Office of Senate Floor Analyses
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UNFINISHED BUSINESS

Bill No: SB 643
Author: Caballero (D), et al.
Amended: 9/3/25 in Assembly
Vote: 21

SENATE ENVIRONMENTAL QUALITY COMMITTEE: 7-0, 4/30/25
AYES: Blakespear, Valladares, Gonzalez, Hurtado, Menjivar, Padilla, Pérez
NO VOTE RECORDED: Dahle

SENATE APPROPRIATIONS COMMITTEE: 6-0, 5/23/25
AYES: Caballero, Seyarto, Cabaldon, Grayson, Richardson, Wahab
NO VOTE RECORDED: Dahle

SENATE FLOOR: 37-0, 6/3/25
AYES: Allen, Alvarado-Gil, Archuleta, Arreguín, Ashby, Becker, Blakespear, Cabaldon, Caballero, Cervantes, Cortese, Dahle, Durazo, Gonzalez, Grayson, Grove, Jones, Laird, Limón, McGuire, McNerney, Menjivar, Niello, Ochoa Bogh, Padilla, Pérez, Richardson, Rubio, Seyarto, Smallwood-Cuevas, Stern, Strickland, Umberg, Valladares, Wahab, Weber Pierson, Wiener
NO VOTE RECORDED: Choi, Hurtado, Reyes

ASSEMBLY FLOOR: 61-0, 9/11/25 – Roll call not available

SUBJECT: Carbon Dioxide Removal Purchase Program

SOURCE: Author

DIGEST: This bill establishes the Carbon Dioxide Removal Purchase Program (CDRPP), which is intended to advance the development of carbon dioxide removal (CDR) technologies through a competitive grant program administered by the Air Resources Board (CARB), subject to future appropriation of funds for this purpose.

Assembly Amendments reframe the program as a competitive grant process rather than the state purchasing CDR credits directly, and make other technical and conforming changes.

ANALYSIS:

Existing law:

Under the Global Warming Solutions Act of 2006 and updates thereof (Health and Safety Code (HSC) § 38500 et seq.):

1) Requires the California Air Resources Board (CARB) to ensure that statewide greenhouse gas (GHG) emissions are reduced to at least 40% below the 1990 level by 2030 SB 32, (Pavley, Chapter 249, Statutes of 2016).

2) Requires CARB to prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions and to update the scoping plan at least once every 5 years.

3) Statutes, under the California Climate Crisis Act (AB 1279, Muratsuchi, Chapter 337, Statutes of 2022), that it is the policy of the state to achieve net zero GHG emissions no later than 2045, and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced to at least 85% below the 1990 level.

4) Directs CARB, under SB 905 (Caballero, Chapter 359, Statutes of 2022), to establish a Carbon Capture, Removal, Utilization, and Storage Program to, among other things, ensure all included projects minimize copollutant emissions, minimize local water and air pollution, minimize risk of seismic impacts, include specified seismic and underground carbon dioxide monitoring and reporting requirements, and monitor criteria air pollutants and toxic air contaminants.

This bill:

1) Requires CARB to do all of the following:

    a) Administer the competitive grant program, as specified.
    b) On or before January 1, 2028, and annually thereafter, conduct and publish on its internet website a survey of CDR projects existing or in development within the state, as specified.

c) Conduct at least two public workshops to receive comments from the public.

d) On or before December 31, 2027, and annually thereafter, until December 31, 2035, publish on its internet website a report describing program activities completed CDR projects to date.
e) On or after July 1, 2026, but on or before December 31, 2035, fund CDR projects in an amount totaling $50 million.
f) Only fund eligible CDR projects that meet both of the following requirements:

    i) The eligible CDR project demonstrates the ability to secure carbon removal purchases from third parties in an amount at least equal to the amount of funds provided to that project by CARB;
    ii) The eligible CDR is additional, as defined; and
    iii) To the extent feasible, provide grants CDR projects operating in at least two of the following categories: direct air capture, biomass carbon removal and storage, enhanced mineralization or enhanced weathering, and marine carbon dioxide removal.

g) Prioritize the following criteria in selecting eligible CDR projects through the program:

    i) The potential of an eligible CDR project to accelerate development of CDR strategies to the scale needed to achieve the state target for total CDR by the year 2045;
    ii) The potential of an eligible CDR project to be completed on or before December 31, 2035;
    iii) The anticipated impacts of the community benefit mechanisms associated with an eligible CDR project; and
    iv) Distribution of program funds across multiple geographic areas and multiple eligible CDR project categories.

h) On or before January 1, 2028, adopt guidelines for the program that include all of the following:

    i) The definition of an eligible CDR project;
    ii) A requirement that an eligible CDR project be physically located within the state;

iii) A requirement that an eligible CDR project incorporate or fund community benefit mechanisms commensurate with the eligible CDR project;
iv) A requirement that an eligible CDR project results in carbon dioxide removals that are verified in the claimed quantity by an independent third-party verifier using appropriate, industry-standard protocols;
v) A minimum duration of sequestration, elimination, or other storage of removed gases without leakage to the atmosphere that is sufficiently long enough to ensure that the risk of leakage poses no material threat to public health, safety, the environment, or the achievement of net zero greenhouse gas emissions in California, and shall not be less than 100 years;
vi) A prohibition against the use of CDR processes for purposes of enhanced oil recovery; and
vii) A prohibition against the use of a biomass feedstock for CDR, unless it is for biomass carbon removal and storage, as defined.

2) Exempts ARB's development of guidelines, standards, and requirements under this bill from the Administrative Procedures Act.

3) Provides that implementation is subject to an appropriation by the Legislature. Requires all funds to be available for encumbrance or expenditure and liquidation until June 30, 2035.

4) Makes related findings.

Background

1) *Net zero GHG emissions*. Achieving net zero GHG emissions – a state where GHG emissions either reach zero or are entirely offset by equivalent atmospheric GHG removal – is essential in all scenarios that would keep Earth's average temperature within 1.5 °C of its historical average. Net zero GHG emissions is also often used interchangeably with "carbon neutrality," however net-zero GHG emissions implies the inclusion of GHGs other than those that contain carbon, such as nitrous oxide, as defined by AB 32 (Nunez, Chapter 488, Statutes of 2006). The sooner net-zero GHG emissions is reached globally, the less warming will be experienced.

   In California, carbon neutrality by 2045 was initially set as a goal for the state under Governor Brown's Executive Order (EO) B-55-18. The goal was subsequently set in statute by Assemblymember Muratsuchi's AB 1279 in

2022, with the additional condition that net zero GHG emissions be achieved with at least an 85% direct reduction in emissions, and no more than 15% of the goal being achieved through negative emission technologies and approaches.

2) *Negative emissions: capturing versus removing*. There is too much carbon dioxide in the atmosphere. The current concentration of carbon dioxide in the atmosphere is over 427 parts per million (ppm)[1], and 350 ppm is generally regarded as the level necessary to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted[2]. To restore Earth's atmosphere to roughly 350 ppm carbon dioxide, two things must happen: we must stop adding carbon dioxide to the atmosphere faster than it is removed (to stop the concentration from rising ever higher), and we must remove carbon dioxide already in the atmosphere (to bring the concentration back in line with historic levels). There are several ways to proceed when it comes to restoring a safe atmospheric carbon dioxide concentration: emissions from a given source can be mitigated or captured, and atmospheric emissions can be removed by some form of CDR.

   Mitigating GHG emissions is generally the least expensive, lowest regrets option. This could look like using a zero-emission technology to replace a polluting legacy source, such as shifting a natural gas boiler in a factory to an electric-powered one (and using zero-carbon electricity to power that). The vast majority of GHG emission reductions that need to be achieved to meet our climate goals are most likely to be achieved through moving to zero-emission processes. However, that is not an option in all circumstances.

   Capturing carbon from a point source and preventing it from entering the atmosphere (often referred to as "carbon capture and sequestration" or CCS) is another way to reduce emissions from a source. In the ideal situation where CCS works perfectly, an otherwise polluting source could be effectively zero-emission and not contribute to rising atmospheric GHG levels. This is generally much more costly than replacing the polluting source, relies on technology that in many cases is still under development and testing, and generally does not operate with 100% efficiency. However, in some situations, this may be the only option for reducing stubborn, hard-to-decarbonize

[1] NOAA Global Monitoring Laboratory trends. **https://gml.noaa.gov/ccgg/trends/monthly.html** Accessed 3/7/2025

[2] How the World Passed a Carbon Threshold and Why It Matters, Nicola Jones. January 26, 2017, Yale Environment 360. **https://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters**

sources' contributions to atmospheric GHG levels.

CDR refers to reducing the carbon dioxide in the atmosphere from the ambient air itself. Since the concentration of carbon dioxide is much lower than at single-point sources (such as a smokestack), it can be challenging to remove carbon dioxide at a level that is both effective and cost-efficient. However, this is the only approach that results in actually *lowering* atmospheric CO2 levels, rather than just preventing their increase.

Without mitigating emissions extensively and rapidly, Earth will face rampant and worsening climate catastrophes, regardless of how much CDR is deployed. Without CDR, only natural biologic and geologic processes will reduce the atmospheric carbon dioxide concentration, and they will likely do so on too slow a timescale to stave off the worst impacts of climate change. Thus, we must both reduce and remove GHG emissions simultaneously, and prompt mitigation is of paramount importance.

Comments

1) *Purpose of this bill.* According to the author, "Carbon Dioxide Removal (CDR) refers to removing Carbon Dioxide (CO2) from the atmosphere and permanently storing it in places like cement, or deep underground in geologically secure locations or in the ocean. It does not refer to capturing CO2 from industrial smokestacks. The California Air Resources Board (CARB)'s 2022 Scoping Plan for Achieving Carbon Neutrality stated that "there is no path to carbon neutrality without carbon removal and sequestration" and established State CDR targets of 7 million metric tons (MMT) annually by 2030 and 75 MMT annually by 2045.

   "Over the last several years, a small number of companies have voluntarily purchased CDR removals as part of their own carbon neutrality goals, but none of the CDR removals have occurred in California. To meet the urgent need to reach carbon neutrality by 2045, this bill directs the California Energy Commission (CEC) to purchase and permanently retire $80 million in CDR credits generated by carbon removal projects. By accelerating CDR development and deployment, the bill is an integral step to remove carbon dioxide from the atmosphere and meet the state's climate goals."

2) *Carbon neutrality won't come cheap.* Increasing CDR capacity to the scale projected to meet climate goals will take a massive amount of money. Current CDR prices with durable storage are typically around $200-$700 per ton of

carbon, though many available solutions cost upwards of $2,000 per ton. Lawrence Livermore National Laboratory's 2020 "Getting to Neutral" report projects prices for DAC projects to fall to approximately $200 per ton by 2045, gasification or pyrolysis of biomass to between $30 and $150 per ton, and natural solutions to $10-20 per ton (natural solutions likely do not store carbon as long). Using the $200 per ton projection and CARB's 2022 Scoping Plan scenario of 75 million metric tons (MMT) of CDR, $15 billion worth of CDR would be needed a year in California by 2045. For a 7 MMT intermediate goal in 2030 laid out in the Scoping Plan, $1.4 billion will be needed by seven years from now, but this number could feasibly be three times higher or more as prices per ton of carbon are likely to still be high.

It is important to note that the markets that will ultimately drive these prices lower are unlikely to mature on their own without policy intervention. Carbon dioxide removal is akin to waste management in that it is not *producing* anything of material value, but there is societal value in preventing its accumulation. Understandably, entities who (either voluntarily or mandatorily) purchase CDR to manage their carbon waste are likely to choose the lowest-cost option. If you had the option to have your trash cans picked up for $10 a week or $1,000 a week, no one would fault you for picking the $10 option; the trash is getting taken care of either way.

At a time when atmospheric carbon dioxide levels are continuing to accelerate upwards, it may seem early to be considering which CDR technologies should be prioritized for achieving carbon neutrality. But without focusing on market development and investment through early interventions, the technology will not be mature when we need it.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: No
According to the Assembly Appropriations Committee:

- One-time cost of $50 million (General Fund, Greenhouse Gas Reduction Fund (GGRF), or other fund source) for CARB to fund CDR projects. The fiscal year 2025-26 budget does not include funding for this purpose.
- CARB will incur significant costs to implement the various requirements of this bill. CARB estimates ongoing costs of about $2.8 million annually (GGRF) to hire 13 staff. Examples of anticipated tasks include, among other things, establishing and updating program guidelines pursuant to the Administrative Procedure Act, including definitions, eligible project and feedstock types, selection criteria, community benefit requirements, and verification criteria;

coordinating with various state entities and stakeholders; conducting public workshops; developing and executing contracts for the purchase of CDR credits; monitoring and auditing projects; and conducting annual reporting. The bill allows CARB to use up to 10% of the $50 million allocation to "supplement necessary administrative costs in establishing the program."

SUPPORT: (Verified 9/11/25)

4 Corners Carbon Coalition
Airmyne, INC.
Altasea At the Port of Los Angeles
Anvil
California State Pipe Trades Council
Capture6
Carbon Blade Corporation
Carbon Removal Alliance
Carbonfuture
Charm Industrial
Corigin Solutions, INC.
East Bay Leadership Council
Heirloom Carbon
Indigenous Greenhouse Gas Removal Commission
Lithos Carbon
Neocarbon Gmbh
Pacific Coast Legacy Emissions Action Network
Palmdale Water District
Partnerships for Tribal Carbon Solutions
Project 2030
Restore the Delta
Sitos Group, LLC
Stripe, INC.
US Biochar Coalition
Wakefield
World Resources Institute
Yosemite Clean Energy, LLC

OPPOSITION: (Verified 9/11/25)

Biofuelwatch

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