Under AB 32, California's climate change law, "greenhouse gas" is defined to include carbon dioxide, methane, nitrous oxide, and some fluorinated gases. But the bulk of the state's efforts to date have focused primarily on the first. CO_2 is undeniably the primary offender: It accounts for about three quarters of annual global emissions, and is responsible for roughly half of the anthropogenic warming we've observed so far. Those numbers are substantial, and they mean that any meaningful response has to highlight CO_2 reductions. But they also leave plenty of culpability on the table, to the tune of about half the overall problem to date.

The other gases and pollutants involved have much stronger warming effects than CO_2 in the short-term, but they generally don't stay in the atmosphere nearly as long. But they're important, nonetheless, because they offer opportunities for significant near-term improvements. These non-CO_2 pollutants, which include mainly those other AB 32 GHGs and black carbon (not a gas, but a particulate), are generally known as "short-lived climate pollutants."

These pollutants have recently been getting attention in California. Last fall, the state enacted SB 605, "Short-lived climate pollutants," which charges the California Air Resources Board (ARB) with developing "a comprehensive strategy" to reduce emissions of these pollutants by the end of this year. Governor Brown singled out a couple short-lived climate pollutants in his latest State of the State address. According to ARB Chair Mary Nichols, the state will have to make enormous reductions in short-lived climate pollutant emissions by 2030 in order to meet its 2050 climate goals.

Methane is the most common, and the most damaging, short-lived climate pollutant. Its warming impacts are over 20 times more potent than CO_2, according to the most common comparison metric, and it persists in the atmosphere for over a decade. ("Short-lived" is relative to CO_2, which pretty much sticks around until it gets absorbed somewhere, usually the ocean.) It is the key ingredient in natural gas, and best known as the product of leaks and releases associated with petroleum operations. In January, the White House announced a 10-year goal to cut oil and gas methane emissions by nearly half.

But the primary source of methane?

Livestock. Farm animals—particularly ruminants like cattle, goats, and

sheep—produce methane on an enormous scale. This methane comes both from manure, and directly, through the process known as “enteric fermentation” (essentially, a scientific euphemism for the sorts of activities Homer Simpson is known for). In the United States and worldwide, manure management and enteric fermentation together account for about a third of total methane emissions, more than any other source (oil and gas systems, landfills, and coal mining are other major U.S. categories).

Livestock GHGs—largely methane, but also CO_2 and nitrous oxide—are a major part of the GHG problem. The latest figures from the UN’s Food and Agriculture Organization attribute about 15 percent of global anthropogenic GHG emissions to livestock. Other estimates are much, much higher. The numbers are lower in California, but still substantial: emissions from livestock digestion and manure are comparable to those generated individually by the industrial manufacturing and commercial sectors. And livestock emissions are on the rise in California, at a time when other sectors are on the decline.

So why haven’t regulators pushed livestock emissions controls? There are a few reasons. A big one is that the emissions are really hard to measure or model. Compared to smokestacks or tailpipes, tracking emissions from cows, pigs, chickens, and their waste is complicated. For this reason, California has so far pursued only voluntary measures to control livestock emissions, like making biogas control systems (used to capture methane from manure) eligible to generate cap-and-trade offsets. Another reason is that livestock GHG regulations aren’t politically palatable. Any strong controls would likely drive up the cost of animal products, an outcome a lot of people—farmers as well as consumers—would be very unhappy with. Consider the uproar when California started regulating fuel suppliers under AB 32—the so-called “hidden gas tax.” Now ponder the repercussions of a “hidden milk tax,” or a “hidden hamburger tax.” Ads against the “gas tax” already showed California taking candy from children; imagine what would happen if the state went after their Happy Meals.

There’s another thing different about farm animal emissions. Generally, climate policy focuses on reducing *anthropogenic* emissions, and there’s something a little odd about characterizing emissions from cows as human-caused. Not convinced? Me neither—to me, this account feels like a blame-it-on-the-doggy response. But industry has made the argument. Straight from the horse’s -ahem- mouth, the California Cattlemen’s Association, from a comment letter to ARB:

> [G]reenhouse gas emissions associated with livestock production both in California and at the national level are negligible. Almost all emissions associated with livestock production are biogenic and are the result of ruminant animals converting feed and forage to energy during digestion and therefore cannot be controlled.

Arguments to the contrary aside, the impacts of animal agriculture—particularly those of methane emissions—are too big to write off. California has admitted that the voluntary measures aren't enough to address livestock methane. And ARB has indicated that agriculture methane controls will need to be part of the solution. SB 605, and moreover the state's 2050 goals, would seem to compel ARB to adopt some control of these emissions. But how should the state go about reducing these emissions?

Last year, the Animal Legal Defense Fund (ALDF) petitioned ARB to start regulating emissions from animal agriculture under AB 32, specifically under the cap-and-trade program and mandatory reporting provisions. The state already caps other much smaller sectors, like cement production and lime manufacturing. But with allowance trading projected at manageable prices into the future, and considering both the political implications and the difficulties in measuring livestock emissions (particularly critical for cap-and-trade, where reductions are made fungible between sectors), ARB is not likely to adopt this course, at least not in the short-term. Only a very few classes of emissions are measured for reporting but not capped, in anticipation of future regulation. (Curiously, livestock emissions were initially included in the proposed reporting requirements, apparently by mistake—they were removed in the final draft.)

A more likely result would be for ARB to make biogas control systems mandatory, or to otherwise encourage adoption of the technology through enhanced incentives. But the benefits of these systems are limited, and they're unlikely to keep pace with California's stringent climate goals. Further, this solution is unlikely to appease those (ALDF among them) who would prefer to see decreases in animal agriculture consumption, rather than just mitigation of impacts. This movement has gotten some traction lately—think Meatless Monday, for example, or the new report by the 2015 Dietary Guidelines Advisory Committee, recently addressed by Dan Farber on this site. As any good vegetarian will tell you, cutting animal products from your diet can drastically lower your personal climate impacts.

ARB is expected to announce a plan for post-2020 efforts sometime soon. And the agency will be developing a strategy to address short-lived climate pollutants sometime this year or early next. Both efforts will probably include some mechanisms for tackling animal agriculture emissions. How ambitious the targets and mechanisms will be remains to be seen. As is true for most thorny problems in environmental law, the effectiveness of these measures will be a product of both good technology and good policy design—and, of course, politics.