Diesel Combustion	439	398	-9%
Gasoline Combustion	2,408	2,146	-11%
Leaked Refrigerants	63	63	0%
Government-Generated Solid Waste	64	54	-15%
Solid Waste Landfill	19,465	2,845	-85%
Municipal-Operations Total	23,234	6,314	-73%

Buildings and Facilities

The buildings and facilities sector includes electricity use and stationary fuel combustion at the County's buildings and other facilities including; airports, public lighting and solid waste facilities. Electricity use is the source of the majority of GHG emissions reported for Amador County's buildings and facilities. The County's buildings and facilities generated an estimated 808 metric tons CO₂e in 2010. This is a 2% increase in GHG emissions from the 795 metric tons CO₂e reported for 2005. Some of the buildings saw increased energy use, which was offset somewhat by decreased energy use in other buildings and reduced PG&E electricity emissions factors. Due to the difficulty in collecting data on refrigerants and the limited significance to the municipal-operations inventory total, these fugitive emissions from leaked refrigerants and fire suppressants were not estimated. Refer to Appendix H for detailed activity data, emissions factors and calculation methods used for the buildings and facilities sector. Table 12 lists the major County buildings and facilities and their associated emissions.

Table 12: 2005 Baseline and 2010 Buildings and Facilities Emissions Summary

Buildings and Facilities	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
County Detention - 700 Court St	187	161	-14%
GSA Office - 12200 Airport Rd B/C	138	106	-23%
County Admin - (500 Argonaut in 2005 and 810 Court St in 2010)	110	134	22%
DAs Office - 708 Court St	38	34	-11%
Jackson Library	51	47	-9%
Health and Human Services (1001 and 1003 Broadway in 2005, 10877 Conductor Blvd in 2010)	104	118	13%
Probation (NY Ranch Road)	13	14	11%
Animal Shelter	10	51	429%
Minor Facilities	27	12	-56%
Building Transmission and Distribution (T&D) Losses	34	41	19%
Airport	37	30	-18%
Airport Electricity T&D Losses	3	3	-1%
Public Lighting	0.3	7	2,185%
Lighting Electricity T&D Losses	0.03	0.7	2,651%
Buena Vista Landfill Electricity Use	5	11	129%
Buena Vista Landfill Electricity T&D Losses	0.4	1.1	177%
All Propane	38	38	0%
Buildings and Facilities Total	795	808	1%
Information Items			
Lighting LS-1 Electricity Use	0.62	0.56	-9%
Lighting LS-1 Electricity T&D Losses	0.05	0.06	11%

Additionally, it is helpful to identify the largest emissions sources and activities within each sector to help target reduction strategies. Table 13 presents the 2010 municipal buildings and facilities emissions by source / activity and a comparison to 2005 baseline emissions.

Table 13: 2005 Baseline and 2010 Buildings and Facilities Emissions by Source / Activity

Source / Activity	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Electricity Use	454	454	0%
Electricity T&D Losses	38	46	21%
Natural Gas Combustion	266	270	2%
Propane Combustion	38	38	0%
Buildings and Facilities Total	795	808	2%

Vehicle Fleet

The vehicles and equipment used in Amador County's daily operations burn gasoline and diesel fuel resulting in the emission of GHGs. In addition, vehicles with air conditioning use refrigerants that can leak from the vehicles during normal operation and maintenance. In 2010, Amador County operated a vehicle fleet with almost 200 vehicles including vehicles for sheriff, public works and a host of other departments. Amador County's 2010 vehicle fleet emissions are estimated to be 1,211 metric tons CO₂e. This is an 18% decrease in GHG emissions from the 1,469 metric tons CO₂e reported for 2005. This is mainly the result of reduced fuel use (primarily gasoline) by the majority of departments. Refer to Appendix I for detailed activity data, emissions factors and calculation methods used for the vehicle fleet sector. Table 14 presents Amador County's 2010 vehicle fleet emissions by major department groupings and a comparison to 2005 baseline emissions.

Table 14: 2005 Baseline and 2010 Vehicle Fleet Emissions Summary

Department	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Sheriff	596	421	-29%
Public Works	429	400	-7%
Health/Social Services	96	64	-33%
DA/Probation	86	87	1%
Other Minor Departments	197	175	-12%
Leaked R-134a Refrigerant	63	63	0%
Vehicle Fleet Total	1,469	1,211	-18%
Information Items			
Leaked R-12 Refrigerant	59	59	0%

It can be helpful to identify the largest emissions sources to help target reduction strategies. Table 15 presents the vehicle fleet emissions by emissions source.

Table 15: 2005 Baseline and 2010 Vehicle Fleet Emissions by Source / Activity

Source / Activity	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Gasoline Fuel Combustion	1,114	893	-20%
Diesel Fuel Combustion	291	255	-13%
Leaked Refrigerants	63	63	0%
Vehicle Fleet Total	1,469	1,211	-18%

Government-Generated Solid Waste

Government operations generate solid waste during normal operations, much of which is eventually landfilled. Typical sources of waste in municipal operations include paper and food waste from offices and facilities, construction waste from public works, and plant debris from parks departments. Organic materials in government-generated solid waste (including paper, food scraps, plant debris, wood waste, etc.) generate methane as they decompose in the anaerobic environment of a landfill. Emissions from the government-generated solid waste sector are an estimate of methane generation that will result from the anaerobic decomposition of the organic portion of waste sent to landfills in the inventory year. Only solid waste generated by the County’s municipal operations is included in this inventory. Community-generated waste collected from park trash cans serving the community is excluded from this sector and reported as an Information Item because the County provides this waste collection as a public service and has little control over the waste that is deposited. It is important to note that although these emissions are attributed to the inventory year in which the waste is generated, the emissions themselves will occur over the 100+ year timeframe during which the waste decomposes, and are therefore categorized as Scope 3 emissions.

Amador County’s 2010 government-generated solid waste sector is estimated to be 54 metric tons CO₂e. This is a 15% decrease in GHG emissions from the 64 metric tons CO₂e reported for 2005. This is primarily the result of reduced waste from sources other than the Detention Center, which saw an increase. Refer to Appendix J for detailed activity data, emissions factors and calculation methods used in the government-generated solid waste sector. Table 16 presents the County’s 2010 solid waste emissions by department and a comparison to 2005 baseline emissions.

Table 16: 2005 Baseline and 2010 Government Solid Waste Emissions Summary

Department	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Public Admin	26	15	-44%
Correctional Waste	38	40	5%
Government Generated Solid Waste Total	64	54	-15%
Information Items			
Community-Generated Solid Waste (Park Cans)	1.6	2.2	35%

Solid Waste Facilities

The most prominent source of greenhouse gas emissions from solid waste facilities is fugitive methane released by the decomposition of organic waste over time in landfills. Amador County’s Buena Vista landfill generated an estimated 2,845 metric tons CO₂e in 2010. This is an 85% decrease in GHG emissions from the 19,465 metric tons CO₂e reported for 2005. This is primarily the result of fewer emissions generated each year as the waste in the landfill decomposes and no new waste is deposited at the landfill. Additionally, the completion of the landfill gas collection system to cover

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100% of the landfill significantly reduced emissions that were estimated from the uncovered portion of the landfill in 2005. The emissions depend upon the size and type of the landfill and the presence or absence of a landfill gas collection system. Buena Vista had a landfill gas collection system covering part of its acreage in 2005 though the collection system was completed by 2010 to cover 100% of the landfill. Refer to Appendix K for detailed activity data, emissions factors and calculation methods used in the solid waste facility sector. Table 17 presents the solid waste facility fugitive emissions by source.

Table 17: 2005 Baseline and 2010 Solid Waste Management Emissions Summary

Source / Activity	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Buena Vista Landfill Fugitive Methane	19,465	2,845	-85%
Solid Waste Facility Total	19,465	2,845	-85%

Employee Commute

Although employees' personal commute is not under the direct operational control of the County, there are a variety of tools and resources available to influence employees' commute patterns. For this reason emissions are included in this inventory. County-employees' commutes generated an estimated 1,397 metric tons CO₂e in 2010. This is a 3% decrease in GHG emissions from the 1,442 metric tons CO₂e reported for 2005. The estimated per-employee emissions are the same for the two years as they are based off of the same 2010 survey. The survey was administered to 119 employees to collect the data needed to estimate emissions. The results were extrapolated to the number of employees in each inventory year, which decreased from 415 to 402 full-time-equivalent employees between 2005 and 2010.

Refer to Appendix L for detailed activity data, emissions factors and calculation methods used in the employee commute sector. Employee commute emissions are categorized as Scope 3 emissions because of the limited influence Amador County has over these emissions. Table 18 presents the 2010 emissions from the Employee Commute Sector and a comparison to 2005 baseline emissions.

Table 18: 2005 Baseline and 2010 Employee Commute Emissions Summary

Source	2005 Metric Tons CO ₂ e	2010 Metric Tons CO ₂ e	Change from Baseline
Employee Commute	1,442	1,397	-3%
Employee Commute Total	1,442	1,397	-3%

Conclusion & Next Steps

The data presented in this report is intended to provide valuable information that Amador County can use to inform future planning efforts, identify cost saving opportunities and identify climate action planning priorities. This analysis found that in 2010, the community as a whole was responsible for emitting 272,817 metric tons CO₂e, a decrease of 8.9% since the 2005 baseline. The municipal operations of Amador County contributed 6,314 metric tons CO₂e to that total, a decrease of 73% since the 2005 baseline. County staff should continue to update these inventories every five years as additional data becomes available. Additional key findings from this analysis include:

- In 2010, the largest source of community-wide GHG emissions originated from community transportation (160,737 metric tons CO₂e). Significant emissions also originated from the residential energy use (49,668 metric tons CO₂e) and non-residential energy use (49,227 metric tons CO₂e) as well. There are significant opportunities for reducing GHG emissions as well as energy and transportation costs in these sectors.
- The greatest reduction in community-wide GHG emissions between 2005 and 2010 was from reductions in fugitive methane emissions from the Buena Vista Landfill and reduced non-residential energy use emissions due to reduced natural gas use, direct access electricity use and decreased PG&E electricity emissions factors for 2010.
- In 2010, the largest source of municipal-operations GHG emissions originates from the Buena Vista landfill (2,845 metric tons CO₂e). Significant emissions also originate from the vehicle fleet (1,211 metric tons CO₂e) and from employee commuting (1,397 metric tons CO₂e). Opportunities to reduce GHG emissions may include electric vehicles for the vehicle fleet that are powered by low-carbon electricity, energy efficiency projects or the procurement of more non-carbon based electricity and incentives to reduce commute emissions.
- The largest change in municipal-operations GHG emissions between 2005 and 2010 was from the solid waste facilities sector. Those GHG emissions decreased 85% due to decreasing emissions from the Buena Vista Landfill as the existing waste decomposed, and no new waste was added, and the collection system was completed to cover 100% of the landfill.

As Amador County moves forward with emissions reduction strategies and uses this data to inform planning efforts, the County should identify the emissions reduction benefits of climate and sustainability strategies that could be implemented in the future including: energy conservation, renewable energy, vehicle fuel efficiency improvements, alternative transportation, vehicle trip reduction, land use and transit planning, waste reduction, landfill gas collection and other strategies. Through these efforts and others, Amador County can achieve benefits beyond reducing emissions, including saving money and improving the County's economic vitality and ultimately increasing the quality of life for residents.

Community-Wide Inventory Appendices

Appendix A – Community-Wide Inventory Details – ICLEI Scoping Tool

Table A-1 provides a summary of the emissions sources and activities that are included in the community-wide inventory, as well as those potential sources that are excluded. The following notation keys are used to report emissions: R – Required Emissions, NR – Not Required, SI – Significant Influence, CA – Community Activities, HC – Household Consumption, IE – Included Elsewhere, NA – Not Applicable, NO – Not Occurring, NE – Not Estimated.

Table A-1: Summary of Included and Excluded Community-Wide Emissions

Emissions Type		Source or Activity?	Required Activities	Explanatory Notes	2005 Emissions (Metric Tons CO ₂ e)	2010 Emissions (Metric Tons CO ₂ e)
Built Environment						
Use of fuel in residential and commercial stationary combustion equipment		Source AND Activity	R – SI		56,855	52,618
Industrial stationary combustion sources		Source	NR – IE	Included with commercial stationary combustion.	IE	IE
Electricity	Power generation in the community	Source	NR – NO		NA	NA
	Use of electricity by the community	Activity	R – SI	Transmission and Distribution losses are listed below, as is electricity used for potable water service and wastewater treatment.	47,338	42,081
District Heating/ Cooling	District heating/cooling facilities in the community	Source	NR – NO		NA	NA
	Use of district heating/cooling by the community	Activity	NR – NO		NA	NA
Industrial process emissions in the community		Source	NR – NO		NA	NA
Refrigerant leakage in the community		Source	NR – NE	Data not available	NE	NE

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Emissions Type		Source or Activity?	Required Activities	Explanatory Notes	2005 Emissions (Metric Tons CO ₂ e)	2010 Emissions (Metric Tons CO ₂ e)
Transportation and Other Mobile Sources						
On-road Passenger Vehicles	On-road passenger vehicles operating within the community boundary	Source	NR – NE		NE	NE
	On-road passenger vehicle travel associated with community land uses	Activity	R – SI	Includes on-road passenger, freight and transit vehicles.	128,373	130,938
On-road Freight Vehicles	On-road freight and service vehicles operating within the community boundary	Source	NR – NE		NE	NE
	On-road freight and service vehicle travel associated with community land uses	Activity	R – SI	Included in on-road passenger vehicle emissions above.	IE	IE
On-road transit vehicles operating within the community boundary		Source	NR – IE	Included in on-road passenger vehicle emissions above.	IE	IE
Transit Rail	Transit rail vehicles operating within the community boundary	Source	NR – NO		NA	NA
	Use of transit rail travel by the community	Activity	NR – NE		NE	NE
Inter-city passenger rail vehicles operating within the community boundary		Source	NR – NO		NA	NA
Freight rail vehicles operating within the community boundary		Source	NR – NO		NA	NA
Marine	Marine vessels operating within the community boundary	Source	NR – IE	Included with off-road mobile equipment emissions.	IE	IE
	Use of ferries by the community	Activity	NR – NE		NE	NE
Off-road surface vehicles and other mobile equipment operating within the community boundary		Source	NR – SI	Includes local aviation fuel.	27,767	29,799
Use of air travel by the community		Activity	NR – NE		NE	NE
Solid Waste						
Solid Waste	Operation of solid waste disposal facilities in the community	Source	NR – SI	Buena Vista Landfill and historical dumps.	21,139	4,320
	Generation and disposal of solid waste by the community	Activity	R – SI		10,423	5,658

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Emissions Type		Source or Activity?	Required Activities	Explanatory Notes	2005 Emissions (Metric Tons CO ₂ e)	2010 Emissions (Metric Tons CO ₂ e)
Water and Wastewater						
Potable Water - Energy Use	Operation of water delivery facilities in the community	Source	NR – IE	Included in potable water activity emissions.	NA	NA
	Use of energy associated with use of potable water by the community	Activity	R – SI		1,127	656
Use of energy associated with wastewater generated by the community		Activity	R – SI		120	110
Centralized Wastewater Systems - Process Emissions	Process emissions from operation of wastewater treatment facilities located in the community	Source	NR – SI		256	254
	Process emissions associated with generation of wastewater by the community	Activity	NR – IE	Included with source emissions.	IE	IE
Use of septic systems in the community		Source AND activity	NR – SI		2,161	2,199
Agriculture						
Domesticated animal production		Source	NR – NE		NE	NE
Manure decomposition and treatment		Source	NR – NE		NE	NE
Upstream Impacts of Community-Wide Activities						
Upstream impacts of fuels used in stationary applications by the community		Activity	NR – NE		NE	NE
Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community		Activity	NR – SI	Includes potable water and wastewater T&D losses	3,873	4,273
Upstream impacts of fuels used for transportation in trips associated with the community		Activity	NR – NE		NE	NE
Upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary		Activity	NR – NE		NE	NE
Upstream impacts of select materials (concrete, food, paper, carpets, etc.) used by the whole community		Activity	NR – NE		NE	NE
Independent Consumption-Based Accounting						
Household Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all households in the community)		Activity	NR – NE		NE	NE
Government Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all governments in the community)		Activity	NR – NE		NE	NE
Life cycle emissions of community businesses (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all businesses in the community)		Activity	NR – NE		NE	NE

Appendix B – Residential Energy Use Sector Notes

Table B-1: Residential Activity Data

Activity / Source	2005	2010	Units	Data Source
PG&E Electricity	101,077,368	99,694,753	kWh	Pacific Gas and Electric
PG&E Natural Gas	142,118	193,630	Therms	Pacific Gas and Electric
Electricity Consumption - Direct Access	191,278	75,033	kWh	California Energy Commission
Electricity Transmission & Distribution Losses	5,704,899	7,325,304	kWh	U.S. Environmental Protection Agency
Propane (LPG) Consumption	3,122,915	3,747,436	Gallons	Energy Information Administration (EIA) and U.S. Census Bureau
Fuel Oil / Kerosene Consumption	18,914	33,868	Gallons	
Wood Consumption	342,969	445,629	MMBtu	

Table B-2: Residential GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
2005 Electricity – PG&E	BE.2.1	489.16 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 Pacific Gas and Electric (CO ₂) 2005 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2010 Electricity – PG&E	BE.2.1	445 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 Pacific Gas and Electric (CO ₂) 2010 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
Natural Gas – PG&E	BE.1.1	53.02 kg/MMBtu	0.005 kg/MMBtu	0.0001 kg/MMBtu	USCP Appendix C - Table B.1 Natural Gas Pipeline (US Weighted Average) and Table B.3 Natural Gas Residential
2005 Electricity – Direct Access	BE.2.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity – Direct Access	BE.2.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2005 Electricity – T&D Losses	BE.4.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity – T&D Losses	BE.4.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
LPG	BE.1.2	5.79 kg/Gallon	0.001 kg/Gallon	0.0001 kg/Gallon	USCP Appendix C - Table B.1 LPG and Table B.4 Residential LPG
Fuel Oil / Kerosene	BE.1.2	10.15 kg/Gallon	0.0015 kg/Gallon	0.0001 kg/Gallon	USCP Appendix C - Table B.1 Kerosene and Table B.4 Residential Kerosene
Wood	BE.1.2	93.80 kg/MMBtu	0.316 kg/MMBtu	0.0042 kg/MMBtu	USCP Appendix C - Table B.2 Wood and Wood Residuals and Table B.3 Biomass Fuels Solid Residential

Methods:

Utility-Derived Data

Utility-provided activity data is shown in Table B-1. Electricity and natural gas consumption data was collected from Pacific Gas and Electric Company (PG&E) for facilities within Amador County. The data provided by PG&E was categorized as residential, commercial or industrial use where possible. The residential electricity and natural gas data was entered into ClearPath where the GHG emissions were calculated using PG&E’s reported grid emissions factors for electricity. Default combustion emissions factors were used for natural gas consumption. The calculation methods and emissions factors are shown in Table B-2.

Table B-3: 2005 Residential Non-Utility Home Heating Fuel Use Calculations

Fuel Type	LPG	Fuel Oil / Kerosene	Wood	Data Source
California Fuel Use	7,365	460	1,294	Energy Information Administration (EIA) State Energy Data System (SEDS) 2005 California Residential Energy Use Estimates
Units	Thousand Barrels	Thousand Barrels	Thousand Cords	
# of California Households	415,918	48,008	217,623	U.S. Census Bureau, 2005 American Community Survey (ACS) 1-year estimates Table B25040. California Households using Non-Utility Fuels for Home Heating
Per Household Fuel Use	743.7	402.4	118.9	
Units	Gallons	Gallons	MMBtu	
Community Households	4,199	47	2,884	U.S. Census Bureau, 2005 American Community Survey (ACS) 5-year estimates. Table DP04. Community Households using Non-Utility Fuels for Home Heating
Estimated Fuel Use	3,122,915	18,914	342,969	
Units	Gallons	Gallons	MMBtu	

Table B-4: 2010 Residential Non-Utility Home Heating Fuel Use Calculations

Fuel Type	LPG	Fuel Oil / Kerosene	Wood	Data Source
California Fuel Use	8,273	305	1,628	Energy Information Administration (EIA) State Energy Data System (SEDS) 2010 California Residential Energy Use Estimates
Units	Thousand Barrels	Thousand Barrels	Thousand Cords	
# of California Households	393,137	35,932	218,319	U.S. Census Bureau, 2010 American Community Survey (ACS) 1-year estimates Table B25040. California Households using Non-Utility Fuels for Home Heating
Per Household Fuel Use	883.8	356.5	149.1	
Units	Gallons	Gallons	MMBtu	
Community Households	4,240	95	2,988	U.S. Census Bureau, 2010 American Community Survey (ACS) 5-year estimates. Table DP04. Community Households using Non-Utility Fuels for Home Heating
Estimated Fuel Use	3,747,436	33,868	445,629	
Units	Gallons	Gallons	MMBtu	

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Non-Utility Derived Data

Non-utility activity data is shown in Table B-1. Propane (LPG), fuel oil / kerosene and wood used for home heating were estimated using Energy Information Administration (EIA) and U.S. Census Bureau American Community Survey (ACS) data. The EIA State Energy Data System California residential energy use estimates and the U.S. Census Bureau ACS 1-year estimates of California households using non-utility fuels for home heating was used to calculate California per household fuel use. This per household fuel use factor was applied to U.S. Census Bureau ACS 5-year estimates of Amador County’s number of households using non-utility fuels for home heating. Incorporated data was subtracted from County totals to give unincorporated County information. Table B-3 and Table B-4 above shows the data used in these calculations for 2005 and 2010. Activity data was then entered into ClearPath using the calculation methods and emissions factors shown in Table B-2.

Table B-5: 2005 Direct Access Electricity Usage

Direct Access Calculator						
County	Sector	Year	Utility Million kWh	Direct Access Million kWh	DA % of Utility kWh	Total
Amador County	Residential	2005	139.18	0.26	0.19%	139.44
Amador County	Non-Residential	2005	143.80	30.36	21.11%	174.16
Total (Million kWh)			282.98	30.62		313.60
Direct Access Estimate by Local Government						
Sector	PG&E Total kWh		% DA Usage		DA kWh	
Residential	101,077,368		0.19%		191,278	
Non-residential	88,413,868		21.11%		18,667,418	

Table B-6: 2010 Direct Access Electricity Usage

Direct Access Calculator						
County	Sector	Year	Utility Million kWh	Direct Access Million kWh	DA % of Utility kWh	Total
Amador County	Residential	2010	139.58	0.11	0.08%	139.68
Amador County	Non-Residential	2010	165.52	8.08	4.88%	173.60
Total (Million kWh)			305.10	8.18		313.28
Direct Access Estimate by Local Government						
Sector	PG&E Total kWh		% DA Usage		DA kWh	
Residential	99,694,753		0.08%		75,033	
Non-residential	104,282,173		4.88%		5,088,544	

Direct Access Electricity Data

Direct access activity data is shown in Table B-1. Direct access electricity is supplied by an energy service provider other than a utility, but uses a utility's transmission lines to distribute the energy. Direct access electricity data was provided by PG&E or, when confidentiality laws would not allow data release, was estimated from county-level direct access

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electricity data provided by the California Energy Commission (CEC). The direct access calculator provided by ICLEI, Table B-5 and B-6, was used to estimate direct access electricity usage within Amador County for 2005 and 2010. The total direct access electricity consumption for the County was used to determine the ratio of direct-access electricity use to utility-provided electricity use for residential and non-residential Sectors. This ratio was applied to the utility-provided electricity use within Amador County to estimate the direct-access electricity consumed. The calculated direct access totals for the County were entered into ClearPath where the GHG emissions were calculated using the U.S. Environmental Protection Agency’s (EPA) Emissions & Generation Resource Integrated Database (eGRID) WECC California sub region grid average emissions factors. Direct access natural gas use is included in the PG&E totals.

Table B-7: Electricity Transmission and Distribution Gross Grid Loss Factor

Activity / Source	2005	2010	Units	Data Source
Electricity Transmission and Distribution Gross Grid Loss Factor	5.33	6.84	%	EPA eGRID Western

Electricity Transmission and Distribution Losses Data

Electricity transmission and distribution (T&D) losses activity data is shown in Table B-1. T&D Losses were calculated for the combined residential electricity total, PG&E and direct access electricity combined, using the EPA eGRID Western region grid gross loss (ggl) factor following EPA guidance shown in Table B-7. EPA recommends multiplying electricity consumption by $ggl/(1-ggl)$. The calculated T&D losses were entered into ClearPath where the GHG emissions were calculated using the EPA eGRID WECC California sub region grid average emissions factors.

Appendix C – Non-Residential Energy Use Sector Notes

Table C-1: Non-Residential Activity Data

Activity / Source	2005	2010	Units	Data Source
Electricity Consumption - PG&E	82,865,220	100,539,131	kWh	Pacific Gas and Electric
Natural Gas Consumption - PG&E	6,488,371	4,747,664	Therms	Pacific Gas and Electric
Electricity Consumption - Direct Access	18,667,418	5,088,544	kWh	California Energy Commission
Electricity Transmission & Distribution Losses	5,719,771	7,755,402	kWh	U.S. Environmental Protection Agency

Table C-2: Non-Residential GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
2005 Electricity – PG&E	BE.2.1	489.16 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 Pacific Gas and Electric (CO ₂) & 2005 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2010 Electricity – PG&E	BE.2.1	445 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 Pacific Gas and Electric (CO ₂) & 2010 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
Natural Gas – PG&E	BE.1.1	53.02 kg/MMBtu	0.005 kg/MMBtu	0.0001 kg/MMBtu	USCP Appendix C - Table B.1 Natural Gas Pipeline (US Weighted Average) and Table B.3 Natural Gas Residential
2005 Electricity – Direct Access	BE.2.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity – Direct Access	BE.2.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2005 Electricity –T&D Losses	BE.4.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity –T&D Losses	BE.4.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)

Methods:

Utility-Derived Data

Utility-provided activity data is shown in Table C-1. Electricity and natural gas consumption data was collected from Pacific Gas and Electric Company (PG&E) for all facilities within Amador County. The data provided by PG&E was categorized as residential, commercial or industrial use where possible. Activity data, shown in Table C-1, was entered into ClearPath where the GHG emissions were calculated using PG&E’s reported grid emissions factors for electricity and default combustion emissions factors for natural gas. The calculation methods and emissions factors are shown in Table C-2.

It should be noted that as a result of PG&E’s 15/15 Confidentiality Rule, electricity and natural gas consumption associated with industrial land uses within Amador County has been aggregated into the non-residential energy totals. According to PG&E’s 15/15 Rule, any aggregated information provided by the utilities must be made up of at least 15 customers and a single customer’s load must be less than 15 percent of an assigned category. If the number of

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customers in the compiled data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released for customer confidentiality purposes.

Table C-3: 2005 Direct Access Electricity Usage

Direct Access Calculator						
County	Sector	Year	Utility Million kWh	Direct Access Million kWh	DA % of Utility kWh	Total
Amador County	Residential	2005	139.18	0.26	0.19%	139.44
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Total (Million kWh)			282.98	30.62		313.60
Direct Access Estimate by Local Government						
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Residential	101,077,368		0.19%		191,278	
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Table C-4: 2010 Direct Access Electricity Usage

Direct Access Calculator						
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Direct Access Electricity Data

Direct access activity data is shown in Table C-1. Direct access electricity is supplied by an energy service provider other than a utility that uses a utility's transmission lines to distribute the energy. Direct access electricity was provided by PG&E or, when confidentiality laws would not allow data release, was estimated from county-level direct access electricity data provided by the California Energy Commission (CEC). The direct access calculator provided by ICLEI, Table C-3 and C-4, was used to estimate direct access electricity usage within unincorporated Amador County. The total direct access electricity consumption for the County was used to determine the ratio of direct-access electricity use to utility-provided electricity use for residential and non-residential Sectors. This ratio was applied to utility-provided electricity use within Amador County to determine an estimate of the direct-access electricity consumed within the unincorporated County. The calculated direct access totals for Amador County were entered into ClearPath where the GHG emissions were calculated using the EPA eGRID WECC California grid average emissions factors. Direct access natural gas use is included in the PG&E totals.

Table C-5: Electricity Transmission and Distribution Gross Grid Loss Factor

Activity / Source	2005	2010	Units	Data Source
Electricity Transmission and Distribution Gross Grid Loss Factor	5.33	6.84	%	EPA eGRID Western

Electricity Transmission and Distribution Losses Data

Electricity transmission and distribution (T&D) losses activity data is shown in Table C-1. T&D Losses were calculated for the combined residential electricity total, PG&E and direct access electricity combined, using the EPA eGRID Western region grid gross loss (ggl) factor following EPA guidance shown in Table C-5. EPA recommends multiplying electricity consumption by $ggl/(1-ggl)$. The calculated T&D losses were entered into ClearPath where the GHG emissions were calculated using the EPA eGRID WECC California sub region grid average emissions factors.

Appendix D – Community Transportation Sector Notes

Table D-1: Community Transportation Activity Data

Activity / Source	Type	2006		Units	Data Source
On-Road Vehicles Amador County Share	Internal – Internal Trips (I-I)	439,463		Miles / Day	AECOM
	Internal – External Trips (I-X)	70,009		Miles / Day	
	External – Internal Trips (X-I)	234,255		Miles / Day	
	Total	743,726		Miles / Day	
Activity / Source	2005	2006	2010	Units	Data Source
Population	21,488	21,751	21,816	people	DOF E-8
Vehicle Miles Traveled	268,177,659	271,459,990	272,271,212	Miles / Year	
Activity / Source	Type	2005	2010	Units	Data Source
County Vehicle Breakdown	Passenger Car - Gasoline	42.1	41.5	Percent	California ARB EMFAC2014 Amador County Emissions Inventory
	Passenger Car - Diesel	0.2	0.2	Percent	
	Light Truck - Gasoline	44.2	44.1	Percent	
	Light Truck - Diesel	0.06	0.03	Percent	
	Heavy Truck - Gasoline	5.0	4.6	Percent	
	Heavy Truck - Diesel	8.39	9.5	Percent	
	Cars / Motorcycles -Electric	0.03	0.02	Percent	
	Light Trucks - Electric	0.003	0.01	Percent	
Off-road Equipment	CO ₂	25,855	27,986	Metric Tons	California ARB OFFROAD2007
	N ₂ O	2.68	3.073	Metric Tons	
	CH ₄	23.34	19.654	Metric Tons	

Table D-2: Community Transportation GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
		2005 (grams / mile)			2010 (grams / mile)			
Passenger Car - Gasoline	TR.1.B	311.80	0.061198	0.025415	312.96	0.043913	0.018414	California ARB EMFAC2014 County Emissions Inventory
Passenger Car - Diesel	TR.1.B	305.00	0.009064	0.010033	302.34	0.005249	0.009946	
Light Truck - Gasoline	TR.1.B	460.63	0.082060	0.047560	468.52	0.060703	0.037519	
Light Truck - Diesel	TR.1.B	503.43	0.010189	0.016561	511.37	0.007714	0.016822	
Heavy Truck - Gasoline	TR.1.B	997.09	0.335443	0.133440	997.46	0.246226	0.117492	
Heavy Truck - Diesel	TR.1.B	935.82	0.025506	0.030786	908.72	0.024839	0.029894	

Methods:

On-Road Vehicles

Since actual fuel consumption data is not available at the county level, on-road transportation emissions for Amador County are calculated using vehicle-miles traveled (VMT) estimates coupled with county-level vehicle type and fuel percentages. On-road transportation activity data is shown in Table D-1. Activity data was entered into ClearPath where county-level fuel and vehicle-type specific emissions factors, shown in Table D-2, were applied to calculate the GHG emissions associated with community on-road transportation. The methodology for collecting and conditioning this data is as follows:

Vehicle Miles Traveled Estimates

Data on VMT for 2006 was taken from AECOM calculations using a regional Origin-Destination Transportation Model. Trips and the subsequent VMT were broken into three categories: Internal-Internal (I-I) (trips beginning and ending within the community), Internal-External (I-X) (trips beginning within the community and ending somewhere within the region) and External-Internal (X-I) (trips beginning somewhere else within the region and ending within the community). Trips and VMT were appropriated to Amador County using 100% of I-I miles and 50% of I-X and X-I miles to provide an estimate of annual-average daily VMT. A ratio of 2005 and 2010 to 2006 population for the County was used to extrapolate the inventory year daily VMT. This was multiplied by 365 to calculate the annual VMT.

Fuel / Vehicle Type Breakdown and Emissions Calculations

Since VMT by fuel and vehicle type was unavailable, local fuel and vehicle type percentages were extracted from the California ARB's Mobile Source Emissions Inventory On-Road Motor Vehicles Emissions Factor (EMFAC2014) model, which provides this information by county. The EMFAC2014 model was run for year 2005 and 2010 for Amador County; daily VMT from this model was summed by fuel and vehicle classification (Passenger Car, Light-Duty Truck and Heavy-Duty Truck) to calculate local vehicle percentages by fuel and vehicle type. These percentages were applied to the jurisdiction-specific annual VMT figures, resulting in final VMT figures by fuel and vehicle type. EMFAC2014 reports CO₂, CH₄ and N₂O emissions factors for 51 different vehicle type and fuel combinations for every county in California, informed by California Department of Motor Vehicles registrations, the Smog Check program and many other data sources. Average CO₂ emissions factors were calculated for gasoline and diesel passenger vehicles, light trucks and heavy trucks. The local vehicle and fuel specific average CH₄ and N₂O emissions factors were calculated from EMFAC2014. The CH₄ emissions for all vehicles were calculated from County EMFAC2014 reported methane total exhaust (CH₄_Totex). N₂O emissions for gasoline-fueled vehicles were calculated from County EMFAC2014 reported nitrogen oxides total exhaust (NO_x_Totex) multiplied by 0.0416, the average fraction of NO_x emissions that are, or react into, N₂O, based on guidance from ARB. N₂O emissions for diesel fueled vehicles were calculated from County EMFAC2014 reported Fuel Use multiplied by 0.3316 grams per gallon, based on guidance from ARB.

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Off-Road Emissions

Off-road emissions were estimated with standard procedures using California ARB’s OFFROAD2007 modeling program. OFFROAD2007 produces emissions for various off-road, fuel-consuming machines at the county level. In order to produce disaggregated emissions data, only machines types that are operated within the county limits of Amador County are considered. Table D-3 summarized the equipment categories and details the percent of emissions applied to the unincorporated County. Entertainment equipment, industrial equipment, lawn & garden equipment, light commercial equipment and transport refrigeration units used the ratio of the population in the unincorporated county to the total county (57.78% in 2005 and 57.39% in 2010) to allocate emissions. Agricultural equipment, construction & mining equipment, pleasure craft and recreational equipment were allocated 100% to the unincorporated county. Railyard operations were attributed based on a GIS analysis completed by AECOM. The data produced by OFFROAD2007 is daily usage – the final data was multiplied by 365 in order to produce annual emissions and converted to metric tons. The final data was entered into ClearPath as annual emissions of CO₂, CH₄, and N₂O, in metric tons. Table D-3 shows the proportions applied to each off-road machine category.

Table D-3: Community Off-Road Proportions by Category

Off Road Machine Type Category	Proportion Applied to OFFROAD 2007 County-Wide Output	
	2005	2010
Agricultural Equipment	100%	
Construction & Mining Equipment	100%	
Entertainment Equipment	57.78%	57.39%
Industrial Equipment	57.78%	57.39%
Lawn & Gardening Equipment	57.78%	57.39%
Light Commercial Equipment	57.78%	57.39%
Pleasure Craft	100%	
Railyard Operations	91.54%	
Recreational Equipment	100%	
Transport Refrigeration Units	57.78%	57.39%

Appendix E – Community Solid Waste Sector Notes

Table E-1: Community Solid Waste Activity Data

Landfill	2005 Tons Waste Deposited	2010 Tons Waste Deposited	Landfill Gas Capture?	Distance to Facility (Miles)	Transport Fuel	Data Source
Keifer Landfill	43,407	22,970	Yes	29	Diesel	CalRecycle Disposal Reporting System. EPA GHG MRR database. Google maps.
Landfill	2005 Methane Emitted (Metric Tons)		2010 Methane Emitted (Metric Tons)		Data Source	
Buena Vista	778.6		113.8		County Staff, IPCC & U.S. EPA	
Historic Dumps	66.99		55.40		County Staff, IPCC, NOAA & U.S. EPA	

Table E-2: Community Solid Waste GHG Calculation Methods and Emissions Factors

Activity / Source	Method	Type	Percent by Weight	Emissions Factor (metric tons CH ₄ / wet short ton waste)	Emissions Factor Source
2005 Community Solid Waste Characterization	SW.4	Newspaper	3.2	0.043	CalRecycle <i>California 2004 Statewide Waste Characterization Study,</i>
		Office Paper	5.5	0.203	
		Corrugated Cardboard	5.7	0.120	
		Magazines/Third Class Mail	6.7	0.049	
		Food Scraps	14.6	0.078	<i>USCP Appendix E (Page 34) & U.S. EPA Waste Reduction Model (WARM)</i>
		Grass	2.1	0.038	
		Leaves	2.1	0.013	
		Branches	2.6	0.062	
		Dimensional Lumber	9.6	0.062	
		All other (Non-Organic)	47.9	0	
2010 Community Solid Waste Characterization	SW.4	Newspaper	1.4	0.043	CalRecycle <i>California 2008 Statewide Waste Characterization Study,</i>
		Office Paper	4.9	0.203	
		Corrugated Cardboard	5.2	0.120	
		Magazines/Third Class Mail	5.9	0.049	
		Food Scraps	15.5	0.078	<i>USCP Appendix E (Page 34) & U.S. EPA Waste Reduction Model (WARM)</i>
		Grass	1.9	0.038	
		Leaves	1.9	0.013	
		Branches	3.3	0.062	
		Dimensional Lumber	14.5	0.062	
		All other (Non-Organic)	45.5	0	
Collection and Transportation of Solid Waste	SW.6	Solid Waste Collection	N/A	0.020 MT CO ₂ e / wet short ton	USCP Appendix E (page 29)
		Solid Waste Transportation	N/A	0.00014 MT CO ₂ e / wet short ton / mile	USCP Appendix E (page 29)
Solid Waste Landfill	SW.1.1	First Order Decay Model	N/A	Varies	California ARB

Methods:

Community-Generated Solid Waste

Solid waste generated within the unincorporated county in the inventory years and disposed of in Kiefer landfill generates GHG emissions that need to be included in an inventory. Reportable emissions occur at the landfill over the entire period that waste decomposes, estimated to be 100 years. The tonnage of waste generated by County residents and businesses and then landfilled was collected from the California Integrated Waste Management Board (CalRecycle). Waste characterization percentages from CalRecycle, shown in Table E-2, were applied to the tonnage of community-generated waste landfilled. The waste tonnage and characterization, shown in Table E-1, was entered into ClearPath where GHG emissions were calculated based on standard factors for organic content and methane generating potential for each waste type. Emissions were adjusted based on the presence of landfill gas capture systems.

Solid Waste Collection and Transportation

A variety of emissions are associated with solid waste management services including emissions resulting from collection, processing, and storage of solid waste generated by residents and businesses. Collection and transportation emissions are included in transportation sector emissions, but they are also reported separately with the waste sector as an information item.

Solid waste collection emissions include emissions from the trucks used to collect municipal solid waste within the community and transport the waste to the regional landfill serving Amador County. The tonnage of waste collected and the distance to the landfill, determined based on the distance from the center of the county to the Kiefer regional landfill, were entered into ClearPath to calculate GHG emissions using default per-ton-mile CO₂e emissions (the GHGs emitted to transport one ton of waste one mile).

Table E-3: Community Solid Waste Buena Vista Landfill Activity Data

Description	2005	2010	Data Source
Total Landfill Gas Collected (million standard cubic feet)	99	60	County Staff
Percentage of Methane in Collected LFG	0.32	0.32	County Staff
Destruction Efficiency of Methane Based upon system	0.99	0.99	IPCC
Collection Efficiency of LFG Collection System	0.75	0.75	County Staff
Methane Soil Oxidation Factor	0.10	0.10	IPCC
Surface area not covered by landfill gas collection system (square feet)	566,280	0	County Staff
Surface covered by Landfill Gas Collection System (square feet)	696,960	1,263,240	County Staff

Table E-4: Community Solid Waste Historical Dumps Activity Data

Landfill	Characteristics	Value	Data Source
Historical Dumps first-order-decay model data	Year opened / closed	1920 /1973	County Staff
	Rainfall (inches / year)	28-37	NOAA
	Associated k value	0.057	U.S. EPA
Waste Deposited (tons / year)	Total	214,122	Waste management data population-weighted to 1920-1973. Assumptions from ICLEI: 75% of waste was sent to dump, 25% burned at home. 20% of dumps waste was burned. Dumps generate 60% of emissions that landfills do.
	1920	3,258	
	1930	3,480	
	1940	3,751	
	1950	3,825	
	1960	4,176	
	1970	4,941	

Solid Waste Facilities Located in the Community

The most prominent source of 2005 and 2010 emissions from Amador County solid waste facilities is fugitive methane released by the anaerobic decomposition of organic waste in the closed Buena Vista landfill. The scale of emissions for landfills depends upon the size and type of the facility, the amount and type of waste deposited and the presence of a landfill gas collection system. Inputs for this analysis are found in Table E-3. The methane released in 2005 and 2010 was estimated using the following equation:

$$\text{METRIC TONS (MT) METHANE} = (\text{MILLION CUBIC FEET LANDFILL GAS COLLECTED} \times \% \text{ METHANE}) \times ((1 - 99\% \text{ DESTRUCTION EFFICIENCY}) + ((1 / 75\% \text{ COLLECTION EFFICIENCY}) \times (1 - \text{METHANE SOIL OXIDATION FACTOR})) \times ((\text{AREA NOT COVERED} / \text{AREA COVERED BY GAS COLLECTION SYSTEM}) + (1 - \text{COLLECTION EFFICIENCY}))) \times 19.125.$$

GHGs were also emitted at historical dump sites in the unincorporated county as waste decomposed. The FOD model was used to estimate emissions from the historical dumps in 2005 and 2010. Historical-dump inputs to the FOD model are shown in Table E-4. Based on guidance from County staff it was assumed historical dumps throughout the county received waste between 1920 and 1973. Current per capita waste generation was used to estimate waste tonnages for those years, with assumptions listed in Table E-4.

The calculated methane emissions activity data shown in Table E-1 was entered into ClearPath where GHG emissions were calculated using IPCC 4th assessment Global Warming Potential.

Appendix F – Community Potable Water Use Sector Notes

Table F-1: Community Potable Water Electricity Use Activity Data

Year	Process	Electricity Use (kWh)	Water Production (MG / Year)	Energy Intensity (kWh / MG)	Population Served	Gallons per Capita per day	Data Source
2005	Potable Water Total	5,044,519	1,053	4,790	16,210	178	AECOM/ Amador Water Agency/ 2010 data, EPA
	T&D (5.33%)	284,180					
2010	Extraction	480,149	166	2,886			Amador Water Agency, JVID, River Pines PUD, PG&E, EPA.
	Conveyance	1,806,622	305	5,914			
	Treatment	804,074	519	1,550			
	Distribution	140,373	675	208			
	Total	3,231,218	675	4,790	16,217	114	
	T&D (6.84%)	237,243					

Table F-2: Community Potable Water GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
2005 Electricity – PG&E	WW.14	489.16 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 Pacific Gas and Electric (CO ₂) & 2005 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2010 Electricity – PG&E	WW.14	445 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 Pacific Gas and Electric (CO ₂) & 2010 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2005 Electricity - T&D Losses	BE.4.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity - T&D Losses	BE.4.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)

Methods:

Community Potable Water Electricity Use

Amador County’s potable water use activity data is shown in Table F-1. Data on the electricity use, water production and population served was collected from water agencies serving Amador County residents and businesses. For potable water treatment and delivery infrastructure that lies within the unincorporated Amador County, the electricity use was subtracted from the non-residential sector’s electricity usage to prevent double counting. The electricity use was entered into ClearPath where the GHG emissions were calculated using PG&E’s reported grid emissions factors for electricity. T&D losses were calculated by applying the EPA eGRID Western region grid loss factor to the total electricity use and then entered into ClearPath where the GHG emissions were calculated using the EPA eGRID WECC California sub region grid average emissions factors.

Appendix G – Community Wastewater Treatment Sector Notes

Table G-1: Community Wastewater Treatment Electricity Use Activity Data

Facility / Process	In-Jurisdiction	Electricity Use (kWh / Year)	Energy Intensity (kWh / MG)	Population Served	Gallons / Day	Gal /Cap /Day
Lake Camanche - AWA Collection & Treatment	Yes	197,100	10,372	813	52,062	64
Pine Grove / Gayla Manor - AWA Collection & Treatment	Yes	99,422	12,714	534	21,424	40
Martell - AWA Collection	Yes	53,759	2,338	282	62,985	223
Martell - City of Sutter Creek Treatment	No	31,654	1,377	282	62,985	223
Mace Meadows – AWA Collection	Yes	7,506	1,942	146	10,589	72
Multiple AWA Gravity-Fed Systems	Yes	0	0	342	17,909	52
River Pines PUD Collection & Treatment	Yes	154,037	12,058	427	35,000	82
2010 Wastewater Electricity Use - In Unincorporated County	Yes	511,824	5,333	2,545	262,954	103
2010 Wastewater Electricity – In Sutter Creek	No	31,654	1,377	282	62,985	223
2010 Transmission & Distribution Losses		39,903				
Grid Loss Factor 6.84%						
2005 Wastewater Electricity Use - In Unincorporated County	Yes	504,129	5,333	2,507	259,001	103
2005 Wastewater Electricity – In Sutter Creek	No	31,178	1,377	278	62,038	223
2005 Transmission & Distribution Losses		30,156				
Grid Loss Factor 5.33%						

Table G-2: Community Wastewater Treatment Operations Activity Data

Year	Population	Nit/Denit Process (Yes / No)	Comm/ Ind Factor	Methane Correction Factor	Aerobic / Anaerobic / Aerated	Dig Gas % Methane	Data Source
Sutter Creek Central Plant							
2005	302	No	1.25	NA	Anaerobic	65%	Plant / County Staff
2010	282	No	1.25	NA	Anaerobic		
Lake Camanche Lagoon							
2005	832	No	1.25	0.3	Aerated	NA	AWA / County Staff
2010	835	No	1.25	0.3	Aerated	NA	
River Pines PUD Lagoon							
2005	437	No	1	0.3	Aerated	NA	RPPUD / County Staff
2010	427	No	1	0.3	Aerated	NA	
Septic Systems - individual and small residential							
2005	19,917	NA	NA	NA	NA	NA	AWA / County Staff
2010	20,272	NA	NA	NA	NA	NA	

Table G-3: Community Wastewater Treatment GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
2005 Electricity – PG&E	WW.15	489.16 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 Pacific Gas and Electric (CO ₂) & 2005 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2010 Electricity – PG&E	WW.15	445 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 Pacific Gas and Electric (CO ₂) & 2010 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2005 Electricity - T&D Losses	BE.4.1	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity - T&D Losses	BE.4.1	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
Septic Systems (population based)	WW.11(alt)	N/A	0.6 kg CH ₄ / kg BOD ₅	N/A	USCP App F page 52.
Lagoons (population based) - no primary treatment	WW.6(alt)	N/A	0.6 kg CH ₄ / kg BOD ₅	N/A	USCP App F page 39, with MCF = 0.3
Central Plants - no nitrification / denitrification process (population based)	WW.8	N/A	N/A	3.2 g N ₂ O / person / year	USCP App F page 43
Effluent (population based)	WW.12(alt)	N/A	N/A	0.026 kg N / person / day	USCP App F page 56
Incomplete Combustion of Digester Gas (population-based)	LGOP 10.2	N/A	N/A	N/A	LGOP 10.3.1.1 page 110
Digester Gas Combustion (population-based)	WW.1.(alt) WW.2.(alt)	N/A	3.2 g CH ₄ / MMBTU	0.63 g N ₂ O / MMBTU	USCP App F pp 24, 28, 30

Methods:

Community Wastewater Treatment Electricity Use

Community-generated wastewater treatment activity data is shown in Table G-1. Data on electricity use, wastewater treated and population served was collected from wastewater agencies serving Amador County residents and businesses. 2005 electricity use was determined by population-weighting the 2010 data (2005 population served = 21,488 and 2010 population served = 21,816. For wastewater collection and treatment infrastructure that lies within the county limits, the electricity use was subtracted from the non-residential sector’s electricity use to prevent double counting. The electricity use was entered into ClearPath where the GHG emissions were calculated using PG&E’s reported grid emissions factors for electricity. T&D losses were calculated by applying the EPA eGRID Western region grid loss factor to the total electricity use and then entered into ClearPath where the GHG emissions were calculated using the EPA eGRID WECC California sub region grid average emissions factors.

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Community Wastewater Treatment Facility Process and Fugitive Emissions

Wastewater treatment emissions account for a small part of total community-based GHG emissions. There are two emissions associated with wastewater treatment processes: methane (CH₄) and nitrous oxide (N₂O). Calculating the makeup and amount of emissions depends on the processes involved and the management practices employed. Biogenic emissions from digester gas combustion are de minimis and are not included.

In 2010, there were a number of treatment systems serving Amador County, as delineated in Table G-1, including Amador Water Agency's (AWA) Lake Camanche lagoon, River Pines PUD lagoon, City of Sutter Creek's central plant that serves the Martell area, and the remaining population served by AWA-operated small septic systems or individual septic systems. The plant characteristics shown in Table G-2 were collected from wastewater agency and county staff. The wastewater treatment activity data was entered into ClearPath where GHG emissions were calculated using the standard methods and emissions factors from the USCP shown in Table G-3.

Uncertainties

According to the latest EPA national inventory of greenhouse gas emissions considerable uncertainty exists within any of the EPA/IPCC-based methodologies used to estimate wastewater process and fugitive emissions. EPA states that population-based methane emissions could be underestimated by 37% or over estimated by 47% while nitrous oxide emissions could be under estimated by 76% or over estimated by 93%. Emissions estimates based on direct source measurements can possibly have higher accuracy and less uncertainty. This extreme degree of uncertainty exists because these methodologies were originally developed for international countrywide inventories that were mainly population-based. By necessity, these methodologies were generalized "top-down" approaches that sought to provide emissions estimates for countries where detailed information would be impractical to obtain. Although these methodologies had the advantage of being relatively simple to calculate, the trade-off was a compromised level of accuracy. Nevertheless, the methodologies in this Appendix reflect the evolution of knowledge since the development of the LGOP.

In some cases, especially where the emissions are based on population and default inputs, communities should exercise caution in drawing conclusions or establishing policy. Methods are evolving but caution should be used drawing conclusions and establishing policies based on these calculations.

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Appendix H – Buildings and Facilities Sector Notes

Table H-1: Buildings and Facilities Activity Data

Facility Name	Activity / Source	2005	2010	Units	Data Source
Jackson Library - 530 Sutter St.	Electricity – PG&E	107,440	90,640	kWh	Pacific Gas and Electric
	Natural Gas	5,067	5,297	therms	
GSA / Corp Yard / Motor Pool - 12200 Airport Rd.	Electricity – PG&E	369,400	294,720	kWh	Pacific Gas and Electric
	Natural Gas	10,396	8,633	therms	
Probation Offices - 675 New York Ranch Rd	Electricity – PG&E	43,120	53,680	kWh	Pacific Gas and Electric
	Natural Gas	586	601	therms	
District Attorney Offices - 708 Court St.	Electricity – PG&E	153,680	142,080	kWh	Pacific Gas and Electric
	Natural Gas	673	936	therms	
County Detention Facility - 700 Court St.	Electricity – PG&E	445,120	427,920	kWh	Pacific Gas and Electric
	Natural Gas	16,400	13,856	therms	
Animal Shelter - 12340 Airport Rd.	Electricity – PG&E	34,691	100,320	kWh	Pacific Gas and Electric
	Natural Gas	373	5,845	therms	
County Administration Offices - Moved from 500 Argonaut Ln to 810 Court St	Electricity – PG&E	334,240	405,684	kWh	Pacific Gas and Electric
	Natural Gas	6,643	9,693	therms	
Health & Human Services - Moved from 1001-1003 Broadway St to 10877 Conductor Blvd	Electricity – PG&E	290,610	450,560	kWh	Pacific Gas and Electric
	Natural Gas	7,430	4,911	therms	
All Minor Facilities	Electricity – PG&E	70,531	34,246	kWh	Pacific Gas and Electric
	Natural Gas	2,405	960	therms	
Buildings Electricity T&D Losses	Electricity – T&D	103,910	146,833	kWh	eGRID WECC
Airport	Electricity – PG&E	164,489	148,008	kWh	Pacific Gas and Electric
Airport Electricity T&D Losses	Electricity – T&D	9,266	10,867	kWh	eGRID WECC
All Propane Combustion	Propane Use	6,514	6,514	Gallons	ACEC inventory (2005 Proxy)

Table H-2: Buildings and Facilities GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
2005 Electricity – PG&E	6.1.1	489.16 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 Pacific Gas and Electric (CO ₂) & 2005 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
2010 Electricity – PG&E	6.1.1	445 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 Pacific Gas and Electric (CO ₂) & 2010 U.S. EPA eGRID WECC California (CH ₄ and N ₂ O)
Natural Gas – PG&E	6.2.1	53.02 kg/MMBtu	0.005 kg/MMBtu	0.0001 kg/MMBtu	LGOP Appendix G - Table G.1 (CO ₂) and Table G.3 (CH ₄ and N ₂ O)
2005 Electricity - T&D Losses	6.2.6	724.12 lbs/MWh	30.24 lbs/GWh	8.08 lbs/GWh	2005 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
2010 Electricity - T&D Losses	6.2.6	610.82 lbs/MWh	28.49 lbs/GWh	6.03 lbs/GWh	2010 U.S. EPA eGRID WECC California (CO ₂ , CH ₄ and N ₂ O)
Propane (LPG)	6.1.1 6.1.2	5.79 kg/gallon	0.011 kg/MMBtu	0.0006 kg/MMBtu	LGOP Appendix G - Table G.1 (CO ₂) and Table G.3 (CH ₄ and N ₂ O)
Refrigerants	6.6.2.2	N/A	N/A	N/A	LGOP
T&D Grid Loss Factor		2005: 5.33%	2010: 6.84%		EPA eGRID WECC

Methods:

Buildings and facilities electricity and natural gas consumption data, shown in Table H-1, was collected from Pacific Gas and Electric Company (PG&E). Propane fuel use estimates came from the ACEC 2005 inventory and was also used as the 2010 proxy, as confirmed by County staff. The activity data was entered into ClearPath where GHG emissions were calculated using the calculation methods and emissions factors shown in Table H-2.

Refrigerants used in Amador County’s HVAC and refrigeration equipment were not estimated because of unavailability of data and the likelihood that these emissions are less than significant.

Table H-3: Public Lighting Activity Data

Facility Name	Activity / Source	2005	2010	Units	Data Source
Streetlights	Electricity – PG&E	356	30,080	kWh	Pacific Gas and Electric
Park Lighting	Electricity – PG&E	1,040	5,012	kWh	Pacific Gas and Electric
Transmission and Distribution Losses (T&D)	Electricity – T&D	79	2,577	kWh	EPA eGRID WECC
LS-1 PG&E Owned and Operated (Information Item)	Electricity – PG&E	2,758	2,773	kWh	Pacific Gas and Electric
LS-1 T&D Losses (Information Item)	Electricity – T&D	155	204	kWh	EPA eGRID WECC

Public lighting electricity usage data, shown in Table H-3, was collected from PG&E. Activity data was entered into ClearPath where GHG emissions were calculated using the calculation methods and emissions factors shown in Table H-2. PG&E designated LS-1 lighting was included as an Information Item. LS-1 designated streetlights are owned,

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operated, maintained and directly paid for by PG&E, but are indirectly paid for by the County through their general rate case with PG&E.

Table H-4: Solid Waste Management Facilities Activity Data

Facility Name	Activity / Source	2005	2010	Units	Data Source
Buena Vista Landfill	Electricity – PG&E	19,666	52,397	kWh	Pacific Gas and Electric
Pump Station		243	374	kWh	
Drainage Pump		1,341	700	kWh	
Transmission and Distribution Losses	Electricity – T&D	1,197	3,926	kWh	EPA eGRID WECC

Solid waste management facilities electricity gas use data, shown in Table H-4, was collected from PG&E. Activity data was entered into ClearPath where GHG emissions were calculated using the calculation methods and emissions factors show in Table H-2.

Appendix I – Vehicle Fleet and Mobile Equipment Sector Notes

Table I-1: Vehicle Fleet and Equipment Activity Data

Facility Name	Activity / Source	2005	2010	Units	Data Source
Sheriff Department	On-Road Gasoline	62,894	46,063	Gallons	County Staff
	Vehicle Miles Traveled (VMT)	999,170	552,492	Miles	
	On-Road Diesel	3180	432	Gallons	
	VMT	44,736	4,805	Miles	
Public Works & Roads Departments	On-Road Gasoline	19,055	16,418	Gallons	
	VMT	200,887	172,014	Miles	
	On-Road Diesel	25,329	19,191	Gallons	
	VMT	172,204	135,668	Miles	
Other Departments	On-Road Gasoline	21,934	19,008	Gallons	
	VMT	343,725	271,374	Miles	
Health/Social Services	On-Road Gasoline	10,689	7,137	Gallons	
	VMT	182,624	131,511	Miles	
DA/Probation	On-Road Gasoline	9,571	9,683	Gallons	
	VMT	157,026	165,367	Miles	
Refrigerants	Number of Vehicles	148	148	Number	County Staff 2010 Proxy
	R-134a Lost	44	44	kg	
	Number of Vehicles	18	18	Number	
	R-12 Lost	5	5	kg	

Table I-2: Vehicle Fleet and Equipment GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
On-Road Passenger Vehicles - Gasoline	7.1.1.1 and 7.1.3.3	8.78 kg / gallon	0.02780 g / mile	0.02940 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
On-Road Light Trucks - Gasoline	7.1.1.1 and 7.1.3.3	8.78 kg / gallon	0.03146 g / mile	0.04331 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
On-Road Heavy Duty Trucks - Gasoline	7.1.1.1 and 7.1.3.3	8.78 kg / gallon	0.12351 g / mile	0.10310 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
On-Road Passenger Vehicles - Diesel	7.1.1.1 and 7.1.3.3	10.21 kg / gallon	0.0005 g / mile	0.0010 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
On-Road Light Trucks - Diesel	7.1.1.1 and 7.1.3.3	10.21 kg / gallon	0.00099 g / mile	0.00149 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
On-Road Heavy Duty Trucks - Diesel	7.1.1.1 and 7.1.3.3	10.21 kg / gallon	0.0051 g / mile	0.0048 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Off-Road Equipment - Gasoline	7.2	8.78 kg / gallon	0.22 g / gallon	0.50 g / gallon	LGOP Appendix G - Table G.11 (CO ₂) and Table G.14 (CH ₄ and N ₂ O)
Off-Road Equipment - Diesel	7.2	10.21 kg / gallon	0.26 g / gallon	0.58 g / gallon	LGOP Appendix G - Table G.11 (CO ₂) and Table G.14 (CH ₄ and N ₂ O)
Refrigerants	7.4	N/A	N/A	N/A	LGOP

Methods:

Vehicle fleet information was collected from Amador County's extensive records. Vehicle Miles Traveled (VMT) was estimated from odometer readings, and fuel use data was provided directly from County records. The County provided the total diesel and gasoline use by department for each vehicle for 2010. 2005 data was taken from the ACEC inventory, which appears to be County provided records also. Activity data, shown in Table I-1, was entered into ClearPath where GHG emissions were calculated using the standard methods and emissions factors outlined in the LGOP and shown in Table I-2.

Due to data limitations, the fugitive emissions from vehicle air conditioning refrigerants were estimated using the LGOP alternate approach, which may overestimate emissions. Given the make and year of the vehicles, the refrigerant was presumed to be R-134a if the vehicle was a 1995 model or newer. The majority of automakers changed from R-12 to R-134a as the refrigerant of choice in their cars in that year. The full-charge volume of refrigerant estimated by the alternate approach is the upper bound of the range approved for the equipment type. This alternate approach estimates refrigerant leakage at the highest potential during normal use and maintenance and likely is higher than if refrigerant use was tracked directly.

Appendix J – Government-Generated Solid Waste Sector Notes

Table J-1: Government-Generated Solid Waste Activity Data

Facility Name	Activity / Source	2005	2010	Units	Density (lb/CY)	Data Source
GSA	Solid Waste	48.1	11.8	Tons	89	ACES Waste Haulers
Admin. Center		8.0	8.9	Tons	89	
DA, Airport, Libraries		8.7	6.4	Tons	89	
Parks (Info Item)		6.7	8.8	Tons	300	
Sheriffs Detention		85.6	89.5	Tons	300	
Animal shelter		5.3	5.9	Tons	89	
Health Human Services		1.3	11.8	Tons	89	
Public Works		8.0	0.0	Tons	89	
Total		171.7	143.0	Tons	Varies	

Table J-2: Solid Waste GHG Calculation Methods and Emissions Factors

Activity / Source	Method	Type	Percent by Weight	Emissions Factor (metric tons CH ₄ / wet short ton waste)	Percentages and Emissions Factor Source
Community-Generated Statewide Waste Characterization	12.2.2	Newspaper	1.4	0.043	CalRecycle California 2008 Statewide Waste Characterization Study, USCP Appendix E (Page 34) & U.S. EPA Waste Reduction Model (WARM)
		Office Paper	4.9	0.203	
		Corrugated Cardboard	5.2	0.120	
		Magazines/Third Class Mail	5.9	0.049	
		Food Scraps	15.5	0.078	
		Grass	1.9	0.038	
		Leaves	1.9	0.013	
		Branches	3.3	0.062	
		Dimensional Lumber	14.5	0.062	
All other (Non-Organic)	45.5	0			
Activity / Source	Method	Type	Percent by Weight	Emissions Factor	Percentages and Emissions Factor Source
Government-Generated Public Administration Waste Characterization	12.2.2	Newspaper	5.7	0.043	CIWMB 1999 Public Admin for 2010 Municipal Operations Solid Waste USCP Appendix E (Page 34) & U.S. EPA Waste Reduction Model (WARM)
		Office Paper	13.2	0.203	
		Corrugated Cardboard	5.1	0.120	
		Magazines/Third Class Mail	15.4	0.049	
		Food Scraps	9.8	0.078	
		Grass	8.1	0.038	
		Leaves	8.1	0.013	
		Branches	0.1	0.062	
		Dimensional Lumber	5.0	0.062	
All other (Non-Organic)	29.5	0			

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Activity / Source	Method	Type	Percent by Weight	Emissions Factor	Percentages and Emissions Factor Source
Government-Generated Correctional Facility Waste Characterization	12.2.2	Newspaper	4.2	0.043	Waste Exchange Prison Recycling Guide – Florida 2004 Waste Composition USCP Appendix E (Page 34) & U.S. EPA Waste Reduction Model (WARM)
		Office Paper	15.1	0.203	
		Corrugated Cardboard	9.9	0.120	
		Magazines/Third Class Mail	8.5	0.049	
		Food Scraps	31	0.078	
		Grass	0.7	0.038	
		Leaves	0.7	0.013	
		Branches	0	0.062	
		Dimensional Lumber	2.1	0.062	
		All other (Non-Organic)	20.4	0	

Methods:

The government-generated solid waste activity data was collected from ACES Waste Haulers, the local waste hauler in the form of the number, size and collection schedule of bins collected in 2005 and 2010. Bins were assumed to be 75% full. The tonnage of solid waste, shown in Table J-1, was calculated using a density of 89 lbs per cubic yard for public waste, provided by the California Integrated Waste Management Board (CalRecycle) and specifically tailored to public administration waste, and 300 lbs per cubic yard for park cans and the detention center, which is the value for un-compacted residential waste. Community generated waste collected at parks and paid for by the County is reported as an Information Item since it is not directly tied to municipal operations and the County cannot control the generation of this waste. Solid waste generated within Amador County was transferred to the Kiefer landfill for disposal. The emissions associated with this waste are defined as Scope 3 since they occur at the landfill sites over the entire period of decomposition (estimated to be about 100 years).

The solid waste tonnage activity data was entered into ClearPath where GHG emissions were calculated using CalRecycle’s public administration for general County waste, CalRecycle’s statewide for parks and the Florida 2004 Correctional waste characterization percentages for the detention facility shown in Table J-2 coupled with standard emissions factors adopted by the California Air Resources Board, the California Climate Action Registry, ICLEI - Local Governments for Sustainability and The Climate Registry and shown in Table J-2.

Appendix K – Solid Waste Management Sector Notes

Table K-1: Solid Waste Management Activity Data

Landfill	2005 Fugitive Methane (Metric Tons)	2010 Fugitive Methane (Metric Tons)	Data Source
Buena Vista	778.6	113.8	County Staff, IPCC & U.S. EPA
Description	2005	2010	Data Source
Total Landfill Gas Collected (million standard cubic feet)	99	60	County Staff
Percentage of Methane in Collected LFG	0.32	0.32	County Staff
Destruction Efficiency of Methane Based upon system	0.99	0.99	IPCC
Collection Efficiency of LFG Collection System	0.75	0.75	County Staff
Methane Soil Oxidation Factor	0.10	0.10	IPCC
Surface area not covered by landfill gas collection system (square feet)	566,280	0	County Staff
Surface covered by Landfill Gas Collection System (square feet)	696,960	1,263,240	County Staff

Methods:

The most prominent source of emissions from Amador County solid waste facilities is fugitive methane released by the anaerobic decomposition of organic waste in the Buena Vista landfill. The scale of these emissions for landfills depends upon the size and type of the facility, the amount and type of waste deposited and the presence of a landfill gas collection system. Inputs are found in Table K-1. The methane released in 2005 and 2010 was estimated using the following equation:

$$\text{METRIC TONS (MT) METHANE} = (\text{MILLION CUBIC FEET LANDFILL GAS COLLECTED} \times \% \text{ METHANE}) \times ((1 - 99\% \text{ DESTRUCTION EFFICIENCY}) + ((1 / 75\% \text{ COLLECTION EFFICIENCY}) \times (1 - \text{METHANE SOIL OXIDATION FACTOR}))) \times ((\text{AREA NOT COVERED} / \text{AREA COVERED BY GAS COLLECTION SYSTEM}) + (1 - \text{COLLECTION EFFICIENCY})) \times 19.125.$$

Energy use data for the Buena Vista Landfill are shown in Table H-4. The calculated methane emissions activity data was entered into ClearPath where GHG emissions were calculated using IPCC 4th assessment Global Warming Potential.

Appendix L – Employee Commute Sector Notes

Table L-1: Employee Commute Activity Data

Vehicle Type	Fuel Type	2005 Vehicle Miles Traveled	2010 Vehicle Miles Traveled	Average Miles Per Gallon	Data Source
Number of Employees	N/A	415	402	N/A	City Staff
Passenger Vehicles	Gasoline	1,267,975	1,228,255	20.0	2009 Employee Commute Survey – adjusted to number of employees.
	Biodiesel (B20)	3,208	3,108	19.5	
Light Trucks	Gasoline	963,191	933,018	13.7	
	Diesel	27,062	26,214	16.4	
Heavy Trucks	Gasoline	51,334	49,726	4.8	
	Diesel	69,260	67,090	5.5	

Table L-2: Employee Commute GHG Calculation Methods and Emissions Factors

Activity / Source	Method	CO ₂	CH ₄	N ₂ O	Emissions Factor Source
Passenger Vehicles - Gasoline	12.2.1	8.78 kg / gallon	0.02780 g / mile	0.02940 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Light Trucks - Gasoline	12.2.1	8.78 kg / gallon	0.03146 g / mile	0.04331 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Heavy Duty Trucks - Gasoline	12.2.1	8.78 kg / gallon	0.12351 g / mile	0.10310 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Passenger Vehicles - Diesel	12.2.1	10.21 kg / gallon	0.0005 g / mile	0.0010 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Light Trucks - Diesel	12.2.1	10.21 kg / gallon	0.00099 g / mile	0.00149 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)
Heavy Duty Trucks - Diesel	12.2.1	10.21 kg / gallon	0.0051 g / mile	0.0048 g / mile	LGOP Appendix G - Table G.11 (CO ₂) and Table G.15 (CH ₄ and N ₂ O)

Methods:

Employee commute emissions were calculated by first conducting a survey of current employees regarding commute distance, mode and frequency. Vehicle miles traveled (VMT) were estimated from the 2009 survey data and average miles per gallon (MPG) were collected from the U.S. EPA Green Vehicle Guide. VMT data was extrapolated to the number of employees in 2005 and 2010. The VMT activity data and MPGs, shown in Table L-1, were then entered into ClearPath where GHG emissions were calculated using the methods and emissions factors shown in Table L-2. The calculated average MPG for each vehicle and fuel type was used to convert VMT to fuel use for the CO₂ emissions calculations. Biodiesel (B20) fuel use was converted to diesel fuel use by multiplying by 80%, the percentage of diesel fuel blended to produce B20 biodiesel.

Baseline Inventory Improvements

Appendix M – Improvements to Baseline Inventories

During completion of the 2010 GHG inventories, improvements to the 2005 baseline inventory methodologies were identified and implemented. Although some updates resulted in very minor changes, they are important for consistency with the 2010 inventories. In addition to the revisions listed below, the global warming potentials were updated to the IPCC 4th Assessment values for consistency with State and Federal GHG reporting. Table M-1 summarizes the revisions to the 2005 baseline community-wide inventory, which increased 2005 community-wide GHG emissions by 1%. Table M-2 presents detailed revisions to the 2005 baseline community-wide inventory.

Table M-1: Summary of Revisions to 2005 Baseline Community-Wide GHG Emissions

2005 Community-Wide Sector	Original AECOM Metric Tons CO ₂ e	Revised Metric Tons CO ₂ e	Primary Reason for Revised Emissions
Total Residential Energy Use	37,688	46,910	Added transmission & distribution losses and non-utility fuel methodology improvements.
Total Non-Residential Energy Use	62,333	61,052	Added transmission & distribution losses and subtracted in-boundary potable water and wastewater energy use.
Total Community Transportation	141,675	156,140	Use of 2005 Amador County specific emissions factors.
Total Community Solid Waste	25,675	31,561	Updated GWPs
Total Water & Wastewater	6,613	3,766	Newer USCP septic system methodology used.
Total Agriculture	22,064	0	Excluded.
Total Community-Wide Emissions	296,048	299,430	1% increase
Information Items			
Total	9,878	33,222	Non-utility fuel methodology improvements.

The most substantial changes in community-wide emissions resulted from updated IPCC 4th assessment Global Warming Potential (GWPs) (increasing emissions), updated home heating methodology (increasing emissions), using 2005 Amador County specific emissions factors for community transportation (increasing emissions) offset by excluding agriculture emissions (reducing emissions).

Improvements to the community-wide inventories include:

- Use of Intergovernmental Panel on Climate Change 4th Assessment Global Warming Potentials (GWPs) in place of 2nd Assessment GWPs.

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- Improved methods to estimate residential non-utility fuel use (e.g. wood, propane) using statewide average non-utility fuel use per household in place of national use per heating and cooling degree days.
- Addition of electricity transmission and distribution losses.
- Use of EPA eGRID WECC California emissions factors for direct access electricity use and transmission and distribution losses.
- AECOM vehicle miles traveled (VMT) population-adjusted from 2006 to 2005.
- Use of 2005 county specific transportation emissions factors in place of national averages.
- Motorcycle vehicle miles traveled included with passenger vehicle miles traveled.
- Emergency generators included with off-road emissions, so not reported separately.
- Use of expanded solid waste characterizations for modeling methane generation potential.
- Addition of community wastewater energy and potable water energy activity emissions.
- Energy associated with wastewater and potable water use within the jurisdiction was subtracted from non-residential energy use to prevent double counting of emissions.
- Energy used for wastewater treatment was estimated from 2010 proxy data and population-weighted.
- Potable water population served updated from 21,806 to 16,210 to exclude population served by wells.
- Amador Water Agency specific 4,790 kWh/MG (2010 proxy) used in place of 3,500 (CEC 2006 California value).
- Potable water use changed from 305 to 178 gal/person/day; from Amador Water Agency 2010 Urban Water Management Plan.
- Added central wastewater treatment plant N₂O fugitive and process emissions.
- Updated partially-aerated lagoon wastewater plants using 0.3 methane correction factor.
- Septic system waste calculations updated using USCP equation WW.11(alt). Changes include: 0.9 (vs 0.85) kg BOD/person/day. EF = 0.132 CH₄ per BOD (vs 0.3).
- Septic system population updated from 20,235 to 19,917 using unincorporated county population minus population served by central treatment plants.
- Addition of community-generated-solid-waste collection and transportation emissions as information item.
- Addition of electric vehicle use as information item.

Table M-2: Detailed Revisions to 2005 Baseline Community-Wide GHG Emissions

2005 Community-Wide Sector	Original AECOM Metric Tons CO ₂ e	Revised Metric Tons CO ₂ e	Primary Reason for Revised Emissions
Residential Energy Use			
Electricity Use	22,695	22,675	Updated GWPs.
Natural Gas Combustion	755	756	Updated GWPs.
Propane, Fuel Oil/Kerosene, Wood Combustion	14,238	21,598	Non-utility fuel methodology improvements
Electricity Transmission & Distribution (T&D) Losses	0	1,882	Added transmission & distribution losses.
Total Residential Energy Use	37,688	46,910	24% Increase
Non-Residential Energy Use			
Electricity Use	27,843	24,663	Subtracted in-boundary potable water and wastewater energy use.
Natural Gas Combustion	34,490	34,502	Updated GWPs.
Electricity T&D Losses	0	1,887	Added transmission & distribution losses.
Total Non-Residential Energy Use	62,333	61,052	2% Decrease
Community Transportation			
On-Road Vehicles	113,198	128,373	Use of 2005 Amador County specific emissions factors.
Off-Road Vehicles and Equipment	28,477	27,767	Duplicate emergency generators removed.
Total Community Transportation	141,675	156,140	10% Increase
Community Solid Waste			
Community-Generated Solid Waste	7,919	10,423	Updated GWPs and solid-waste characterization.
Solid Waste Disposal Sites	17,756	21,139	Updated GWPs
Total Community Solid Waste	25,675	31,561	23% Increase
Community Potable Water and Wastewater Treatment			
Potable Water Energy Use	1,901	1,220	Population & gal/person/day updated. AWA-specific kWh/MG used. Added T&D losses
Wastewater Energy Use	0	129	Added community wastewater electricity and T&D losses
Total Community Water and Wastewater Energy Use	1,901	1,350	29% Decrease
Wastewater Treatment Septic System Emissions	4,332	2,161	USCP methodology used (WW.11(alt)). MCF=0.22.
Wastewater Treatment - Lake Camanche, River Pines PUD, City of Sutter Creek	380	256	Added N ₂ O process and fugitive emissions and used Methane Correction Factor of 0.3 for Camanche Lagoon.
Total Community Wastewater Process and Fugitive Emissions	4,712	2,416	49% Decrease
Agriculture			
Total Agriculture	22,064	0	Excluded
Total 2005 Community-Wide Emissions	296,048	299,430	1% Increase
Information Items			
Biogenic CO ₂ Emissions (Wood Combustion)	8,951	32,170	Non-utility fuel methodology improvements.
On-Road Electric Vehicles	0	8	Added electric vehicles.
Solid Waste Collection & Transportation	0	1,044	Added collection/transportation.
Biogenic CO ₂ Emissions (Landfill)	927	0	Excluded.

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Table M-3 summarizes the revisions to the 2005 baseline municipal-operations inventory, which increased 2005 baseline municipal-operations emissions by 150%, primarily due to a correction in landfill area. Table M-4 presents detailed revisions to the 2005 baseline municipal-operations inventory.

Table M-3: Summary of Revisions to 2005 Baseline Municipal-Operations GHG Emissions

2005 Municipal-Operations Sector	Original ACEC Metric Tons CO ₂ e	Revised Metric Tons CO ₂ e	Primary Reason for Revised Emissions
Total Buildings and Facilities	1,127	790	Excluded non-Amador County records. Subtracted landfill energy use. Added transmission and distribution losses.
Total Vehicle Fleet	1,666	1,469	Re-calculated emissions
Total Solid Waste	4,423	19,534	Corrected landfill areas (covered and uncovered). Included landfill energy use and transmission and distribution losses.
Total Employee Commute	2,088	1,442	Vetted data reducing fuel use and VMT.
Total 2005 Municipal-Operations Emissions	9,303	23,305	150% increase
Information Items			
LS-1 Lighting (Lights + T&D)	0	0.7	Added electricity and transmission and distribution losses.
Community-Generated Solid Waste	0	2	Park trash reported as community waste not municipal operations.
Vehicle Fleet R-12 Refrigerant Loss	0	59	Added refrigerant loss.

The primary revision in Municipal-Operations emissions was the correction of the Buena Vista landfill area, increasing fugitive methane emissions at the landfill the from 4,393 Metric Tons CO₂e to 19,465 Metric Tons CO₂e. Revisions to the 2005 municipal-operations inventory include:

- Buena Vista Landfill Area was previously modeled as 1,000 square feet covered by landfill gas collection system and 0 square feet uncovered. This has been corrected to 696,960 covered square feet and 566,280 uncovered square feet.
- Use of Intergovernmental Panel on Climate Change 4th Assessment Global Warming Potentials (GWPs) in place of 2nd Assessment GWPs.
- Addition of electricity transmission and distribution (T&D) losses.
- Use of EPA eGRID WECC California emissions factors for direct access electricity use and transmission and distribution losses.
- Excluded PG&E electricity and natural gas records for non-Amador County records including: Amador Water Agency, Amador Regional Transit, Victory Lighting, Office of Education and Central Sierra Child Support Agency.
- Recalculated vehicle fleet emissions.
- Vehicle Fleet R-12 refrigerant loss was added using 2010 proxy data.
- Updated solid waste density used for government-generated solid waste to 89 pounds/cubic yard for use with public administration waste characterization and 300 pounds/cubic yard for residential, un-compacted waste characterization (used for parks, Probation and Detention) used with State-Wide and Correctional Institute characterizations.
- Added a Florida Correctional Institute characterization data set for modeling waste from Detention.

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- Community-generated solid waste collected by County in park trash cans removed from total municipal-operations-generated solid waste, and the park waste emissions are categorized as an information item.
- Use of expanded solid waste characterizations for modeling methane generation potential.
- Employee commute (EC) survey data was vetted more thoroughly to remove incomplete or erroneous records.

Table M-4: Detailed Revisions to 2005 Baseline Municipal-Operations GHG Emissions

2005 Municipal-Operations Sector	Original ACEC Metric Tons CO ₂ e	Revised Metric Tons CO ₂ e	Primary Reason for Revised Emissions
Buildings and Facilities			
Electricity Use	605	449	Excluded non-Amador County records. Subtracted landfill energy use.
Natural Gas Combustion	437	266	Excluded non-Amador County records.
Other Emissions	85	38	Excluded non-Amador County records.
Transmission and Distribution (T&D) Losses	0	37	Added transmission and distribution losses.
Total Buildings and Facilities	1,127	790	30% Decrease
Vehicle Fleet			
Gasoline Combustion	Unknown	1,114	Re-calculated emissions
Diesel Combustion	Unknown	291	Re-calculated emissions
Refrigerant Loss	Unknown	63	Re-calculated emissions
Total Vehicle Fleet	1,666	1,469	12% Decrease
Solid Waste			
Buena Vista Solid Waste Facility Biogenic Flared Methane	4,393	0	Reported incorrectly as flared methane. Excluded.
Buena Vista Solid Waste Facility Fugitive Methane	0	19,465	Added fugitive methane emissions and corrected calculations - landfill area and reporting description.
Buena Vista Facility Energy Use	With Bldgs	6	Reported with Solid Waste sector
Government-Generated Solid Waste	30	64	Updated GWPs, waste densities, waste characterization profiles, excluded park waste as information item.
Total Solid Waste	4,423	19,534	342% Increase
Employee Commute			
Employee Commute	2,088	1,442	Vetted data reducing fuel use and VMT.
Total Employee Commute	2,088	1,442	31% Decrease
Total 2005 Municipal-Operations Emissions	9,303	23,234	150% Increase
Information Items			
LS-1 Lighting Electricity and T&D Losses	0	0.7	Added electricity and transmission and distribution losses.
Community-Generated Solid Waste	0	2	Park trash reported as community waste not municipal operations.
Vehicle Fleet R-12 Refrigerant Loss	0	59	Added R-12 refrigerant loss.