

# Alameda County Community Greenhouse Gas Emissions 2005 Roll-up Inventory, Methodology, and Results

Alameda County developed this inventory of major greenhouse gas (GHG) emissions as part of its continuing commitment to tackling the potential problems presented by global climate change. The inventory was completed in order to create policy-relevant analysis to guide future decisions about the steps to be taken to reduce the region's carbon footprint and to highlight areas of focus for regional collaboration. This inventory includes emissions from each of the 14 municipalities in the County and the unincorporated regions. It was prepared by ICLEI – Local Governments for Sustainability and was presented at the Alameda County & Cities Climate Forum (January 23, 2009).

## Results

The community inventory is organized by sector – including residential, commercial, industrial, transportation, and waste related emissions. Alameda County communities emit over 13.4 million metric tons of CO<sub>2</sub>e.<sup>1</sup> This includes the emissions of the three major greenhouse gases – carbon dioxide, methane, and nitrous oxide.

Transportation as a whole is the largest source of these emissions (57%). The next largest emissions source is energy use in the commercial/industrial<sup>2</sup> sector (18%), followed by the residential (14%), direct access<sup>3</sup> (7%), and waste (4%) sectors.<sup>4</sup>

Additional analysis provided greater detail into the origin of the emissions from each of these sectors. Within the transportation sector, travel on major highways releases more GHGs than travel on local roads. This reflects a greater number of vehicle miles traveled along state highways which carry local vehicles as well as pass through traffic. Additionally, the movement of gasoline powered vehicles released a much greater amount of greenhouse gases than diesel vehicles. This is a reflection of the greater number of gasoline powered vehicles on the area's roadways.

In the inventory, stationary emissions sources include emissions from the built environment (i.e. the residential, commercial, and industrial and direct access sectors). Within this grouping, natural gas contributed more GHGs than electricity use. Despite emitting slightly less GHGs per energy unit (using local emission factors), there are more energy units (kWh or therms converted to BTUs) of natural gas consumed than electricity.

Finally, the waste sector analysis showed that the landfilling of paper products was the largest GHG emitter from local landfills.

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<sup>1</sup> Carbon dioxide equivalents (CO<sub>2</sub>e) is a way to aggregate and report different greenhouse gases in terms of their climate impact (i.e., methane is 21 times more potent than carbon dioxide; therefore 1 ton CH<sub>4</sub> = 21 tons CO<sub>2</sub>e).

<sup>2</sup> Due to privacy issues, it was not possible to separate commercial and industrial emissions.

<sup>3</sup> Direct access is energy purchased directly from fuel/power supplier and not from the utilities. Detailed information on this sector was not available; however, it is assumed that commercial/industrial users and electricity for the local BART system are a significant portion of the energy used in this sector. As the exact source of the fuel/electricity purchased is not known, emissions from this sector should be considered a broad estimation.

<sup>4</sup> Additional detailed results have been included in the charts at the end of this report.

## Methodology

This inventory is related to the individual emission inventories completed by each jurisdiction as part of the Alameda County – Cities Climate Project. However, this countywide rollup is more than a summation of the inventories of individual jurisdictions – it is a separate inventory that utilized both new and reanalyzed data.<sup>5</sup> This is an end-user/tail-pipe inventory that does not account for the additional up- and down-stream emissions associated with the production of the goods and services consumed.<sup>6</sup>

The input data used in this report (i.e., energy usage, vehicle miles traveled, waste generation, fleet energy use, etc.) were provided by PG&E, StopWaste.org, and various State and local agencies. This data were converted to GHG emissions by applying regionally appropriate emission factors, supplied by PG&E, the California Energy Commission and CalTrans. Methane emissions from landfills were not measured directly – they were estimated, using the EPA’s WARM model from the amount and type of solid waste disposed of within the community. The waste sector also represents a front-loading of the future GHG emissions that will be released over time due to the disposal of the waste in the inventory year.

It should also be noted that emissions data for most jurisdictions within the County were collected for 2005. However, as Albany and Emeryville chose to conduct inventories for 2004, some input data from those communities represent 2004 information used as a proxy in the 2005 emission analysis. Similarly, the most recent detailed waste survey was completed in 2000; therefore, breakdowns of waste generation by tonnage and generator reflect that data – the actual tons of waste generated was from the year inventoried. Past experience indicates that use of this proxy data should not significantly impact the results of the inventory.

This inventory was prepared following internationally accepted standards for greenhouse gas inventories.<sup>7</sup> All inventories attempt to strike a balance between the time and resources involved with quantifying every source of emissions and ensuring that the analysis is conducted with sufficient detail to ensure accurate results to guide emission reduction actions. The next two sections outline the emission sources that were included an excluded in this inventory – based on data availability, significance, and relevance to the inventory results.

### *Included Emissions Sources*

Sector		Data / Emission Source
<b>Built Environment</b>	Residential	<i>Electricity and Natural Gas Consumption</i>
	Commercial	
	Industrial	
	Direct Access <sup>8</sup>	
<b>Mobile Sources</b>	On-Road Transportation	<i>Vehicles on Local Roads</i>
		<i>Vehicles on State Highways</i>
<b>Waste</b>	Community Generated Waste	<i>Total Landfilled Waste</i>
		<i>Total Organic Alternative Daily Cover</i>

<sup>5</sup> Specifically, the Waste, Direct Access, and Transportation sectors represent countywide activity data as opposed to a compilation of the individual jurisdictions’ emissions.

<sup>6</sup> From a lifecycle perspective, emissions from the production, transport, use, and disposal of products would be greater than indicated in this inventory.

<sup>7</sup> The analysis was complete prior to the State of California’s adoption of inventory protocol for local governments; however it followed the internationally accepted inventory framework developed by ICLEI – Local Governments for Sustainability. Differences in the results due to the methodology applied are estimated to be minor.

<sup>8</sup> BART emissions are included as Direct Access electricity consumption which leads to a slight overestimation of the emissions from stationary sectors, as a group, and an underestimation of the emissions from mobile sources.

### ***Excluded Emissions Sources***

- Emissions of Perfluorocarbons, Hydrofluorocarbons, and Sulfur Hexafluoride
- Built Environment
  - Other fuel sources not delivered by PG&E. For example, wood, charcoal, propane, kerosene, stationary diesel, heavy fuel oil, etc. In California, these fuels are largely used in industrial combustion processes.
  - Non-combustion emissions from industrial process (i.e. the release of chemicals as a by-product of the process itself)
  - Emissions from electrical power plants – those emissions were allocated to the end-user of the electricity
  - Emissions from wastewater treatment
  - Energy use at the U.C. Berkeley Campus
- Transportation
  - Off-road emissions, including off-road vehicles/equipment, marine vessels, and aircraft
  - Interregional rail transportation (the ACE Train, Capitol Corridor, Union Pacific, etc.)
  - Use of fuels in vehicles other than gasoline or diesel (constitutes a minor percentage of overall mobile fuel use)
- Waste
  - Non-methane emissions from the breakdown of non-organic waste (plastics, metals, etc.)
  - Upstream emissions from the production of disposed materials
  - Emissions from composting, recycling activities
  - Emissions from waste generated outside of the County and imported to area landfills

### **Data Sources**

#### ***Built Environment***

- Utility electricity and natural gas consumption for was provided by PG&E.
- Countywide Direct Access electricity and natural gas consumption (purchased directly from the power generator, not through PG&E) for Alameda County was obtained from the California Energy Commission.

#### ***Transportation/Mobile Emissions Sector***

- Local Roads and State Highway VMT data was obtained from CalTrans through the Highway Performance Monitoring System.<sup>9</sup> CalTrans obtains local roads VMT data from the Metropolitan Transportation Commission (MTC). MTC obtains data on local roads VMT either from the local governments within its jurisdiction or, if that data is unavailable, through a CalTrans model.

#### ***Waste Sector***

- Waste Tonnage: California Integrated Waste Management Board (CIWMB), California Solid Waste Statistics.  
<http://www.ciwmb.ca.gov/lgcentral/DRS/Reports/JurDspFa.asp?VW=JURIS>
- Waste Characterization: Countywide Municipal Solid waste characterization was taken from the Alameda County Waste management Authority's 2000 Countywide Waste Characterization study

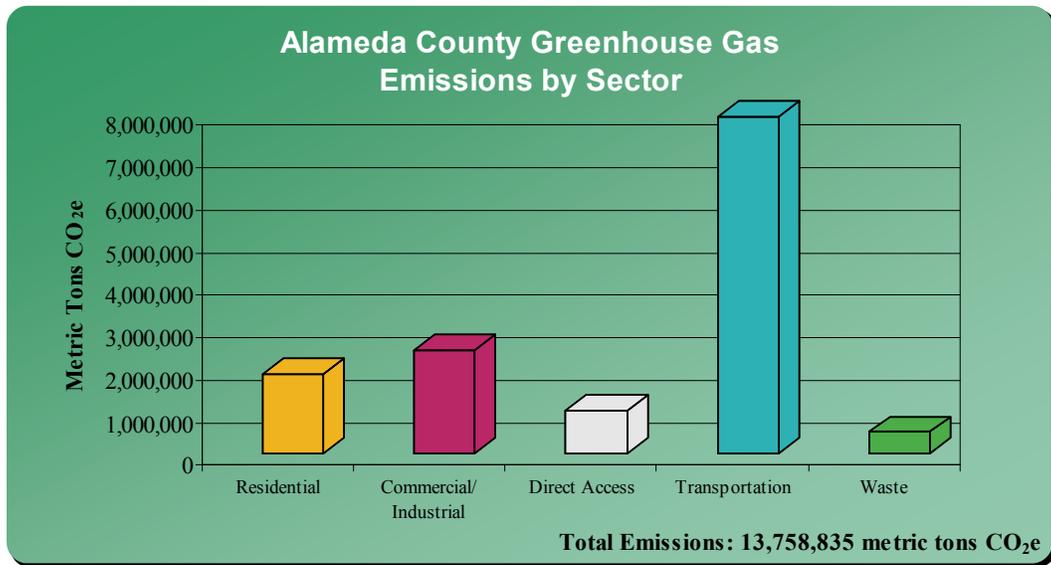
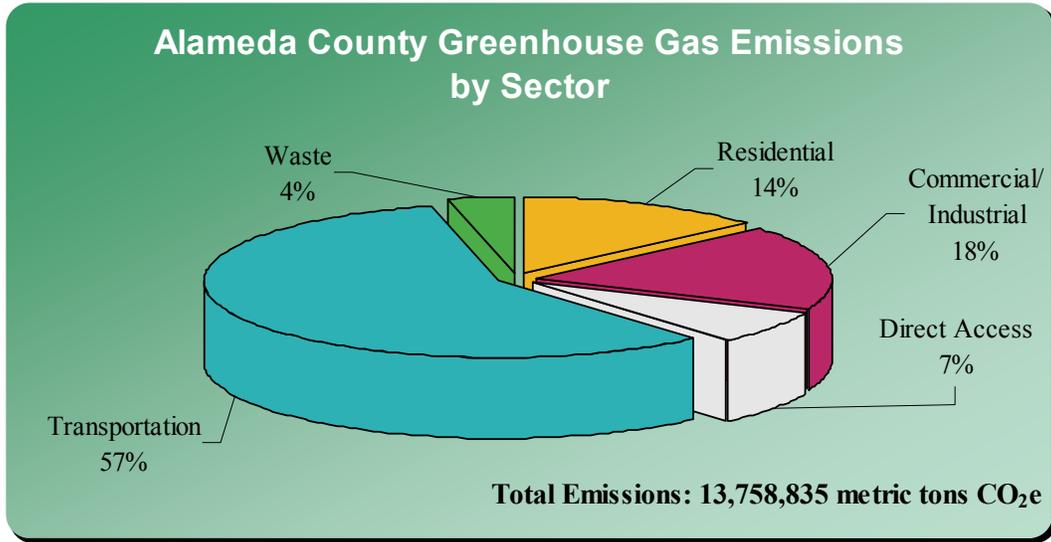
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<sup>9</sup> The 2005 report is available at: <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2005PRD.pdf>.

# Alameda County 2005 Community Roll-up Inventory

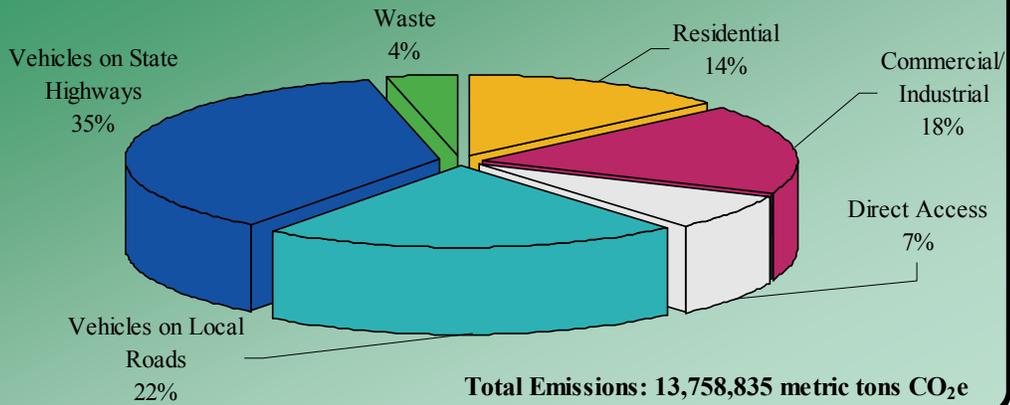
## Detailed Results

*Overview of all sectors and sources*

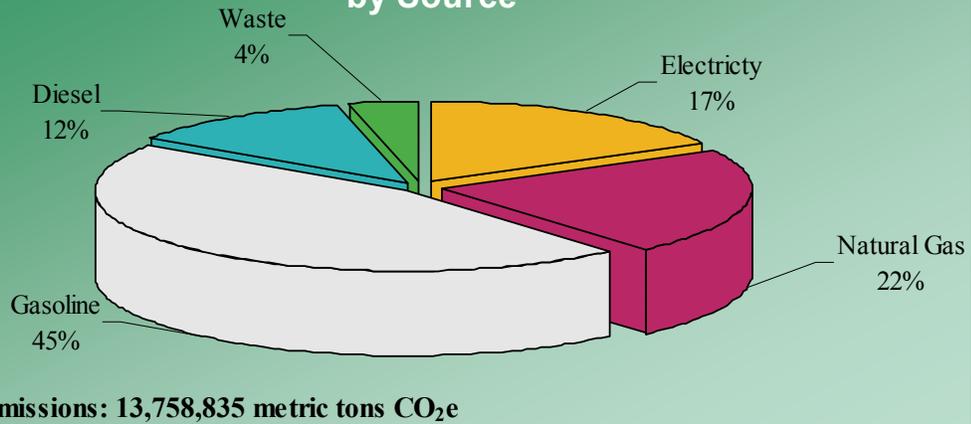


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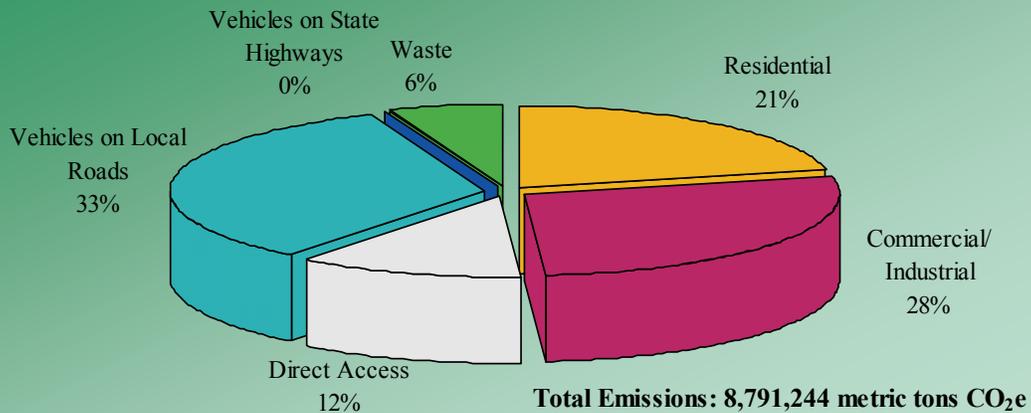
## Alameda County Greenhouse Gas Emissions by Sector



## Alameda County Greenhouse Gas Emissions by Source

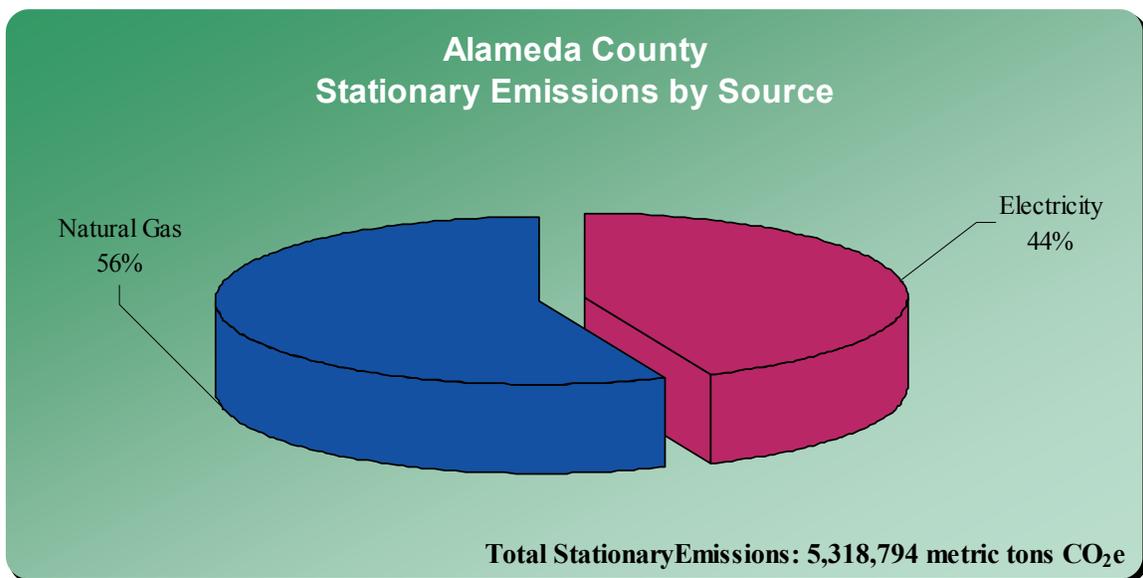
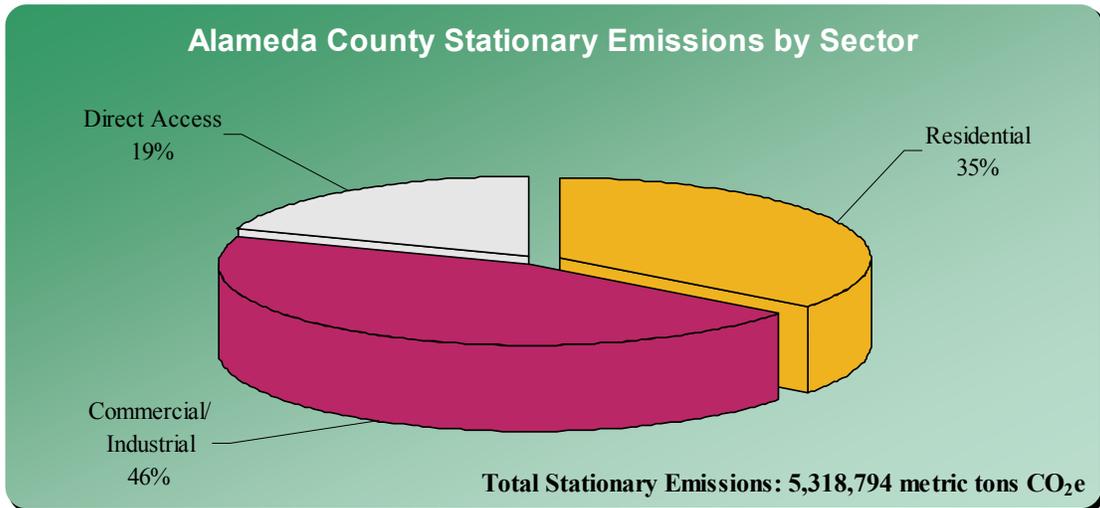
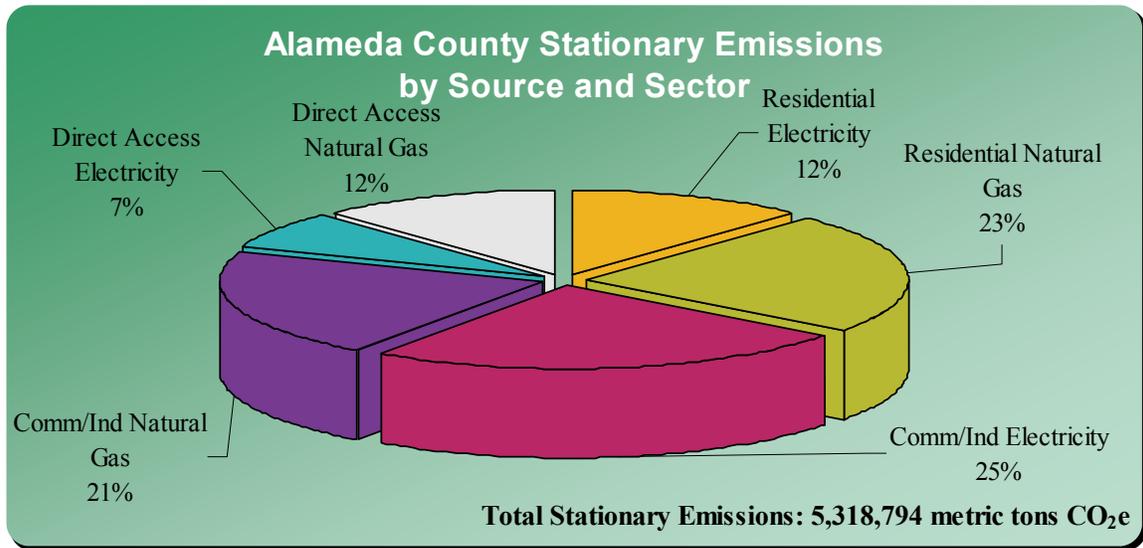


## Alameda County Greenhouse Gas Emissions by Sector (without highway VMT)

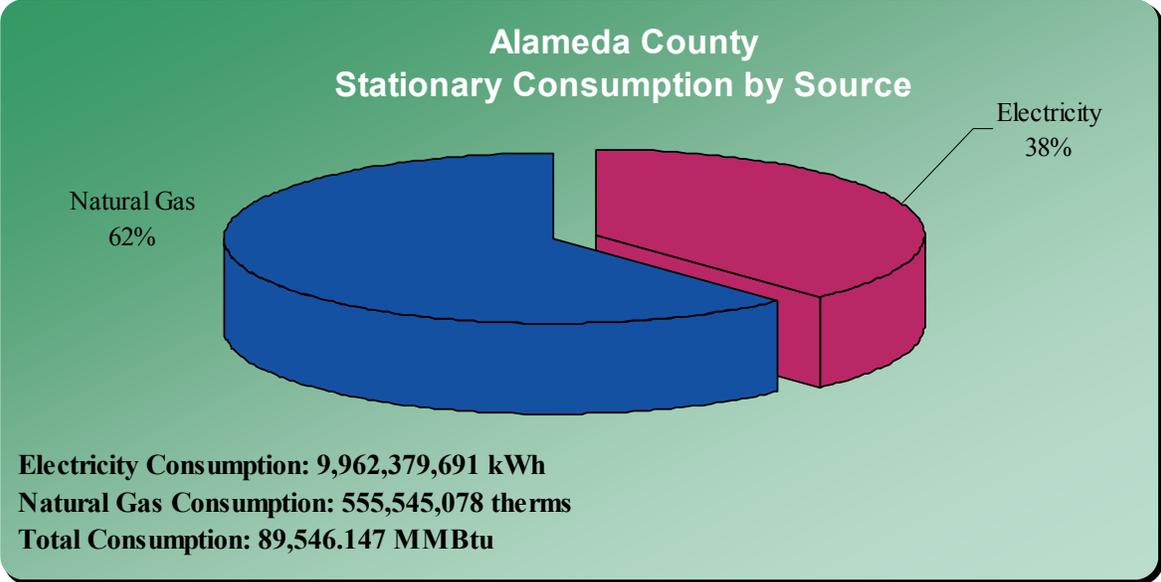


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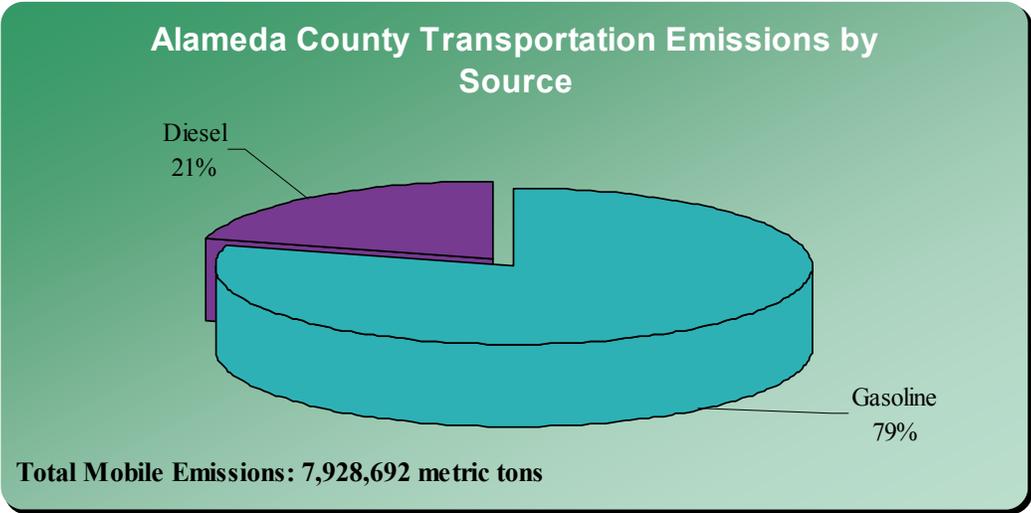
## Stationary Sources (additional details)



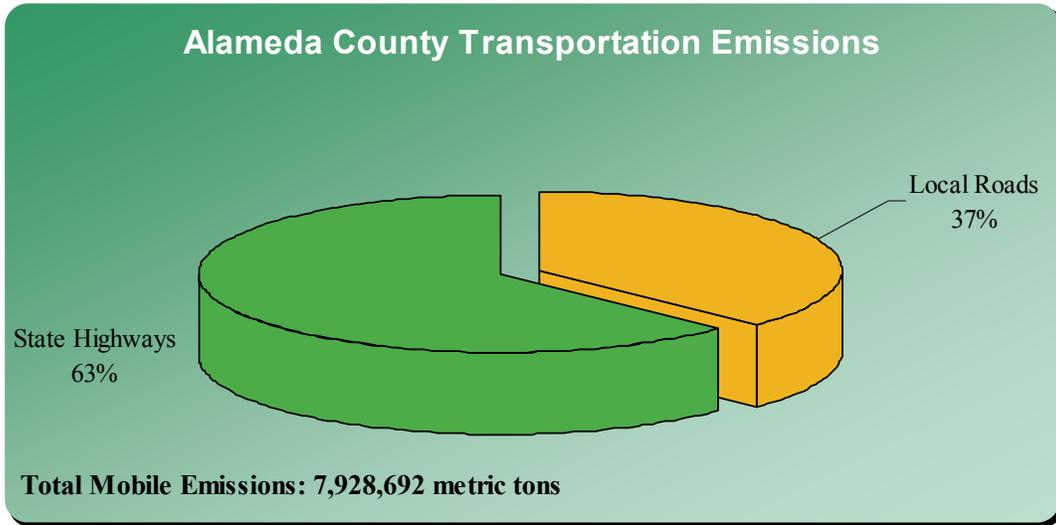
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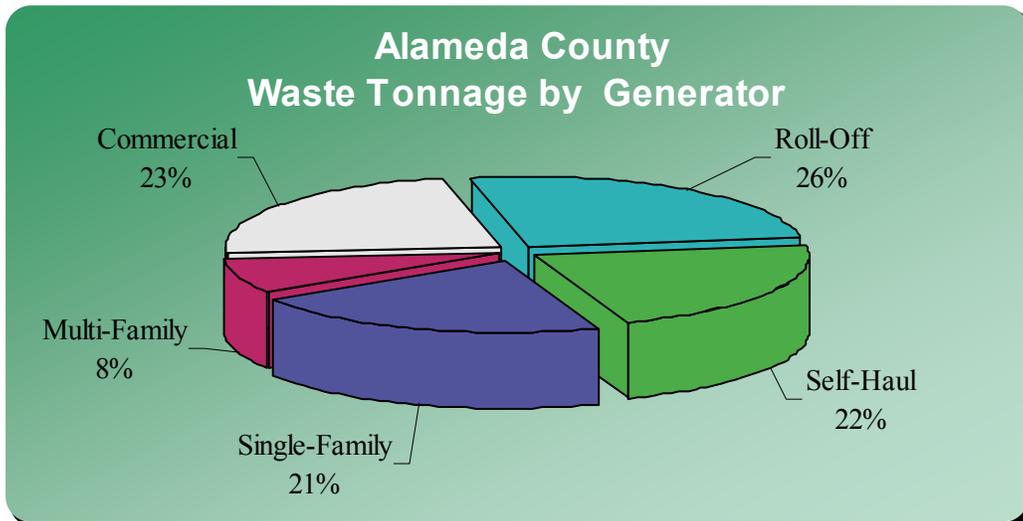
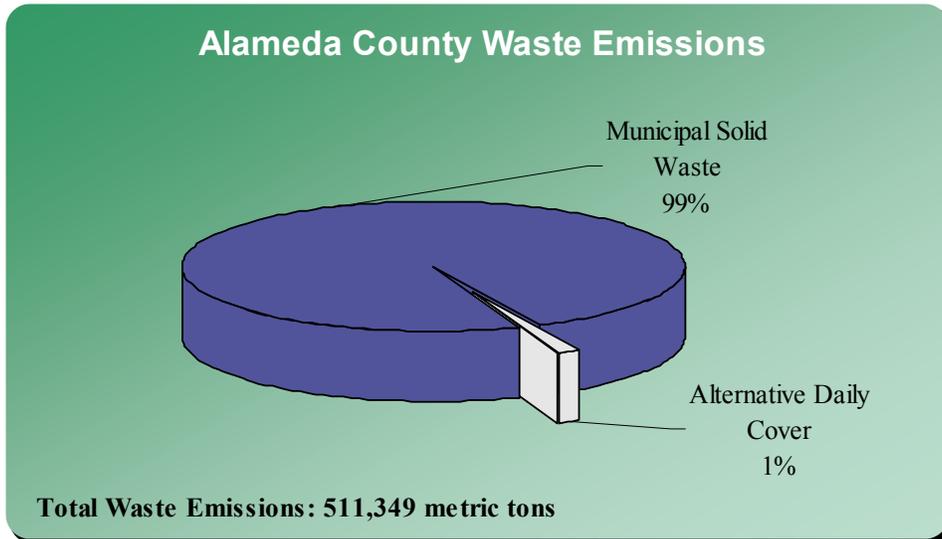
### Mobile Sources (additional details)



# Alameda County 2005 Community Roll-up Inventory



## Waste Sector (additional details)



Alameda County 2005 Community Roll-up Inventory

