# California State Legislature

## JOINT LEGISLATIVE COMMITTEE ON CLIMATE CHANGE POLICIES

ASSEMBLYMEMBER CRISTINA GARCIA, CHAIR
SENATOR HENRY STERN, VICE CHAIR

INFORMATIONAL HEARING
"Annual Update on Statewide Trends of Greenhouse Gas Emissions and Indicators"

Hearing Goal

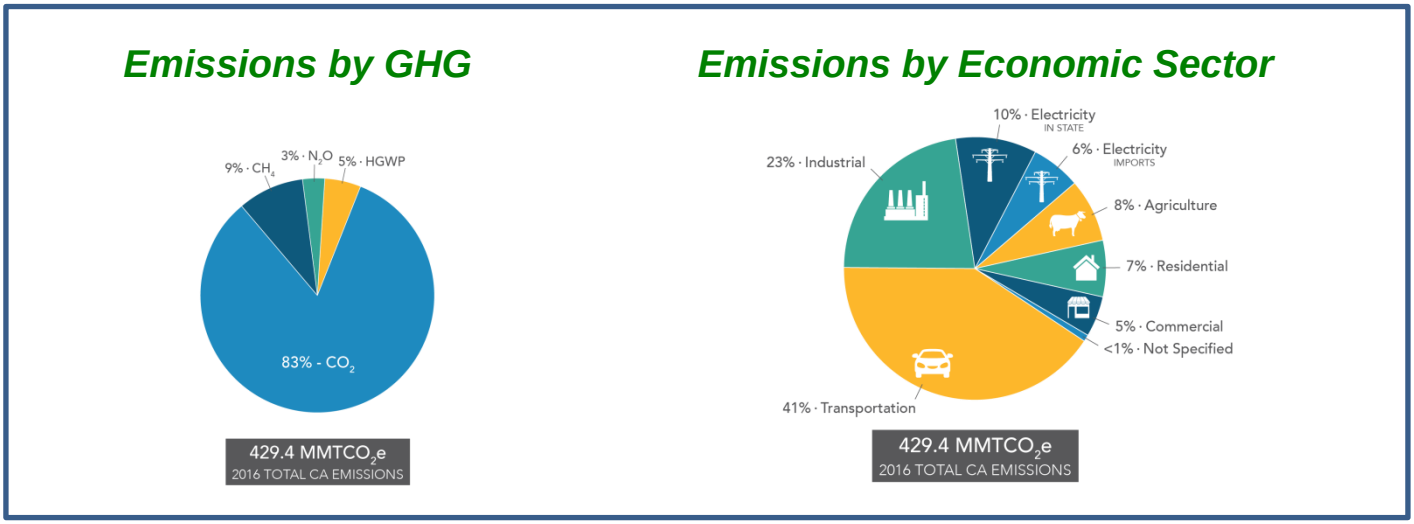
Assembly Bill 197(Garcia, Chapter 250, Statutes of 2016) requires the chair of the California Air Resources Board (ARB) to appear annually before the Joint Legislative Committee on Climate Change Policies (JLCCCP) to present an informational report on the reported greenhouse gases, criteria pollutants and toxic contaminants from all sectors covered by the ARB's scoping plan. The goal of this hearing is to provide members with an evaluation of emission trends and information regarding the regulatory requirements, initiatives, and other programs that may influence those trends. The report may also include recommendations from ARB for legislative action and consideration.

Background on Reported Statewide Greenhouse Gas Emissions

A. General

California's annual statewide greenhouse gas (GHG) emission inventory is an important tool for establishing historical emission trends and tracking California's progress in reducing GHGs. In concert with data collected through various California Global Warming Solutions Act (AB 32) programs, the GHG inventory is a critical piece in demonstrating the state's progress in achieving the statewide GHG target. The inventory provides estimates of anthropogenic GHG emissions within California, as well as emissions associated with imported electricity. However, natural sources are not included in the inventory. ARB is responsible for maintaining and updating California's GHG Inventory per Health and Safety Code section 39607.4.

The inventory includes estimates for carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases with high global warming potentials (High-GWP) which includes hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3). It uses an inventory scope and framework consistent with international and national GHG inventory practices. An updated emission inventory is published annually to include additional years and improved estimation methods. Archives of all previous inventory data and documentation are available at: https://ww3.arb.ca.gov/cc/inventory/pubs/pubs.htm.




*Source:* *https://ww3.arb.ca.gov/cc/inventory/data/data.htm*

B. Data Overview

Statewide emission estimates rely on state, regional or federal data sources, and on aggregated facility-specific emission reports from ARB's Mandatory GHG Reporting Program (MRR). Calculation methodologies are consistent with the 2006 IPCC guidelines. The current inventory uses 100-year global warming potential (GWP) values from the IPCC Fourth Assessment Report, consistent with current international and national GHG inventory practices. Full documentation of data sources and methods is available below or by using the detailed documentation index.

In preparation for each new edition of the inventory, recalculations are made to correct errors, incorporate new methodologies or, most commonly, to reflect changes in statistical data supplied by other agencies. Emission estimates are recalculated for all years to maintain a consistent time-series following IPCC recommendations for developing GHG inventories. Thus the new inventory may report a different emission level for an earlier year than previous inventory editions.

The California GHG inventory is categorized in three ways:

1. Scoping Plan; follows the categories identified in the AB 32 Scoping Plan.
2. Economic sectors; allows for comparison with other ARB emission inventories, which are similarly categorized.
3. IPCC process-oriented categories; follows the IPCC categorization to ensure comparability with international inventories.

## Background on Examples of Significant Greenhouse Gas Emissions Impacts on Vulnerable Urban Communities

A. Urban Heat Islands

Large urbanized areas can experience higher temperatures, greater pollution and more negative health impacts during hot summer months when compared to more rural communities. This phenomenon is known as an urban heat island. Heat islands are created by a combination of

heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators) and the absence of vegetation (which provides evaporative cooling). According to the U.S. Environmental Protection Agency, daytime temperatures in urban areas are on average 1-6° F higher than in rural areas, while nighttime temperatures can be as much as 22° F higher as the heat is gradually released from buildings and pavement.

The concentration of heat in urban areas creates health risks both because of heat exposure and because of the enhanced formation of air pollutants, especially ozone. The strong influence of the urban heat island on nighttime temperatures limits the ability of people to cool down and recover before the heat of the next day, and therefore adds to the risk of illness and fatalities. Those most susceptible to heat include pregnant women, young children, the elderly, and people with certain preexisting conditions such as diabetes or heart disease, and people who work or exercise outdoors. These issues are summarized in the report "Preparing California for Extreme Heat", published by the California Climate Action Team's Public Health Workgroup[1].

Major increases in deaths, hospitalizations, and emergency room visits have been documented to occur during heat waves. Further, even during a non-heat-wave period, there are clearly documented associations between increased temperatures and a range of health problems. Increased hospital visits and emergency room visits have been documented in California from increased heat, including visits due to respiratory disease, emphysema, heart disease, heart attacks, stroke, diabetes, renal failure, intestinal infections, heat stroke, dehydration, hypertension, and asthma. For every increase of temperature by 10° Fahrenheit, there is a nearly 9 percent increase in preterm births. Many of these studies are summarized in the Human Health Impacts of Climate Change, a summary compiled by the Office of Environmental Health Hazard Assessment[2].

Because urban heat islands result in locally higher temperatures, they also have significant effects on energy consumption. Additional air conditioning is required to counter-balance the increased temperatures, thereby increasing greenhouse gas emissions. This problem is especially serious because heat intensity is projected to increase significantly with climate change, thereby exacerbating the urban heat island cycle.

B. Case Study: West Oakland

The West Oakland Environmental Indicators Project (WOEIP) is a community-based organization with recognized leadership in local air pollution issues related to greenhouse gas emissions. West Oakland and Downtown Oakland communities are exposed to some of the highest levels of air pollution in the Bay Area. For instance, A 2008 California Air Resources Board (CARB) health risk assessment found that West Oakland residents are exposed to air concentrations of diesel pollution that are almost three times higher than average background levels in the Bay Area, and that 71 percent of air pollution risk was attributable to truck traffic[3]. Air pollution also varies significantly within neighborhoods and even within individual city blocks.

[1] California Climate Action Team's Public Health Workgroup, "Preparing California for Extreme Heat," available at https://www.climatechange.ca.gov/climate_action_team/reports/Preparing_California_for_Extreme_Heat.pdf

[2] Office of Environmental Health Hazard Assessment, Human Health Impacts of Climate Change, available at https://oehha.ca.gov/climate-change/general-info/human-health-impacts-climate-change

[3] California Air resources Board, Diesel Particulate matter health Risk Assessment For the West Oakland Community," available at https://ww3.arb.ca.gov/ch/communities/ra/westoakland/documents/westoaklandreport.pdf

West Oakland and Downtown Oakland communities are also known to experience high health burden. According to the Alameda County Public Health Department, residents of West Oakland and Downtown Oakland neighborhoods have higher rates of asthma emergency room visits as well as stroke and congestive heart failure as compared to the rest of the county. While many factors contribute to these health disparities, studies show that exposure to higher concentrations of air pollutants — like black carbon, NO and NO2 — are associated with greater risk of heart disease, stroke and asthma. Further, these pollutants are associated with poorer health at every stage of life, from pregnancy and development in the womb to heart attacks leading to death.

Greenhouse gas emissions cause global temperatures to rise and weather patterns to shift. This creates a significant risk to the ecological resources, public health, and economy of urban communities, like West Oakland. Projected impacts include rising bay waters, increased risks of flooding, more days of extreme heat, and increased fire danger. These hazards are magnified for communities of color and low-income communities in areas that face the most risk associated with climate change.

C. Case Study: San Joaquin Valley

The San Joaquin Valley Region makes up the southern half of California's Central Valley, a 460-mile basin extending through the heart of the state. The region encompasses the entirety of San Joaquin, Stanislaus, Merced, Kings, and Tulare County and part of Madera, Fresno, and Kern County. The eight counties that compose the region are home to over four million people, more than a tenth of California's population. Sustaining agricultural productivity in the San Joaquin Valley will require improved adaptation and mitigation strategies such as shifts in cropping patterns, use of limited water supply, and repurposing of fallowed lands.

Agriculture is one of the most vulnerable sectors under climate change due in part to more frequent and severe drought, as well as tighter water supply. According to researchers from the University of California Merced, infrastructure in the San Joaquin Valley, including urban, water, and transportation systems, may face increased stress from higher temperatures and extreme precipitation events, including droughts and floods[4]. The direct link between the greenhouse gas emissions from the transportation sector and the public health sector point toward exacerbated poor air quality and its direct negative effects on the most vulnerable communities in the San Joaquin Valley. Mitigation strategies to reduce emissions through improved modes of transportation will have positive effects on public health and climate adaptation.

Public health in the San Joaquin Valley will also be exacerbated by many negative impacts from climate change. Warmer temperatures will facilitate the spread of disease, worsen air quality from extended agricultural fallowing, and challenge food security in disadvantaged communities. At the same time, concentration of pollutants in drinking water, particularly in small community water systems and rural household drinking wells, may increase the incidence of waterborne diseases. Disadvantaged rural communities are likely to experience more intense impacts from extreme events compared to urbanized areas. They are often less equipped to rebound from such events given their rural geography and historic underinvestment, and thus are likely to be disproportionately impacted by economic and environmental stressors under future climate conditions.

[4] Westerling, Leroy, Josue Medellin-Azuara, Joshua Viers. (University of California, Merced). 2018. San Joaquin Valley Summary Report. California's Fourth Climate Change Assessment. Publication number: SUMCCCA4-2018-003.