CALIFORNIA
AIR RESOURCES BOARD

Frequently Asked Questions: Greenhouse Gas Emissions Inventory

2022 Edition: Emissions covering years 2000-2020

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; natural sources are not included in the inventory.

The AB 32 Inventory includes sources of emissions within the state's borders, as well as imported electricity consumed in the state over a calendar year. The scope is defined in AB 32, and the format for the inventory is consistent with Intergovernmental Panel on Climate Change practices to allow for comparison of statewide GHG emissions with those at the national level and with other international GHG inventories. Statewide GHG emissions calculations use many data sources, including data from other state and federal agencies.

Each year, CARB posts an edition for that year of the GHG Inventory. Because of the time needed for other state and federal government agencies to compile the source data used in CARB's GHG Inventory, and the time needed for CARB staff to assemble and verify the multiple sources of data, the annual edition of the inventory covers the time period two years prior. Thus, the 2022 edition of the GHG Inventory covers 2020. Along with the GHG Inventory, CARB staff also issue an annual Trends Document that covers changes in the inventory on a sector-by-sector basis to provide an accessible but deeper look at the data.

- The 2022 GHG Inventory can be found here: *https://ww2.arb.ca.gov/ghg-inventory-data*
- The 2022 GHG Inventory Trends Document can be found here: *https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf*

The document below provides responses to frequently asked questions related to the 2022 edition of the GHG Inventory.

2020 was the beginning of the COVID-19 pandemic. Did that impact the GHG Inventory?

Yes. In 2020, greenhouse gas emissions fell by 35.3 million metric tons (MMT), the largest decline as a percentage of the previous year's total in the more than 20 years the state has been tracking emissions. This is likely the result of the pandemic, the stay-at-home orders, and the related drop in travel (transportation emissions fell by 16%) and contraction of the economy.

How much did the economy contract, and how did that impact the GHG Inventory?

The state's economy contracted 2.8%, the likely reason that the industrial sector saw a decline of 7 MMT (9%), and the related reduction of 13% in oil and gas production emissions, and a 10% drop in refining and hydrogen production emissions as demand dropped for petroleum products during the pandemic.

Does this mean that we accelerated our progress in 2020 towards our climate reduction goals?

Because of the pandemic, the GHG data from 2020 is an outlier and cannot be used as a reliable data point for subsequent years as GHG emissions are likely to increase as the economy recovers. This important consideration was noted in the Draft 2022 Scoping Plan Update:

> "It is also worth noting that the COVID-19 pandemic had significant impacts on economic activity in California and elsewhere. Emissions were significantly lower in 2020 due to the impacts of the global pandemic. There is an expectation that emissions will increase as the economy recovers and behaviors continue to shift from the impacts of the ongoing pandemic. As a result, 2020 should be regarded as an outlier in the emissions trends."

Even though 2020 was unprecedented, is it possible to determine if the state's climate programs were continuing to impact GHG emissions?

Yes. CARB employs a statistic that determines the amount of greenhouse emissions that are needed to generate each million dollars of the state's economy. This statistic is a determination of the overall carbon intensity of the economy and tracks the degree to which fossil fuels and a range of climate-warming chemicals are needed to generate products and services. As carbon intensity drops, the state's economy is getting 'cleaner,' the ultimate goal of California's climate programs. In 2020, it is noteworthy that the GHG emissions per capita continued to

decline (to 9.3 tons per person), demonstrating that the economy was using proportionately fewer fossil fuels overall to generate the state's sum total of products and services.

Is transportation still the largest source of GHG emissions in 2020?

Yes. Transportation accounts for 37% of all GHG emissions in the state, considering the tailpipe emissions alone. That is, the emissions from burning fossil fuels such as gasoline and diesel. When you also include emissions from refining and oil and gas extraction operations, transportation accounts for about half of the state's GHG emissions.

Were there any trends in the transportation sector that point to progress by transportation-related climate programs?

Yes. The use of bio- and renewable diesel fuel continued to increase, and those replacements of fossil fuels now constitute 21% of all diesel fuel used in the state. In addition, there was an 18% growth in the number of fully electric all-battery cars on the road, the largest increase in any year to date.

Was there any change in methodology to the 2020 inventory?

Yes. The annual GHG Inventory is one tool to assess progress towards our statewide targets and is derived from multiple sources, including external data. The 2022 GHG Inventory features changes in methodology that resulted in an adjustment of the sectoral totals to correct a data discrepancy that was identified during the detailed reconciliation process of the inventory development.

What changes were employed this year in the inventory?

The changes this year resulted from aligning several sectors related to fossil gas and diesel fuel usage with data from the Regulation for the Mandatory Reporting of GHG Emissions (*MRR*). This includes fossil gas used in industrial, residential and commercial sectors, a correction for volumes of fossil gas used in refineries, use of MRR emission factors, an adjustment to the fossil component of denaturant in ethanol, and other minor changes.

What was the impact of this change in methodology?

The adjustment as a result of the changes in methodology resulted in lowering the 2019 emissions from 418.2 million metric tons of carbon dioxide equivalents (MMT CO_2e) to 404.5 MMT CO_2e, an overall reduction of 3.3%.

Were other years also adjusted?

Yes. To ensure conformity and in accordance with Intergovernmental Panel on Climate Change (IPCC) guidelines, inventories from previous years have also been adjusted to reflect the methodology changes noted above. One result of this adjustment is that California achieved the AB 32 goal of meeting 1990 emissions of 431 MMT in 2014 rather than 2016, since the inventory for that year was adjusted from 443 MMT to 428.2 MMT.

Have there been other changes to GHG inventory methodology in previous years?

Yes. In the past, changes in the inventory were made to reflect shifts in the global warming potential of some gases as determined by the IPCC. As was done with each of the previous updates, CARB realigns the previous years' inventories to be sure that each years' emissions are comparable when a methodology change is made. As noted, for the 2022 edition, we applied the updated methodology to inventories for previous years.

What is the Mandatory Reporting Regulation for GHG Emissions?

The Mandatory Reporting Regulation for GHG emissions requires facilities and entities with more than 10,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) of combustion and process emissions, all facilities belonging to certain industries, and all electric power entities to submit an annual GHG emissions data report directly to CARB. This regulation also requires that reports from entities that emit more than 25,000 $MTCO_2e$ be verified by a CARB-accredited third-party verification body. These reporters include gas-fired power plants, refineries, cement plants, food processors, transportation fuel suppliers, and fossil gas suppliers, among others.

The sources that report under the MRR make up approximately 80% of the total sources included in the AB 32 Inventory. Sources not reported under MRR, but still included in the AB 32 Inventory, include fugitive methane emissions from dairies, and high global warming gases from refrigerant leaks. More information on MRR emissions reports can be found *here*.

What specific changes in the 2022 Edition of the AB 32 Inventory were the result of the methodology changes related to Mandatory Reporting Regulation?

- The MRR reported and verified diesel fuel is now used as the total of fossil fuel consumed in the state for applicable sectors, resulting in a decrease in emissions statewide.
- The inventory now uses MRR CO2 emission factors for gasoline and also assumes MRR reported ethanol that is 2.5% fossil denaturant rather than 5% fossil denaturant. These changes led to a decrease in gasoline consumption emissions for most years.
- The inventory corrects double counting of refinery gas (gas that is not imported by pipeline or truck but produced from the refining process itself and used to power operations in refineries).
- The inventory now uses total MRR supplier fossil gas as the total of fossil gas in the inventory, resulting in a decrease in emissions statewide

Why were these changes included in this edition of the Inventory?

When developing the first CARB inventory in 2007, federal or other state level data sets were used to compile the AB 32 inventory because no emissions data were reported from facilities and fuel suppliers. That data under MRR was first reported in 2008 with third-party verification of these reported data in 2009 for the 2008 emissions data reports. From 2007 until 2011, the MRR requirements were being aligned to the maximum extent feasible with the federal GHG reporting regulation. Over time, CARB also began to gradually integrate the 'bottom-up' third-party verified MRR data into the AB 32 Inventory to ensure the most accurate accounting of emissions. Since the MRR data only covers a subset of the sources included in the AB 32 Inventory, the inventory must still rely on additional sources of state and national level data sets to be comprehensive of all sources in the state.

Over the past few years, CARB has been steadily integrating reported and verified data for sectors such as cement and electricity. The 2022 Edition completes the final integration of MRR emissions data from other sectors into the development of the AB 32 Inventory.

Does this new methodology impact the 2022 Scoping Plan Update?

No. For the 2022 Scoping Plan, the E3 PATHWAYS model was calibrated with a combination of MRR data and AB 32 Inventory data. This means the methodology updates and correction for the error in the refinery sector to the 2022 Edition are already accounted for in the 2022 SP modeling. CARB previously provided a more *detailed response* to differences between the Draft 2022 Scoping Plan modeling and public AB 32 Inventory data in a FAQ posted earlier this year.

Do these changes impact any other climate programs like the Cap-and-Trade program?

No. The changes to the inventory methodology do not affect the implementation of the Cap-and-Trade Program as it relies on both reported and third-party verified data collected under MRR. Similarly, for the Low Carbon Fuel Standard, CARB relies on data directly collected from the regulated sources, which are third-party verified and established in regulation.