California Legislature

JOINT LEGISLATIVE COMMITTEE ON
CLIMATE CHANGE POLICIES
ASSEMBLYMEMBER AL MURATSUCHI, CHAIR

Informational Hearing: "Annual Update on Statewide Trends of Greenhouse Gas Emissions and an Overview of the 2022 Scoping Plan"

BACKGROUND

The California Air Resources Board is required to provide the Joint Legislative Committee on Climate Change Policies an annual update on emissions. Assembly Bill 197(Garcia, Chapter 250, Statutes of 2016) requires the chair of the California Air Resources Board (CARB) to appear annually before the Joint Legislative Committee on Climate Change Policies to present an informational report on the reported greenhouse gases, criteria pollutants and toxic contaminants from all sectors covered by the CARB's scoping plan. The report shall evaluate emission trends and include a discussion of the regulatory requirements, initiatives, and other programs that may influence those trends. The report also may include recommendations from the state board for legislative action and consideration.

2021 GHG Emissions. The table below provides preliminary estimates of California's 2021 GHG emissions for each Scoping Plan sector, in units of million metric tons of carbon dioxide equivalent (MMTCO2e).

Table 1. Estimated 2021 California GHG Emissions by Sector

Sector	2019 GHG Inventory ($MMTCO_2e$)	Ratio of MRR Emissions 2020 to 2019	Estimated 2020 Emissions ($MMTCO_2e$)	Estimated 2021 Emissions ($MMTCO_2e$)
Transportation	166	0.856	142	159.2 ±15.0
Electric Power	59	0.984	58	60.0 ±2.7
Industrial	88	0.916	81	86.1 ± 4.5
Residential and Commercial	44	0.958	42	42.4 ±1.2
Agriculture	32	N/A	32	32.2 ±0.5
High GWP	21	N/A	20	20.3 ±0.3
Recycling and Waste	9	N/A	9	8.9 ±0.1
Total	418		384	409.1 ±24.4

Source: CARB

We are not on track to meet the 2030 GHG target. SB 32 (E. Garcia, 2016) requires a GHG emission reduction target of 40 percent below the 1990 levels by 2030. Based on the latest data on 2021 GHG emissions, we are approximately two percent below that of 2019 levels. This is well short of the trajectory needed to meet the 2030 GHG target under SB 32 which would require a four percent reduction each year.

The Scoping Plan. Current law requires the California Air Resources Board (CARB) to prepare and approve a Scoping Plan at least once every five years. The Scoping Plan details California's policy path toward meeting statutorily required greenhouse gas emission goals using reductions measures that are the maximum technologically feasible and cost-effective.

Statute requires the Scoping Plan to identify the following information for each emissions reduction measure, including each alternative compliance mechanism, market-based compliance mechanism, and potential monetary and nonmonetary incentive:

a) The range of projected GHG emissions reductions that result from the measure.
b) The range of projected air pollution reductions that result from the measure.
c) The cost-effectiveness, including avoided social costs, of the measure.

CARB released its first Scoping Plan in 2008 and is currently working on its fourth scoping plan, which is scheduled to be adopted at the end of 2022.

It is important to note that the Scoping Plan itself does not predetermine the outcome of regulations. After regulations of specific programs are updated, the actual anticipated GHG reductions can be more or less than is identified by the scoping plan.

2022 Scoping Plan Update is underway. The California Air Resources Board (CARB) began development of the 2022 Scoping Plan Update in June 2021 in coordination with other state agencies. According to CARB, the 2022 Scoping Plan Update will: (1) assess progress towards achieving the 2030 target established by SB 32, (2) identify the need for potential adjustments to stay on track, and (3) lay out a path to achieve carbon neutrality no later than 2045.

The draft planning documents lays out four draft scenarios for achieving carbon neutrality, which are designed to explore the potential speed, magnitude, and impacts of transitioning California's energy demand away from fossil fuels. According to CARB, the modeling assumptions used identify the primary fossil fuel alternative that is commercially available and technically feasible for widespread use by 2045 for each sector. CARB also assumes that any energy demand that remains after the alternative technology or fuel is applied, such as on-road internal combustion engines, industrial processes, and gas use in existing buildings that have not yet decarbonized, will continue to be met by fossil fuels, resulting in residual emissions. All four scenarios are detailed below.

- Alternative 1: Achieve carbon neutrality by 2035 with nearly complete phase out of combustion, limited reliance on engineered carbon removal, restricted applications for biomass derived fuels, and ambitious innovation in electric technology and aggressive consumer adoption trends (e.g. electric aviation adoption and 100% electrification by 2035).

- Alternative 2: Achieve carbon neutrality by 2035 with a full suite of technology options, including engineered carbon removal.
- Alternative 3: Achieve carbon neutrality by 2045 with a broad portfolio of existing and emerging fossil fuel alternatives and alignment with statutes and executive orders.
- Alternative 4: Achieve carbon neutrality by 2045 with existing and emerging technologies, slower rate of clean technology and fuel deployment and consumer adoption.

CARB asserts that they are continuing to evaluate whether natural and working lands will produce residual GHG emissions that must be compensated for in 2035 and 2045 to meet the carbon neutrality goal. CARB intends to use the results of the natural and working lands modeling to help determine the extent to which natural and working lands can be relied upon to compensate for residual emissions from fossil fuel combustion and release of non-combustion GHGs, or if they will be a net source of emissions. This consideration of the role of natural and working lands is a new one and appears inherent to the conversation of achieving emissions neutrality.

Because of the breadth and scope of the Scoping Plan update, this document only highlights a few big picture issues/concerns and is not at all exhaustive. Those concerns are below.

1. **Reliance on engineered carbon removal.** Based on the released draft, all four scenarios contemplated relies on the use of engineered carbon removal strategies. Many argue that this reliance of engineered carbon removal strategies would delay or undercut efforts in immediate direct emission reductions.

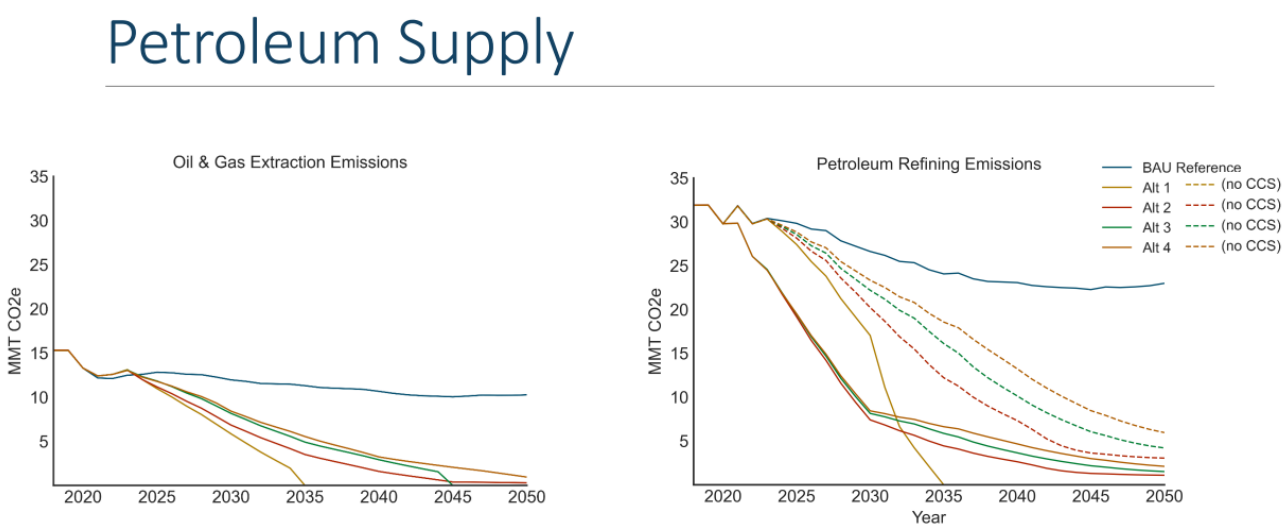
   These carbon removal strategies, which includes point source capture or CCS, and direct air capture or carbon dioxide removal, has been a topic of concern for many stakeholders. This Committee intends to hold a separate informational hearing on this topic.

2. **Overly ambitious assumptions relating to Carbon Capture and Sequestration (CCS)?** The planning documents indicates a need for CCS to varying degrees across the four scenarios in the industrial and refining sectors. CARB is assuming CCS devices have a capture rate of 90 percent, which appears to be a very optimistic assumption. Based on information from other CCS projects, the actual capture rates reported falls well below the 90 percent target. The Petra Nova CCS project in Washington, one of the largest CCS plants in the world, reported a 33 percent capture rate[1] while the Shell Quest CCS project in Canada reportedly only captured 48 percent[2].

[1] https://www.smh.com.au/national/millions-of-tonnes-of-carbon-added-to-pollution-as-gorgon-project-fails-capture-deal-20210215-p572na.html

[2] https://www.cnbc.com/2022/01/24/shell-ccs-facility-in-canada-emits-more-than-it-captures-study-says.html

Assuming CCS performs as intended, it seems questionable that the reductions will manifest immediately. The graph below shows anticipated reductions to take place within the refining sector beginning in 2023.



Source: CARB

It is unclear how CARB arrived at this conclusion and whether CARB has taken into the account the lead time needed to deploy CCS projects, such as installation, permitting, etc.

3. **Electricity generation will not be completely carbon free by 2045 even with SB 100.** SB 100 (De Leon, Statutes of 2018), established a goal for California to achieve 100 percent carbon-free electricity by 2045. SB 100 also directed the California Energy Commission, California Public Utilities Commission, and California Air Resources Board to produce a joint agency report examining pathways for California to achieve its goal of 100 percent carbon-free electricity by 2045. The report, titled 2021 SB 100 Joint Agency Report: Achieving 100 Percent Clean Electricity in California: An Initial Assessment, was released in March 2021.

   In the report, the joint energy agencies interpret SB 100 to only apply to retails sales and state agency procurement of electricity. This would mean that wholesale or nonretail sales and losses from storage and transmission and distribution lines would not be subject to the law.

   CARB's modeling reflects this interpretation. Only one of the four scenarios in the draft scoping plan update considers "total load coverage" and as a result has 0MMT of emissions in 2045. The other three scenarios still anticipates anywhere from 10 to 24 MMT of emissions by 2045.

4. **Various statutes mandate CARB to prioritize direct emission reduction strategies.** SB 32, AB 398, and AB 197 all required CARB to consider the social cost of GHG emissions when adopting rules and regulations. ARB must also prioritize both direct emissions reductions at large stationary sources of GHG emissions and direct emission reductions from mobile sources, as well as direct emissions reductions from other sources.

   It is unclear whether CARB has exhausted strategies that would provide more aggressive direct emission reductions, such as increasing the sector reduction targets or accelerating electrification.

5. **The Independent Emissions Market Advisory Committee (IEMAC) Report**. The IEMAC analyzes the environmental and economic performance of the state's cap-and-trade (C&T) program and other relevant climate policies, then reports its findings to the California Air Resources Board and the Joint Legislative Committee on Climate Change Policies.

   One of the issues identified in the 2021 IEMAC report was the need for CARB to develop an updated baseline emissions scenario that models the expected impact of non-C&T policies on GHG emissions in the 2022 Scoping Plan.

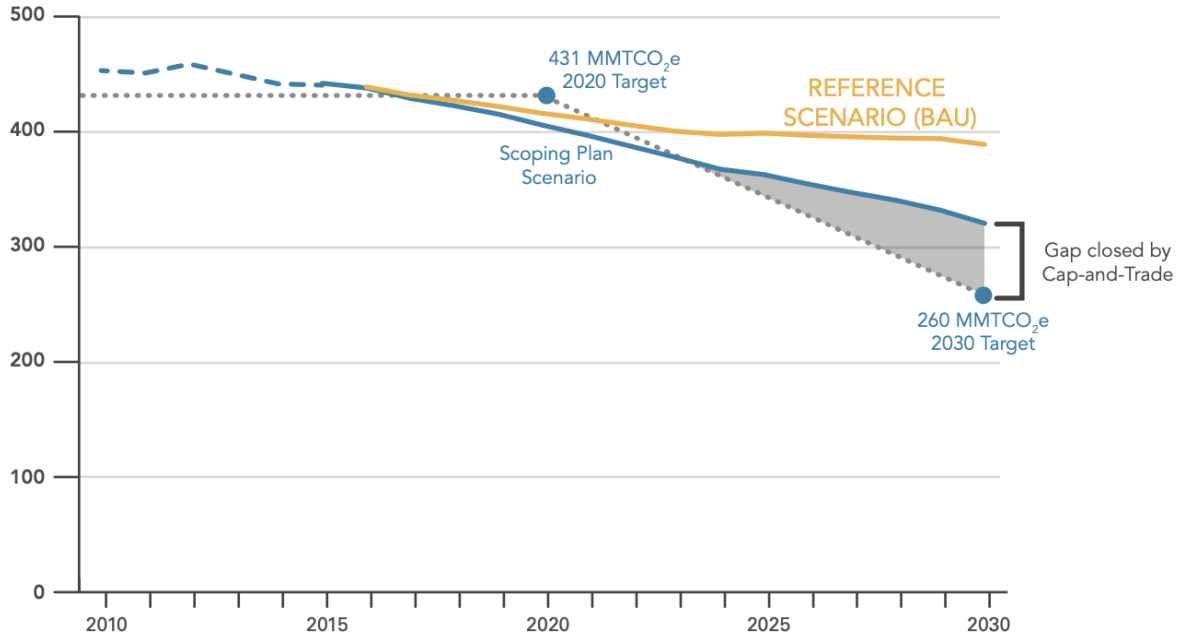
   Such a baseline scenario would help CARB identify the "gap" between the state's other policies and the C&T program and therefore the additional actions the state must take to achieve our climate goals.

   The IEMAC also recommends the 2022 Scoping Plan include an evaluation of existing policy, recommendations where existing policy could be more ambitious, and recommend what, if any, additional policy will be needed.

6. **Inadequate analysis and modeling in 2022 scoping plan.** According to the IEMAC report, the 2022 Scoping Plan, as discussed in the planning process, does not evaluate abatement potential of policies nor attribute reductions to specific measures. Rather, the 2022 Scoping Plan appears to identify technology options and subsequently choose a technology pathway, rather than identifying the potential gap between expected reductions and those reductions needed to achieve the 2030 goal or a carbon neutrality goal.

   Prior scoping plans included a baseline scenario and the reduction potential of policies, as seen in Figure 9 below from the 2017 Scoping Plan. The reference scenario represented by the yellow line is the scoping plan baseline scenario. This line models the effect of all regulations except for the cap-and-trade program, which is represented by the blue line. The "gap" to be closed by cap-and-trade is represented by the grey shaded area.

FIGURE 9: SCOPING PLAN SCENARIO GHG REDUCTIONS



Source: CARB, 2017 Scoping Plan

The draft released in March does not contain such information. Without this information, it is impossible to evaluate the performance of the C&T program in relation to the 2022 Scoping Plan and whether the cap-and-trade program is likely to make the necessary reductions to "close the gap" to the 2030 target. Additionally, we won't have information needed to anticipate the changes needed to C&T to sufficiently close the gap.

The 2017 Scoping Plan assigned the C&T program a major role in emissions reduction, applying it to 75 percent of the State's GHG emissions. If the C&T program continues to play a central tool in GHG emission reductions in the 2022 Scoping Plan, it is imperative for CARB to conduct the necessary modeling work in order to identify C&T's role and to inform how the program should be designed going forward.

7. **Environmental Justice Advisory Committee (EJAC) concerns**. The EJAC, comprised of representatives from communities with the most significant exposure to air pollution, is tasked with advising CARB in developing the Scoping Plan and any other pertinent matter in implementing AB 32. The EJAC workgroup has submitted a letter to CARB indicating concerns with process and the inadequacies of modeling and the lack of modeling results data to inform recommendations. The letter also contains numerous recommendations.

Potential Questions for the Panel:

- What is CARB doing to get us on track to meet the 2030 GHG reduction target?
- Why didn't the March scoping plan modeling work project a baseline emissions scenario that models the effect of non-cap-and-trade policies, as the 2021 IEMAC report recommended? When can we expect this information?
- How did CARB determine the appropriate carbon capture rate to assume for CCS technology?
- What is the contingency plan if the use of engineered carbon removal solutions fall short of their intended role in reductions?
- Are there direct emissions reduction measures that can be accelerated in order to maximize near-term progress?
- Has CARB explored exhausting direct reduction measures prior to deploying engineered solutions such as CCS?
- What does CARB need from the Legislature to be more aggressive on making bigger strides on direct emission reductions?