

The California's Polluters Pay Climate Superfund Act ([SB684](#) Menjivar/[AB1243](#) Addis) A Strong Scientific Basis

Fossil fuel emissions are worsening climate hazards across California, causing more destructive wildfires; more extreme heat waves, drought, rainfall and flooding; rising temperatures and sea levels; and ocean acidification.

The Polluters Pay Climate Superfund Act establishes a program to assess fees on the largest fossil fuel polluters to pay their fair share of the climate damages they've caused in California.

Well-established climate attribution science allows California to attribute the damages from climate hazards in the state to specific fossil fuel polluters.

1. Scientists can quantify the contribution of fossil fuel emissions to particular climate hazards in California, past, present, and into the future.

Using consensus, peer-reviewed methods, **attribution science allows scientists to determine if fossil fuel emissions made climate hazards more severe or more likely to occur—and to quantify by how much.**¹

One standard climate attribution approach compares the severity or likelihood of a climate hazard under two scenarios: (1) a “counterfactual” scenario in which atmospheric GHG concentrations are kept at levels before humans started burning fossil fuels; and (2) an “actual” scenario in which atmospheric GHG concentrations increase over time due to the burning of fossil fuels, as they have in the real world.

By comparing model outcomes with and without fossil fuel emissions, scientists can quantify how much more severe or likely a climate hazard has become because of fossil fuel emissions. For example, if an extreme heat wave occurs three times more often in the scenario that includes fossil fuels emissions compared to the scenario without those emissions, scientists can determine that those fossil fuels emissions made that heat wave three times more likely.

Climate attribution studies have determined that fossil fuel emissions increased the likelihood and severity of climate change hazards across California, including more extreme heat waves,² increased likelihood of extreme fire weather,³ increased wildfire area burned,⁴ and intensified drought.⁵

Scientists can even identify emissions from specific fossil fuel polluters and compare the severity or likelihood of climate hazards with and without those polluters' specific emissions. For example, climate attribution research has quantified the contribution of major fossil fuel polluters' emissions to surface temperature rise, sea level rise, ocean acidification, and area burned by wildfire.⁶

2. Scientists can estimate the costs caused by fossil fuel emissions-driven climate hazards in the state.

The Polluters Pay Climate Superfund bill directs CalEPA to complete a climate cost study to quantify the total damages to the state caused by past fossil fuel emissions released from 1990 through 2024.

Scientists use a variety of peer-reviewed methods to estimate the costs caused by emissions-driven climate hazards. “Bottom-up” methods involve adding up the costs caused by a particular climate hazard across sectors—such as the costs of an extreme heat wave to public health, agriculture, infrastructure, and labor productivity—to estimate the total damages caused by that climate hazard. Climate attribution science allows scientists to quantify how much more likely or severe that heat wave was due to covered emissions, to estimate the damage attributable to those emissions.

“Top-down” methods estimate the changes in economic growth attributable to an emissions-driven climate hazard, using macroeconomic indicators such as gross domestic product and damage functions. These methods estimate how much economic growth was lost in the state due a particular climate hazard.

CalEPA can draw upon numerous existing studies that provide estimates of emissions-driven damages and costs in California, in addition to supporting new studies. Even with these studies, CalEPA’s calculation of total damages will represent a significant underestimate because it is so difficult to fully account for the wide array of costs caused by climate change, and because some climate damages are difficult or impossible to measure in dollar amounts.

3. Scientists can attribute cost estimates of damages to particular fossil fuel emissions and emitters.

The Polluters Pay Climate Superfund bill directs CalEPA to identify responsible fossil fuel polluters and assess fees on the largest polluters, proportional to their fossil fuel emissions from 1990 through 2024. **Research shows that nearly two-thirds of all industrial CO₂ and methane emissions are caused by just 90 of the world’s largest carbon producers, 83 of which are fossil fuel producers.**⁷

The bill directs CalEPA to calculate the “proportionate share percentage” for each responsible polluter as the ratio of the polluter’s covered fossil fuel emissions to covered fossil fuel emissions globally. CalEPA must then quantify the “cost recovery demand” for each responsible polluter as the ratio of that polluter’s proportionate share percentage multiplied by the total damage amount to the state. This linear apportioning method is scientifically sound because **climate models consistently show that global warming is closely proportional to cumulative CO₂ emissions. CalEPA can estimate total covered emissions for each responsible polluter from peer-reviewed consensus-based data, such as, for example, the [Carbon Majors’ database](#).**⁸

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⁸ Carbon Majors Database, <https://carbonmajors.org/>