



INFORMATION ITEM

Carbon Capture and Storage in the Delta

Summary: Representatives from the Sacramento-San Joaquin Delta Conservancy, Lawrence Livermore National Laboratory, and a local landowner will provide background for the Council on the emergence of Carbon Capture and Storage (CCS) technology, the possibility of the Delta as a site for carbon storage, perspectives of local landowners who might participate in carbon storage projects, and potential resident concerns. Several future CCS projects may be covered actions under the Delta Plan.

BACKGROUND

Carbon Capture and Storage (CCS) refers to the process of capturing carbon (CO₂) emissions from large point sources, such as cement plants, steel plants, refineries, or power plants, before they reach the atmosphere. The CO₂ is then transported to a permanent storage location, usually via pipelines, trucks, trains, and barges. CO₂ is typically stored underground by injecting it through wells into rock formations where the CO₂ can be stored permanently. Appropriate rock formations generally are located thousands of feet below the ground's surface and consist of a storage formation that can hold the CO₂, such as sandstone, and one or more sealing formations that sit above the storage formation, such as shale. This storage process replicates the way rocks have naturally held water, oil, and gas underground¹.

California's Climate Change Scoping Plan

California's greenhouse gas (GHG) reduction goals to achieve 1990 emissions levels by 2020 were originally set forth in Assembly Bill (AB) 32 (2006), along with a requirement for the California Air Resources Board (CARB) to prepare and adopt a Climate Change Scoping Plan (Scoping Plan) that includes a suite of policies the State implements to achieve the desired level of GHG emissions. Senate Bill (SB) 32 (2016) increased and extended the emissions reduction mandate to 40% below 1990 levels by 2030.

The Scoping Plan, first approved by CARB in 2008, must be updated at least every five years. Since 2008, there have been two updates to the Scoping Plan in 2013 and 2017. CARB is currently preparing a 2022 Scoping Plan update to assess progress towards achieving the SB 32 2030 target and lay out a path to achieving

¹ Additional background on CCS technology from Lawrence Livermore National Laboratory is available at: <http://carboncleanupinitiative.org/>

carbon neutrality no later than 2045. This is an ambitious goal, as emissions from transportation, agriculture, wildfires, and other sources are challenging to eliminate. Large-scale solutions for eliminating emissions from those sources may not be available in time to meet the State's climate goals, which makes removing CO₂ directly from the atmosphere an important option.

Possibility of the Delta for Carbon Storage

Until recently, locations and storage capacities of storage sites in California have been based on high-level, basin-scale assessments. Lawrence Livermore National Lab scientists recently advanced this understanding to location-specific knowledge by assessing the storage capacity of California's oil and gas fields, as well as deep saline aquifers that share the same geology. These scientists have identified CO₂ storage options in two Central Valley locations: the Delta and Western Kern County. Both sites have supported extensive oil and/or gas production, which results in the extensive availability of geologic data. The Delta has ideal geology for carbon storage, should CCS be part of the portfolio of actions needed to meet California's GHG emissions reduction goals².

The California Natural Resources Agency (CNRA) is currently coordinating efforts among numerous State agencies charged with reviewing and permitting potential CCS projects to advance the appropriate and safe use of the technology to support California's emissions reduction goals. The Sacramento-San Joaquin Delta Conservancy (Conservancy) and the Council have been participating in ongoing discussions among this group of agencies regarding the potential benefits and impacts of these projects in the Delta.

Environmental Justice Considerations

While CCS projects may enable progress toward achieving GHG reduction goals, they also have numerous potential impacts that must be considered, including potentially prolonging California's reliance on fossil fuels, and continuing and/or exacerbating existing environmental justice and public health issues associated with point source air pollution. Several environmental justice organizations led by Physicians for Social Responsibility-Los Angeles (PSR-LA) recently authored a letter to the California Assembly opposing Assembly Bill (AB) 1395 (See Attachment 1). AB 1395 would have directed CARB to identify a range of approaches to meet carbon neutrality goals, including requiring CARB to consider both the potential benefits

² Additional information regarding the suitability of Delta geology for CCS is available in Lawrence Livermore National Laboratory's publication *Getting to Neutral*, available at: https://carboncleanupinitiative.org/wp-content/uploads/2021/09/Getting_to_Neutral.pdf. Chapter 6, "Permanent Sinks" specifically addresses the Delta.

and risks of carbon capture and removal technologies, including monitoring and reporting, and to ensure that there are no adverse impacts to local air quality, particularly in low-income and disadvantaged communities as part of the Scoping Plan. In the letter, PSR-LA notes that “By their nature [CCS] projects would increase toxic and criteria pollutants and have an adverse impact on local air quality and public health. Because polluting facilities that would be eligible for [CCS] infrastructure to capture CO₂ are already disproportionately sited in low-income communities of color, [CCS] infrastructure will also disproportionately harm frontline Environmental Justice communities.” Although AB 1395 failed passage on the Senate floor earlier this year, it could be reconsidered during the second half of the current legislative session in January 2022.

Relationship to the Delta Plan, Covered Actions, and other Council Initiatives

Given the geologic potential of the Delta for CCS and California’s aggressive emissions reduction goals, it is likely that several future CCS projects may be proposed in the Delta, and many of those projects may meet the definition of a covered action that is required to demonstrate consistency with the Delta Plan. CCS project factors to consider in the context of the Delta Plan could include, but are not limited to:

- the potential use of pipelines, barges, trucks, and rail to transport CO₂ to storage sites in the Delta;
- the potential for CCS technology to extend existing environmental justice and public health impacts; and
- the potential for agricultural land conversion to support infrastructure required at CCS storage sites.

Given the current understanding of CCS projects, Council staff anticipates that CCS projects that would be covered actions would be anticipated to implicate several Delta Plan policies, including, but not limited to:

- **G P1(b)(2)**, Mitigation Measures;
- **G P1(b)(3)**, Best Available Science;
- **ER P3**, Protect Opportunities to Restore Habitat;
- **ER P5**, Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species;
- **DP P1**, Locate New Urban Development Wisely; and
- **DP P2**, Respect Local Land Use.

Council staff will continue to engage with CNRA and other agency partners to understand the details of potential future projects and advise project proponents regarding Delta Plan regulations at early points in project development. Staff will also proactively offer early consultation to project proponents prior to submitting a certification of consistency with the Delta Plan. The environmental justice impacts of CCS projects will likely also be considered as part of the Council's ongoing Environmental Justice Issue Paper initiative.

TODAY'S PANEL

At today's meeting, representatives from the Sacramento-San Joaquin Delta Conservancy, Lawrence Livermore National Laboratory, and a local landowner will provide background for the Council on the emergence of CCS technology, the suitability of the Delta as a site for carbon storage, and perspectives of local landowners who might participate in carbon storage projects. This presentation will provide the Council with initial background regarding the potential for and issues associated with such projects and an opportunity to ask questions that will help inform consideration of future projects. The Council will also hear public comments concerning the topics and issues presented today.

Today's panelists include:

- Campbell Ingram, Executive Director, Sacramento-San Joaquin Delta Conservancy. Mr. Ingram will provide a general context for CCS, distinguish CSS from surface carbon sequestration and subsurface carbon storage, and current ongoing management efforts.
- George Peridas, Ph.D., Director, Carbon Management Partnerships, Lawrence Livermore National Laboratory. Dr. Peridas will present on the suitability of the Delta for carbon storage and provide a brief summary of a recent community survey.
- Tom Zuckerman, Delta landowner. Mr. Zuckerman will provide landowner perspectives on the potential for carbon storage.
- Jeff Henderson, Deputy Executive Officer, Planning and Performance Division, Delta Stewardship Council. Mr. Henderson will address the relevance of carbon storage to the Delta Plan and other Council initiatives.

FISCAL INFORMATION

Not applicable

LIST OF ATTACHMENTS

Attachment 1: September 7, 2021, letter from Physicians for Social Responsibility-Los Angeles and associated organizations to Honorable Christina Garcia and Honorable Al Muratsuchi, California State Assembly, RE: Oppose AB 1395 – California Climate Crisis Act

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