FILED
07/15/25
04:59 PM
R2005003

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	**Rulemaking 20-05-003** **(Filed May 07, 2020)**

CALIFORNIA RESOURCES CORPORATION COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENTS ON RELIABLE AND CLEAN POWER PROCUREMENT PROGRAM STAFF PROPOSAL

Chris Gould
Jonathan Dethloff
California Resources Corporation / Carbon TerraVault
1 World Trade Center, Suite 1500
Long Beach, CA 90831
(888) 848-4754
Chris.Gould@crc.com
Jonathan.Dethloff@crc.com

Nora Sheriff
Buchalter, A Professional Corporation
425 Market Street, 29th Floor
San Francisco, CA 94105-2491
415.227.3551 office
415.227.0770 fax
nsheriff@buchalter.com

Counsel for California Resources Corporation

CALIFORNIA RESOURCES CORPORATION | CARBON TERRAVAULT

July 15, 2025

TABLE OF CONTENTS

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE
STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	**Rulemaking 20-05-003** **(Filed May 07, 2020)**

CALIFORNIA RESOURCES CORPORATION COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENTS ON RELIABLE AND CLEAN POWER PROCUREMENT PROGRAM STAFF PROPOSAL

California Resources Corporation (CRC)[1] submits these comments to the April 29, 2025 *Administrative Law Judge's Ruling Seeking Comments On Reliable And Clean Power Procurement Program Staff Proposal* (April 29 Ruling), the May 15, 2025 *Email Ruling Granting Request for Extension of Time*, and the June 16, 2025 *Email Ruling in Response to Motion for Clarification of Alliance for Retail Energy Markets*.

I. INTRODUCTION AND SUMMARY

The April 29, 2025 Energy Division Staff Proposal (Staff Proposal)[2] for the Reliable and Clean Power Procurement Program (RCPPP) outlines the options for a RCPPP that would apply to all Load Serving Entities (LSEs) within the California Public Utilities Commission's (CPUC) jurisdiction.[3] The RCPPP is intended to provide LSEs with a more predictable regulatory

[1] CRC, through its Carbon Terravault line of business (CTV), is leading the development of Carbon Capture and Sequestration (CCS) in California. CTV is developing a CCS project at CRC's Elk Hills power plant in Kern County, where captured CO_2 will be stored in a co-located, depleted oil and gas storage reservoir.
[2] April 29 Ruling at *Attachment A, Staff Proposal: Reliable and Clean Power Procurement Program* (Staff Proposal).
[3] Staff Proposal at 1.

framework to guide the procurement of their share of resources needed to meet their electric system reliability and greenhouse gas (GHG) emission reduction goals at least cost.[4]

The RCPPP also proposes a Clean Energy Standard (CES) encompassing new and existing Renewables Portfolio Standard (RPS) or zero-carbon resources.[5] Under the CES, compliance would be measured based on a backwards-looking review of renewable energy credits (RECs) and zero-emission credits (ZECs).[6] The CES, however, does not define zero-carbon resource eligibility or ZEC. The Commission should design the CES in a way that promotes grid reliability and affordability, while rapidly advancing GHG reductions. Further, there is a near-term need to define terms like ZEC and eligibility, for zero-carbon and low-carbon resources to move forward effectively and efficiently.

As stated in the Staff Proposal, the options included are intended to satisfy the five principles of effectiveness, affordability, fairness, feasibility, and predictability.[7] The Commission should adopt these five program design principles and ensure the solutions in the RCPPP align with the design principles.

The CES should be adopted with the following modifications:

- ✓ Disallow or severely limit the use of unbundled credits and require electricity to be delivered to California;
- ✓ Limit use of existing renewable, low-carbon and zero-carbon resources from out of state to avoid resource shuffling;
- ✓ Require long-term contracts; and
- ✓ Differentiate between clean non-firm, clean firm baseload, and clean firm dispatchable power.

---

[4] Staff Proposal at 1.
[5] *Id.* at 6.
[6] *Id.* at 43.
[7] *Id.* at 2.

Critically, the CES should not be limited to zero-carbon resources, as no generation resource is truly zero-carbon. Indeed, the Commission should acknowledge the fact that every power generation and storage resource has a GHG impact—all are low carbon**. The CES should clarify that eligible low-carbon resources include natural gas power generation paired with carbon capture and sequestration (NGCCS).** NGCCS is clean, reliable, affordable, and scalable, making it an ideal resource for California's future electricity grid, and key to the timely achievement of the state's clean energy goals. Including NGCCS in CES eligibility would build on California's strengths:

- California has low carbon intensity natural gas production;
- The state is a national leader in CO2 sequestration capacity; and
- California has a fleet of existing, interconnected gas plants.

Consideration of full lifecycle GHG emissions—or carbon intensity—in the CES and enabling participation by NGCCS will ensure that California's grid minimizes its impact on GHG emissions and minimizes leakage.

Local durable carbon removals (direct air capture or biomass carbon removal and storage), should also be considered to allow resources to negate emissions—as eliminating the last remnants of GHG emissions can be prohibitively expensive and technologically infeasible. Given the state's challenging targets and long project development timelines, guidance should be provided as soon as possible to send the necessary signals for LSE procurement of low carbon resources. Guardrails could include simple, temporary eligibility guidelines, such as generic factors and minimum expected emissions reductions, under which procurement for the first compliance period could proceed now. More detailed guidelines can be developed later for subsequent procurement and compliance periods.

II. COMMENTS ON CLEAN ENERGY STANDARD

A. General Comments

The Staff proposes a CES aligned with existing GHG reduction goals, while remaining open to hearing proposals from parties regarding alternative approaches.[8] The proposed CES would include annual clean energy targets based on a percentage of LSE sales, and compliance would be reviewed under three-year compliance periods on a backward-looking basis, aligning with RPS compliance periods.[9] Under the CES-established targets, LSEs would be required to show a steady and increasing contracted quantity of clean energy to meet the CES targets, in the timeframe of the three-year compliance periods.[10] With regard to a timeline for GHG reduction procurement, the RCPPP Staff Proposal presents a timeline that incorporates a need determination, need allocation, and compliance and enforcement.[11] The first compliance period would be 2028 to 2030, and would align with the RPS compliance period (CP) 6.[12]

There are gaps in the CES that need to be filled. As a threshold matter, the CES does not define zero-carbon resource eligibility or ZEC. **Eligibility and ZEC terms should be defined prior to moving forward with a specific CES design.** Given the goal of setting CES percentage targets by 2026 with the first compliance period starting in 2028, adoption of definitions and eligibility

---

[8] Staff Proposal at 41-42.
[9] *Id.* at 42.
[10] *Id.*
[11] *Id.* at 42-43.
[12] *Id.* at 43.

requirements should be a high priority.[13] Recommended approaches are offered below with our responses to the GHG questions posed in the Staff Proposal.

B. Responses to Greenhouse Gas Reduction Questions in Section 5.2

1. Should existing IRP and RPS processes be used or modified to achieve the electric sector's GHG emissions reduction goals instead of a new CES framework? If so, why?

Existing IRP and RPS processes can be built upon as a foundation for the CES, but they should not be used or modified to achieve the electric sector's GHG emissions reductions goals instead of a new CES framework. The Staff Proposal recognizes that the existing IRP and RPS will not suffice to achieve the state's goals.[14] The state's goals are set by law, including Senate Bill (SB) 100 (De León, Chapter 312, Statutes of 2018) and SB 1020 (Laird, Chapter 361, Statutes of 2022).

a. The Need for Non-Renewable, Clean Power

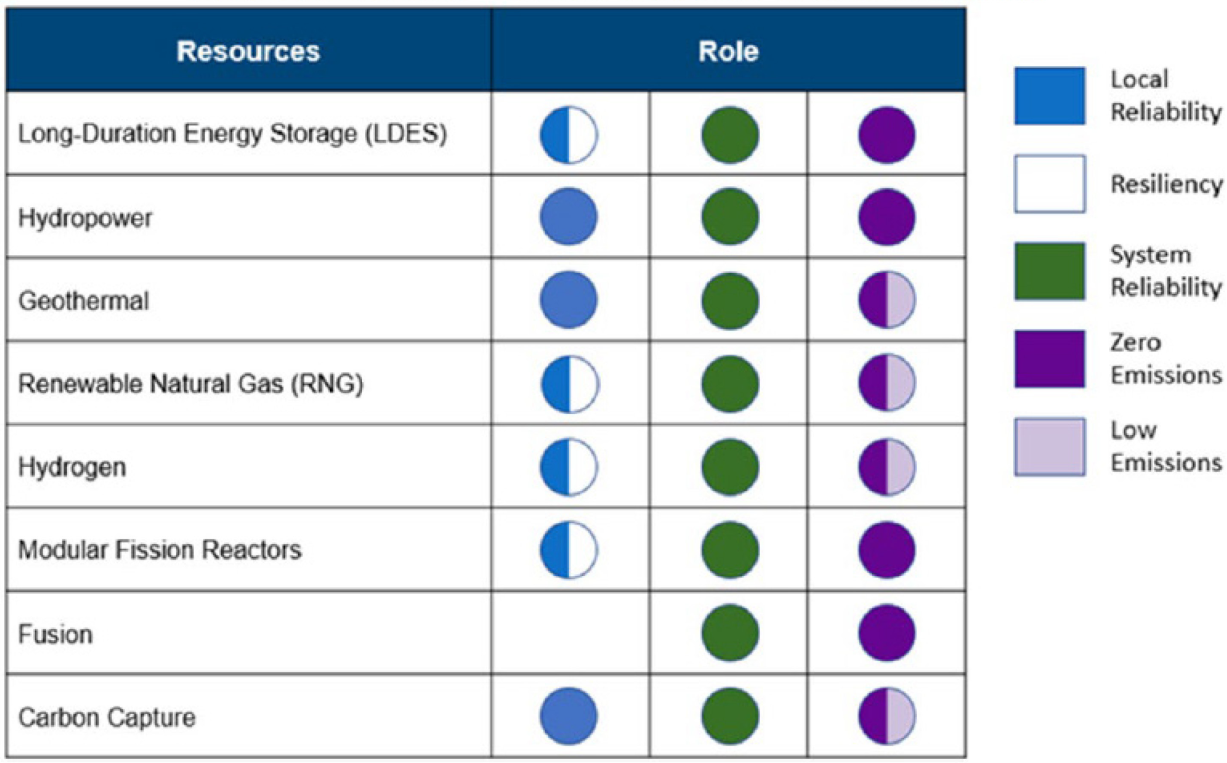
SB 100 and SB 1020 recognized the need for non-renewable resources by calling for "zero-carbon resources" in addition to eligible renewable energy resources to meet electricity GHG goals.[15] SB 423 (Stern, Chapter 243, Statutes of 2021) further supports expanded procurement under a CES to achieve the state's GHG emissions reductions goals, as SB 423 directed the assessment of "firm zero-carbon resources that support a clean, reliable, and

---

[13] Staff Proposal at 43 ("Need Allocation: Each LSEs need would be defined as its annual retail electricity sales multiplied by the CES percentage requirement released in 2026.").
[14] Staff Proposal at 1.
[15] SB 100 (adding Cal. Pub. Util. Code § 454.53) ("It is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045"); SB 1020 (amending Cal. Pub. Util. Code §454.53).

resilient electrical grid".[16] The resulting SB 423 report identified a number of firm, zero- and low-emission resources that fill this critical gap (see Figure 1, below).[17]

Figure 1: Overview – Role of Firm Zero-Carbon Resources



These statutes clearly identify the need to move beyond RPS to achieve GHG emissions reduction goals. A new CES framework accomplishes this through expanding eligibility to a wider set of resources.

2. Should the CPUC adopt the Clean Energy Standard and create Zero-Emission Credit (ZEC) instruments as proposed by Staff with or without modifications?

The CPUC should adopt the CES and create ZEC instruments, with the following modifications:

[16] SB 423 (adding Cal. Pub. Resources Code § 25216.7).
[17] California Energy Commission, *SB 423 Emerging Renewable and Firm Zero-Carbon Resources Report*, Dec. 2024, Publication Number: CEC-200-2024-012 (SB 423 Report) at 8.

- <u>Disallow or severely limit the use of unbundled credits and require electricity to be delivered to California</u>. This is the only way to accurately account for renewable, low-carbon, and zero-carbon electricity consumption in California. (This also avoids resource shuffling, as discussed below.) The issue of unbundled credits and deliverability to the California are already addressed in the RPS program, where the vast majority of RECs must be from facilities with a first point of interconnection within a California Balancing Authority (Category 1 RECs). **The CES should continue this trend of increasing in state deliverability requirements to ensure that RECs/ZECs result in actual low-carbon electrons delivered to California retail customers.**
- <u>Avoid resource shuffling</u>. Use of increasing amounts of out-of-state large hydro and nuclear can be used to meet CES goals but may lead to high emission resources filling the resulting gap for out-of-state electricity demand, resulting in potentially higher west-wide GHG emissions. This is exemplified in the American Clean Power California, RCPPP Workshop presentation on June 24, 2025, which showed how the Grant County Public Utility District increased sales of hydroelectric power to California, backfilling with market (non-clean) power. **To avoid this resource shuffling, limits should be placed on use of existing renewable, low-carbon, and zero-carbon resources from out-of-state.**
- <u>Require long-term contracts</u>. Similar to the existing RPS program, long-term contracts should be required to fulfill a portion of the CES. Long-term contracts are needed to justify investment in new renewable, low-carbon, and zero-carbon resources. Without long-term contracts, financing for project developments, construction and operation will

be limited. **Without available financing, there is a real risk that insufficient resources will be constructed to meet long-term CES targets.**

- <u>Differentiate between clean non-firm, clean firm baseload, and clean firm dispatchable power</u>. Clean non-firm power cannot meet demand throughout the year (8760 hrs), and therefore should be given the least value under the CES. Clean firm baseload power provides more value given its ability to produce throughout the year, but clean firm baseload power is unable to ramp up and down to accommodate clean non-firm power or swings in demand, thereby limiting flexibility and resiliency of the grid. In contrast to both clean non-firm power and clean firm baseload power, clean firm dispatchable power can both meet demand throughout the year, ***and*** ramp up and down to accommodate clean non-firm power and demand. **Given the significant value of these characteristics towards promoting a clean, reliable grid, clean firm dispatchable power should receive the greatest value under the CES.**

3. What considerations should be taken into account to ensure that all RECs and ZECs used for CES compliance would align with how CARB regulates GHG emissions in its Mandatory Reporting Regulation (MRR) and GHG Emissions Inventory?

The California Air Resources Board (CARB) has on multiple occasions stated its intention to incorporate Carbon Capture and Sequestration (CCS) carbon accounting into the MRR and Cap-and-Trade programs, recognizing the emissions reductions and positive environmental impact from CCS.[18] The positive contributions from CCS are recognized by CARB in its 2022

---

[18] *See, e.g.,* CARB, *Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms 2024 Amendments; Standardized Regulatory Impact Assessment*, Apr. 9, 2024 at 24 ("Overall, there is need to have policies in place to reduce emissions from uncapped sources and

Scoping plan, which includes 16.7 million metric tons of CCS from existing natural gas power plants in 2045 to meet State GHG and clean electricity goals.[19] CARB intends to implement changes to incorporate CCS into GHG programs utilizing upcoming Cap-and-Trade and SB 905 rulemaking, having already recognized and incorporated CCS into the Low Carbon Fuel Standard through its CCS Protocol.[20] **Given CARB's support of the technology and intentions to incorporate into MRR and Cap-and-Trade, CCS should also be recognized as a clean power technology under the CES and be eligible for ZECs.**

4. Which zero-carbon resources should be eligible for the CES?

The CES should not be limited to zero-carbon resources, as no generation resource is truly zero-carbon; rather, the CES should allow for low-carbon resources to be eligible along with resources currently classified as zero-carbon. Specifically, NGCCS should be eligible as a low-carbon resource for the CES. NGCCS is clean, reliable, affordable, and scalable, making it an ideal resource for California's future electricity grid, and key to achieving SB 1020 and SB 100 goals. NGCCS plays to California's strengths, which include the following:

- World class geology for storing CO2 (with estimates of up to 70 gigatons of CO2 storage potential);[21]
- Access to cheap and cleanly produced natural gas deliverable through an expansive pipeline network' and
- A large existing NGCC fleet, already interconnected, that can be readily retrofitted with CCS.

CCS as a compliance path for large emitters covered by the Cap-and-Trade Program to support the achievement of statewide targets.").

[19] CARB, *2022 Scoping Plan for Achieving Carbon Neutrality*, Nov. 16, 2022 (CARB 2022 Scoping Plan) at 201.

[20] CARB 2022 Scoping Plan at 85; CARB, *Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard*, Aug. 13, 2018.

[21] Energy Futures Initiative & Stanford University, *An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions*, Oct. 2020 at 43.

Repurposing existing California generation assets and power infrastructure through NGCCS leverages these strengths. Importantly, it also would significantly reduce the cost associated with decarbonizing the grid, while accelerating emissions reductions.

According to the California Energy Commission (CEC), in 2023 37% of California's electricity was supplied by renewables, with another 21% provided by large hydro and nuclear.[22] Most of the remaining power demand was supplied by natural gas (36%), given its dispatchability and low cost. Power demand is expected to grow in the state due to electrification and data centers, yet the cost of pairing renewables with batteries to provide power for larger portions of the day is high. Moreover, the state lacks mature and affordable options for long duration energy storage, and it is difficult to build other sources of clean, firm power (e.g., hydro, nuclear). These facts, plus the current affordability crisis support inclusion of NGCCS as an eligible resource in the CES. NGCCS will be critical to meeting California clean power demand in the coming decades. For these reasons, the CARB 2022 Scoping Plan includes 16.7 million metric tons of CCS from existing natural gas power plants in 2045 to meet state GHG and clean electricity goals.[23]

a. NGCCS Is Clean

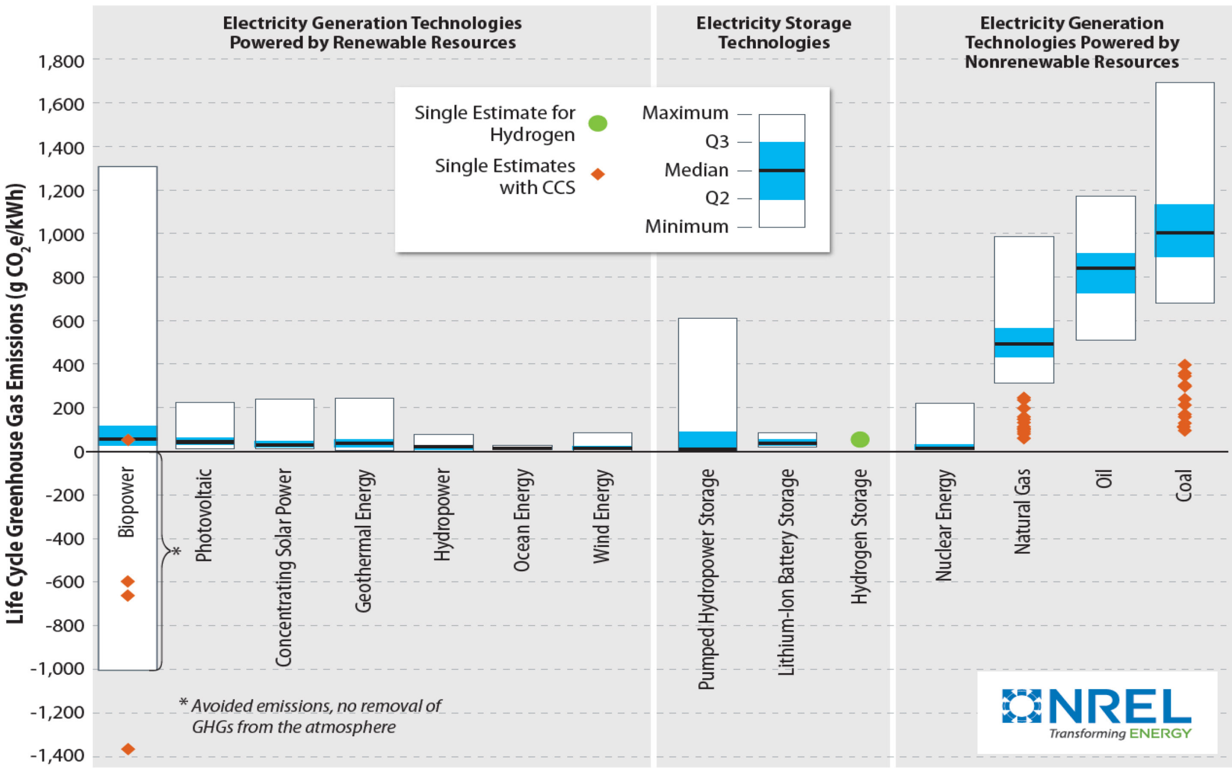
No electricity resource is truly zero-carbon. When looking at the full lifecycle GHG impact of power resources, renewables such as solar and wind generate emissions through manufacturing, construction, and decommissioning/disposal (see Figure 2, below). When paired with CCS and low carbon intensity natural gas, NGCCS has lifecycle GHG emissions on par with,

---

[22] *See* CEC, *2023 Total System Electric Generation* (available at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2023-total-system-electric-generation).
[23] CARB 2022 Scoping Plan at 201.

and often below, that of renewable power resources paired with battery storage. This advantage becomes even clearer when accounting for system GHG emissions arising from energy storage, backup generation, and additional infrastructure needed to accommodate new, intermittent power resources. Thus, NGCCS should be eligible as a low-carbon resource for the CES.

Figure 2. Life Cycle of GHG Emission Estimates for Selected Electricity and Generation and Storage Technologies, and some Technologies Integrated with CCS[24]



Further analysis of lifecycle GHG emissions specific to California indicates that aggregated solar and wind may be higher carbon intensity than in-state NGCCS.[25] The difference is more pronounced with solar and wind plus battery storage.

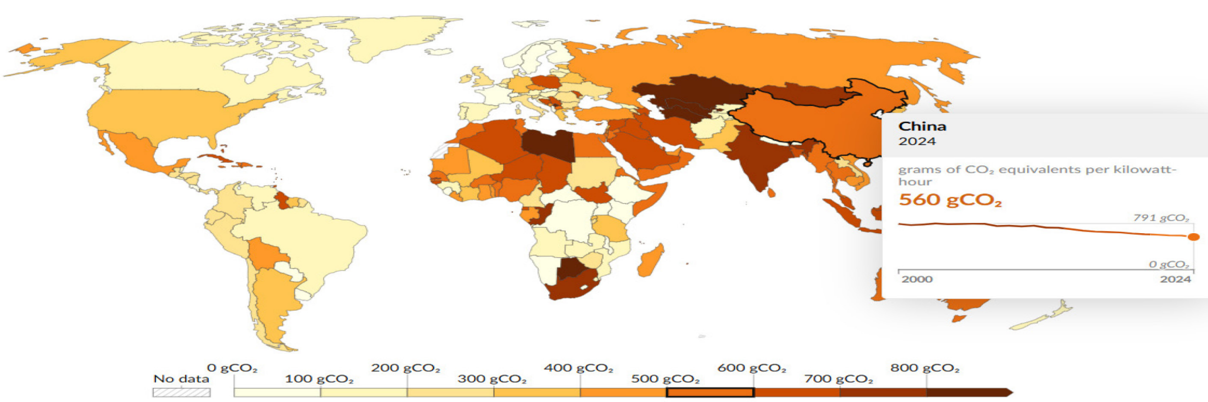
[24] Source: National Renewable Energy Laboratory (NREL), *Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update*, NREL/FS-6A50-80580, 2021 at 2 (available at: https://docs.nrel.gov/docs/fy21osti/80580.pdf).

[25] As reflected in the above graph, wind without battery storage may be of lower carbon intensity than solar and NGCSS. That said, the deployment of wind generation alone is not realistic as it is insufficient to meet the state's power requirements.

i. Solar and wind plus battery storage have significant lifecycle GHG emissions due to upstream manufacturing

It is estimated that 80% of solar photovoltaic panels, 70% of battery storage, and 60% of wind turbines are made in China, using some of the highest carbon intensity electric grids in the world (560 g/CO2e per kwh, as shown in Figure 3, below) in the manufacturing process. Given California's reliance on solar energy and imported solar photovoltaics, wind energy and imported wind turbines and imported battery storage units, this high carbon intensity manufacturing process contributes significantly to the lifecycle GHG emissions of solar and wind. The primary sources of solar photovoltaic panels, wind turbines and battery storage units include the Southeast Asian countries of Malaysia (604 g/CO2e per kwh), Thailand (554 g/CO2e per kwh), Vietnam (471 g/CO2e per kwh), and Cambodia (497 g/CO2e per kwh). By comparison, CARB's published carbon intensity of the California electric grid is 80.55 g/CO2e per megajoule (MJ) (converts to 290 g/CO2 per kwh), which is significantly less carbon intensive than the source of electricity in these Southeast Asian countries (see Figure 3, below).

Figure 3. Carbon Intensity of Electricity Generation, 2024[26]



[26] Source: Ember (2025); Energy Institute - Statistical Review of World Energy (2024) (available at: https://ourworldindata.org/grapher/carbon-intensity-electricity).

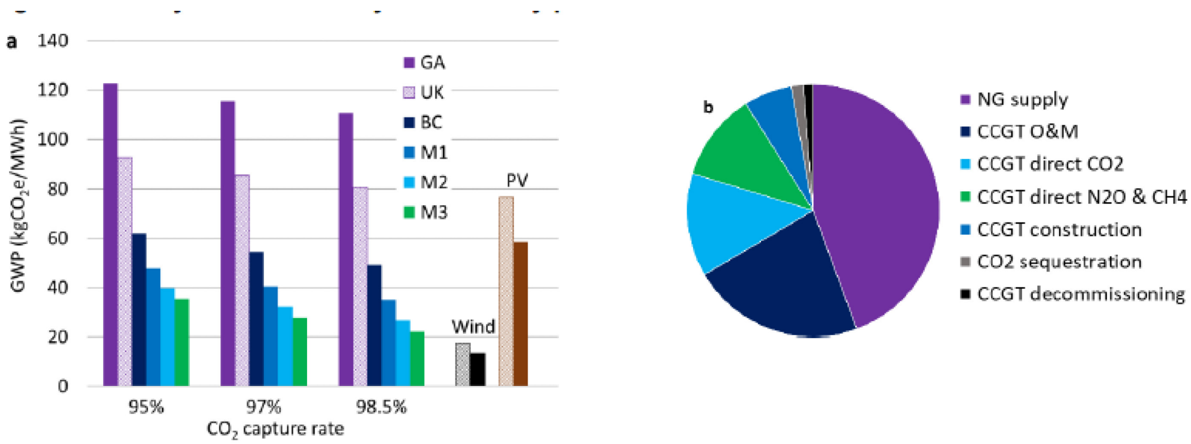
In addition to evaluating solar on the basis of lifecycle emissions, it is important to consider the system GHG impact of adding energy resources, including the need for energy storage (which is shown in Figure 2, above, as "Lithium-Ion Battery Storage"). To properly compare NGCCS to solar and wind on a reliability basis (albeit lithium-ion batteries are generally limited to 4-hours versus 24 hours dispatchability for NGCCS) would conservatively require adding the lithium-ion battery storage carbon intensity to the solar and wind values to account for the need to firm the power; this further elevates the lifecycle GHG emissions of firm (4-hour) solar plus storage renewable resource relative to firm (24-hour) NGCCS.

ii. NGCCS lifecycle GHG emissions are near the "minimum" in California

In addition to NREL, a recent Oxford study also shows that NGCCS can have a lifecycle carbon intensity comparable to wind and solar (see Figure 4, below) when paired with low carbon intensity natural gas production.[27] Low carbon intensity natural gas paired with NGCCS is indicated by M3 (green) bar column when compared to Western U.S. wind and solar PV (solid black and brown, respectively) bar columns.

[27] Oxford Institute for Energy Studies, *Unlocking gas-to-power with life cycle greenhouse gas emissions as low as renewables*, May 2025. (May 2025).

Figure 4. Life Cycle GW Intensity of Electricity Produced from CCGT with CCS[28]

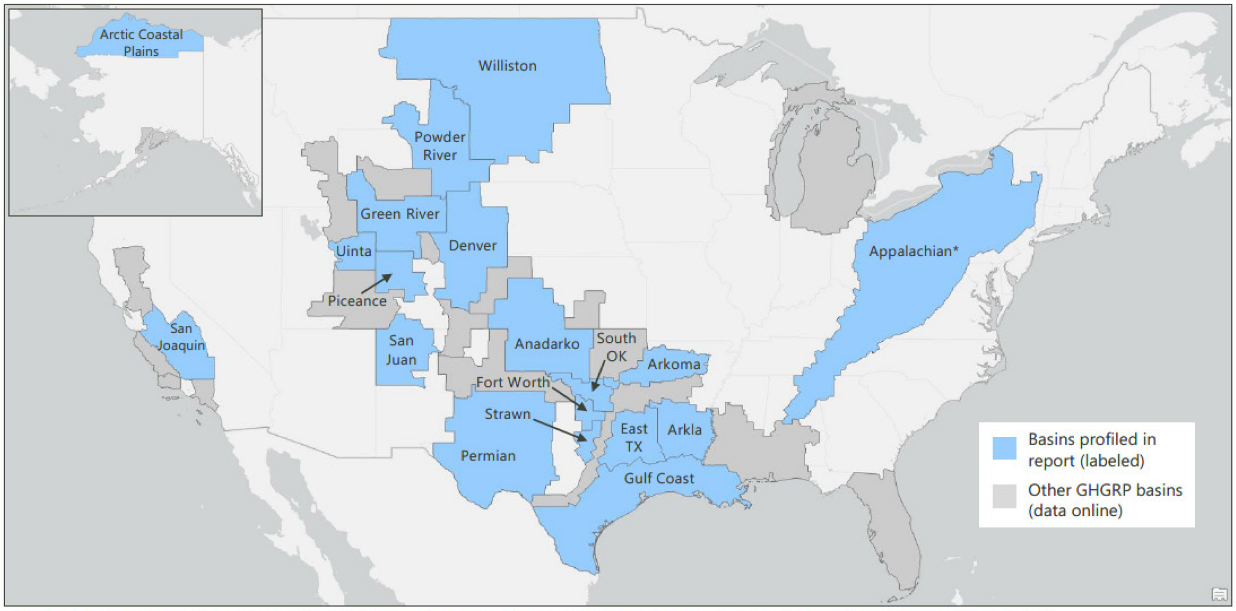


Note: **(a)** Carbon footprint for CCGT electricity generation with six natural gas supply chain scenarios compared to wind and photovoltaic generation. Natural gas supply scenarios: global average supply (GA), UK average supply (UK), BC average production in 2020 (BC), BC Montney production with natural gas drive compressors (M1), BC Montney production with electric drive compressors (M2), and BC Montney production with electric drive compressors and 2030 fugitive methane emission reduction target achieved (M3). Results for wind and photovoltaic shown for BC (diagonal hatch) and western USA (solid). **(b)** Breakdown of life cycle GHG emissions for CCGT with 98.5 per cent CO_2 capture and BC Montney natural gas supply with electric drive compression and reduced fugitive methane emissions (M3)[41].

As pointed out in the Oxford study, emissions associated with natural gas production and transportation play a critical role in NGCCS lifecycle GHG evaluation.[29] California procures its natural gas from the following basins: California basins of San Joaquin and Sacramento (11% of total supply); and U.S. imports from Permian, San Juan, Anadarko, Powder River, Denver, Green River, Uinta, and Piceance (see Figure 5, below).

[28] *Id.* at 6.
[29] *Id.* at 10.

Figure 5. GHG Reporting Program Basins[30]



* GHGRP data contain two distinct Appalachian basins (160 & 160A). This analysis combines data reported across both basins and presents them as a single basin.
Note: Basin boundaries defined by geologic provinces published by the American Association of Petroleum Geologists; data provided by U.S. EPA.

A recent study by the Clean Air Task Force benchmarked GHG emissions and methane intensity from all of these major fields in the US, including but not limited to California supply (see Figure 6, below).

---

[30] Clean Air Task Force, *Benchmarking Methane and Other GHG Emissions of Oil & Natural Gas Production in the United States*, June 2024 at 18.

Figure 6. GHG reporting Program Basin Methane & GHG Intensity[31]

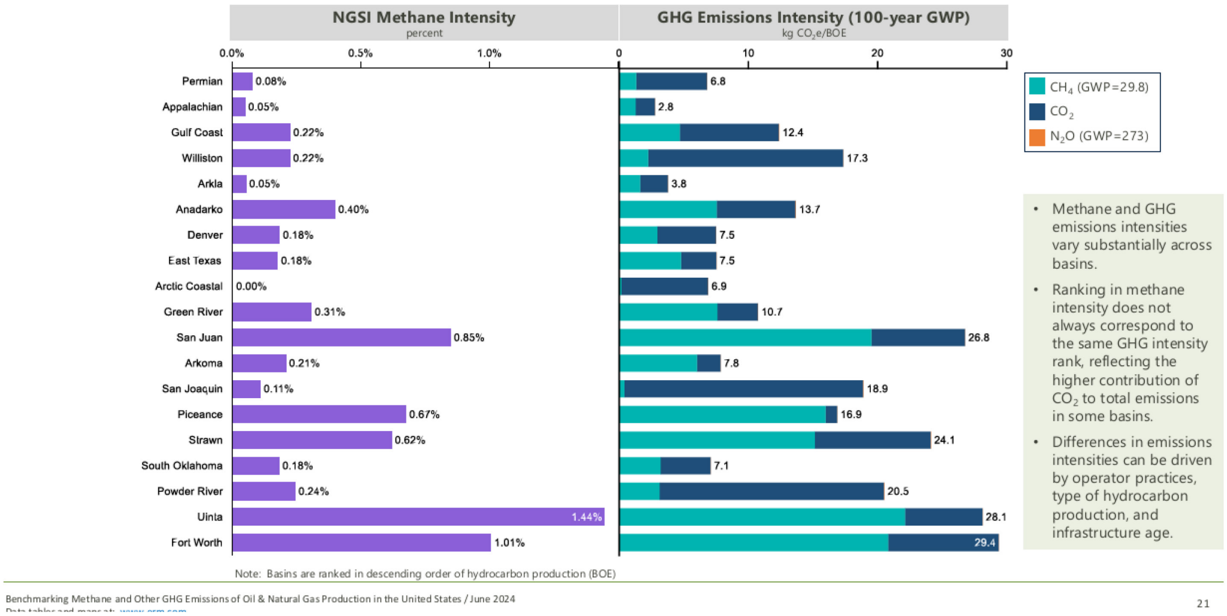


Figure 6, above, shows that the simple average of GHG emissions intensity for all of the California supply basins is 16.7 kg CO2e/BOE. To compare this GHG emissions intensity to values in the Oxford study, the value is converted to same units, resulting in 2.7 g CO2e/MJ, which places California's natural gas supply at the lowest M3 level. The result is that NGCCS at any of the Oxford study capture rates is *lower* than PV solar and wind on a lifecycle basis when deployed together. Further, California, with some of the strictest environmental standards in the world, excels at producing low carbon intensity natural gas. This is evidenced by CRC's "Grade A" MiQ certification for methane emissions at its Los Angeles and Orange County operations.[32] Even with some of the lowest natural gas production emissions, CRC continues to pursue further GHG reductions, exemplified by its planned deployment of CCS in natural gas processing at its

---

[31] *Id.* at 21.
[32] *See California Resources Corporation Achieves MiQ "Grade A" Certification for its Los Angeles Basin Assets*, Apr. 11, 2024 (available at: https://www.crc.com/news-releases/news-release-details/california-resources-corporation-achieves-miq-grade).

Elk Hills field. This is planned to reduce the carbon intensity of the natural gas feeding the Elk Hills Power Plant[33] and can be replicated elsewhere in the state.

iii. Consideration of resources on a lifecycle GHG emissions is required by law in California

California's landmark Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, specifically directs CARB to "minimize leakage to the extent feasible."[34] Leakage is the potential for regulations aimed at reducing emissions in one area to inadvertently shift those emissions to other regions, either within California or to other states or countries. Leakage could happen if, for example, industries relocate to avoid emissions restrictions. Accounting for lifecycle GHG emissions is required for CARB to properly evaluate and minimize leakage

Similarly, accounting for the lifecycle GHG emissions of importing solar PV, batteries, and wind turbines from Southeast Asian countries with electric grids used in the manufacturing process with nearly double the carbon intensity of California's grid would enable the CPUC to properly evaluate and minimize leakage. As previously stated, China's electric grid is 560 g/CO2 per kwh. Other Southeast Asian countries which are primary sources of solar photovoltaic panels include Malaysia (604 g/CO2 per kwh), Thailand (554 g/CO2 per kwh), Vietnam (471 g/CO2 per kwh), and Cambodia (497 g/CO2 per kwh). By comparison, CARB's published carbon intensity of the California electric grid is 80.55 g/CO2 per MJ,[35] which converts to 290 g/CO2 per kwh. CARB's requirement to minimize emission leakage, per AB 32, is the global "resource shuffling" analog to SB 1020's prohibition on the Western grid electric resource shuffling. Both

---

[33] 35R gas processing CCS project, projected to come online in 2025 and sequester CO2 in the CTV I Class VI site at Elk Hills field.
[34] Cal. Health & Safety Code § 38562(d)(1).
[35] CARB, *Low Carbon Fuel Standard Annual Updates to Lookup Table Pathways*, 2024 at 1 (Table 1).

AB 32 and SB 1020 clearly prohibit resource shuffling, which undermines the effectiveness of California's cap-and-trade program by creating the illusion of reduced emissions without any real environmental benefit.

iv. Implementing CCS on existing Natural Gas Power Plants in California would eliminate GHG faster than planned by CARB and new renewables that require interconnection to the grid

The CARB 2022 Scoping Plan included 16.7 million metric tons of CCS on existing natural gas power plants in 2045 to meet State GHG and clean electricity goals.[36] The 20-year timeline to reduce these emissions can be reduced and largely achieved by 2030 because of the development of EPA Class VI permitted CO2 sequestration capacity in California. CRC's carbon management subsidiary, Carbon TerraVault (CTV), alone has 320 MMT of sequestration capacity in various phases of EPA permitting, which would support approximately 15 million MMT of CO2 injection (see below); this alone is enough to meet 90% of CARB's goal.

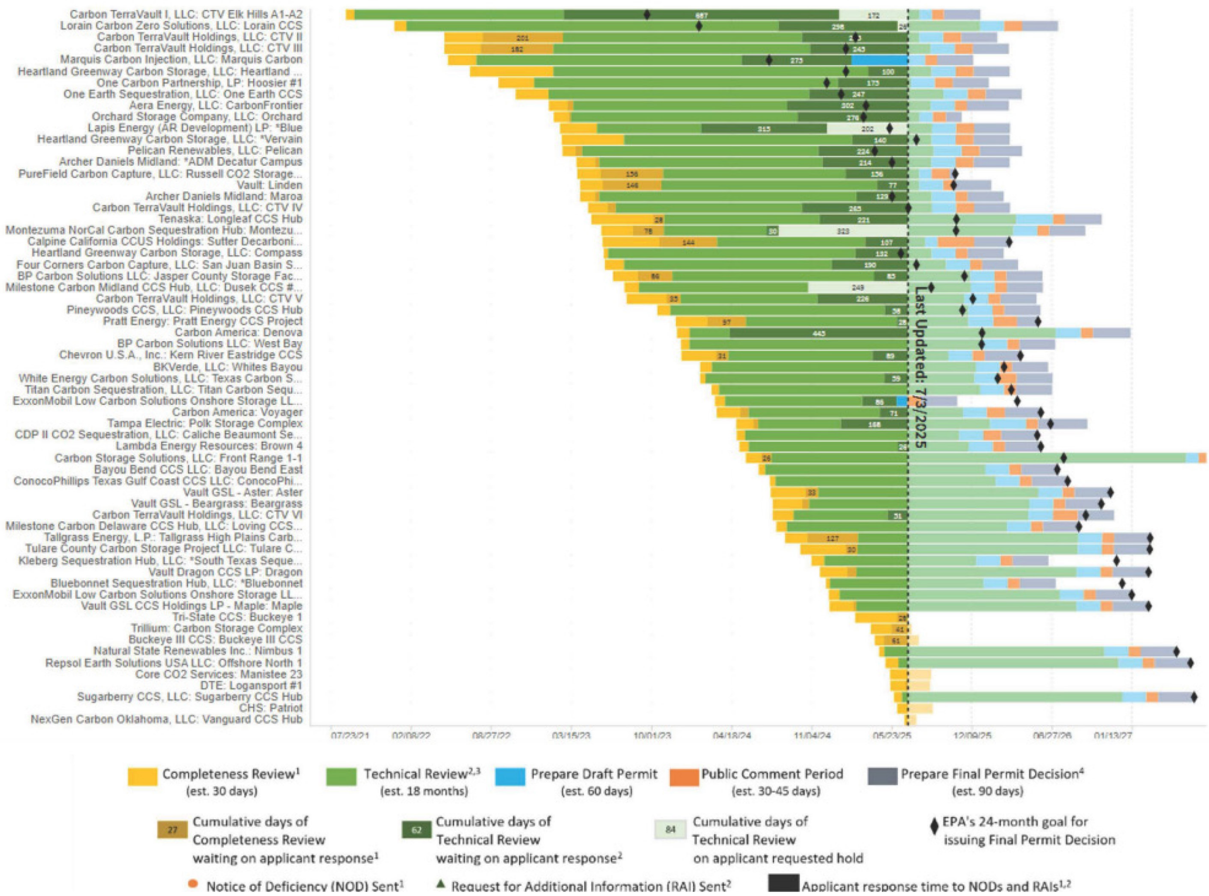
California is a national leader in CO2 sequestration capacity, with CTV securing, in December 2024, the first final Class VI permits in the nation issued west of the Rockies, representing only the second time EPA issued effective Class VI permits for a CCS project.[37] Given CTV's sequestration capacity and the estimated carbon that can be captured from existing natural gas power plants and sequestered beginning in 2030, these projects can eliminate a cumulative total of 250 million metric tons of CO2 (16.7 million metric tons per annum CO2

[36] CARB 2022 Scoping Plan at 201.

[37] *See, EPA issues first ever underground injection permits for carbon sequestration in California*, Dec. 31, 2024 (available at: EPA issues first ever underground injection permits for carbon sequestration in California | US EPA).

emissions x 15 years acceleration) over the final CARB 2022 Scoping Plan scenario. Put into perspective, California's total economy wide emission are 371 million metric tons.[38]

Figure 7. EPA Underground Injection Control (UIC) Class VI Permit Tracker[39]



As it relates to the alternative of solar PV plus battery storage, NGCCS has a built-in timing advantage in that it is already permitted and interconnected to the grid. A recent study by the Lawrence Berkley National Laboratory[40] indicates that the California Independent System

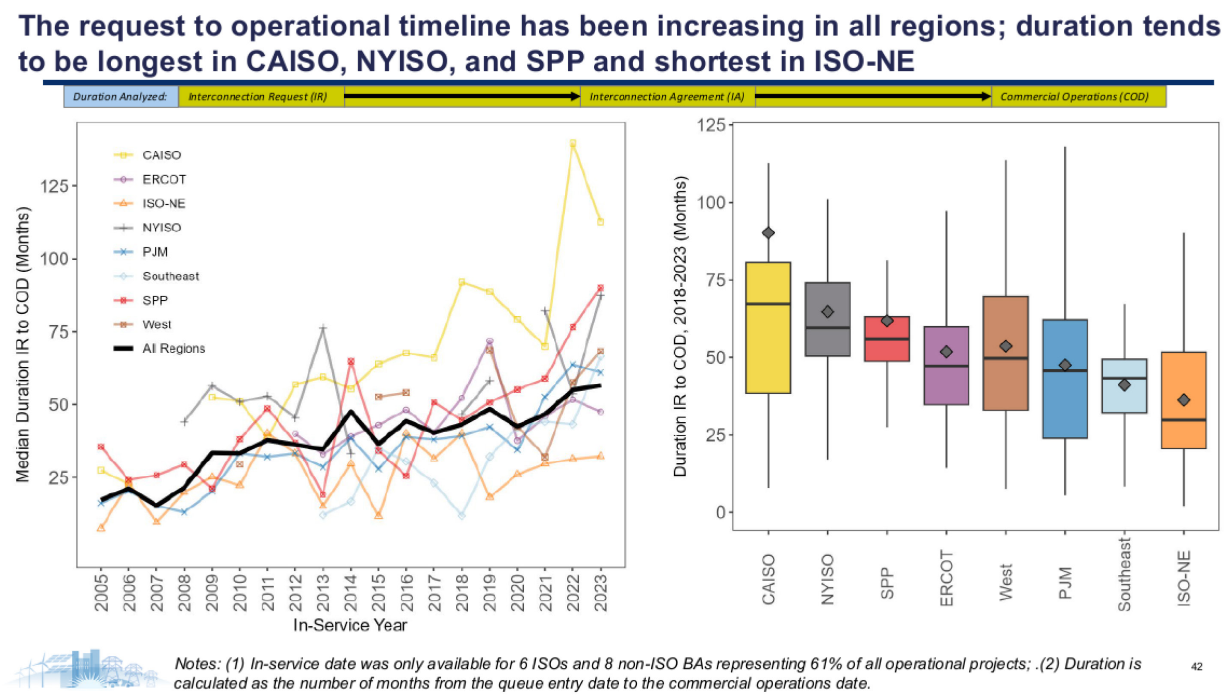
[38] *See* CARB, 200-2022 GHG Inventory (2024 Edition) (available at: https://ww2.arb.ca.gov/ghg-inventory-data).

[39] Available at: https://awsedap.epa.gov/public/single/?appid=8c074297-7f9e-4217-82f0-fb05f54f28e7&sheet=51312158-636f-48d5-8fe6-a21703ca33a9&theme=horizon&bookmark=6218ffed-bb6e-42e4-a4f1-52d87e036a1b&opt=ctxmenu.

[40] Rand et al., Queued *Up: 2024 Edition; Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2023*, Apr. 2024 (Berkeley Report).

Operator (CAISO) has the longest interconnect time in the country at approximately 110 months (9 years) from start to commercial operations (COD) (see Figure 8, below).

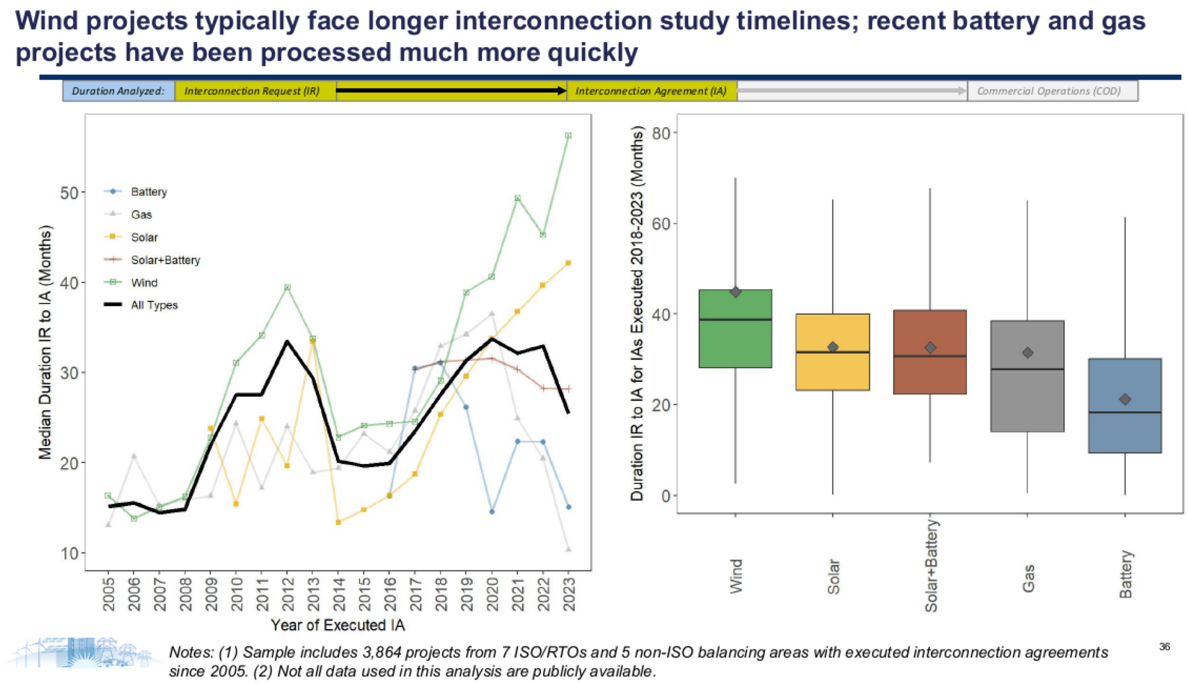
Figure 8. Comparison of Request to Operational Timelines[41]



The Berkley report also indicates that wind and solar have the longest interconnect timelines among U.S. ISOs at ~60 and ~40 months, respectively, compared to natural gas power plants at 10 months (see Figure 9, below).

[41] Berkeley Report at 42.

Figure 9. Comparison of Resource Interconnection Study Timelines[42]



Using the 9-year interconnect process as the proxy for new solar and wind compared to existing natural gas power plant retrofit with CCS in 5 years (because of the utilization of existing interconnects), the emissions savings is cumulative total 67 million metric tons CO2 (16.7 million metric tons CO2 per annum x 4 years acceleration). In reality, all resources are needed to meet California's SB 100 goals, and so all emissions savings are relevant.

v. Beyond lifecycle GHG emissions, NGCCS offer significant air quality improvements for California

In addition to reductions in GHG emissions, CCS is also expected to reduce criteria pollutant emissions, such as nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM). Recent studies have shown that implementation of carbon capture, and requisite flue gas pre-treatment, can reduce criteria pollutant emissions by 75-99+%, resulting in material health

[42] Berkeley Report at 36.

benefits for residents of the surrounding region (see Table 1, below). This directly addresses concerns that NGCCS could increase criteria pollutant emissions and negatively impact local communities.

Table 1. Summary of Emissions Reductions at Martinez and Beaumont FCC Units[43]

Reduction in Emissions of Various Pollutants from CCS Addition at Studied Refinery FCC Units*

	CO_2 Reduction	Criteria Air Pollutants Reduction			
Refinery	CO_2	NO_X**	SO_2	Filterable PM	Condensable PM
Martinez	87% 1,250,000 TPY	73% 351 TPY	99+% 673 TPY	97.5% 61 TPY	96% 296 TPY
Beaumont	87% 1,344,000 TPY	33% 55 TPY	99+% 160 TPY	95% 151 TPY	95% 59 TPY

** TPY=tons per year. Calculation of % Reduction is (Original Emissions less Emissions w/ Pre-Treatment and CO2 capture, including New Auxiliary Boiler)/(Original Emissions).*

*** NO_X reduction for Martinez is greater than for Beaumont because Beaumont has an existing SCR that achieves high efficiency NO_x control. This study included an upgrade of Martinez's SNCR to an SCR, resulting in higher NO_x removal efficiency.*

The information and third-party study data presented in this section II.B.4.a directly address any concerns related to the ability of NGCCS to: provide lower lifecycle GHG emissions power than solar PV with battery storage; deliver bundled ZECs (NGCCS clean power would be sited within California); avoid resource shuffling (existing natural gas power plants are already interconnected and located within CAISO); and avoid contracts for "dirty" facilities (i.e., near elimination of CO2 and air pollution via CCS).

b. NGCCS Is Reliable

Natural gas currently forms the backbone of California's electricity grid given its reliability and dispatchability, allowing it to meet demand regardless of the weather or time of

---

[43] Source: Clean Air Task Force, *Air Pollutant Reductions From Carbon Capture*, Nov. 2023 at 8 (available at: https://www.catf.us/resource/air-pollutant-reductions-carbon-capture/).

day/year. This reliability has become ever more important with the increasing penetration of intermittent renewables, and is why most studies, including CARB's 2022 Scoping Plan, call for retaining natural gas power generation for decades to come.[44]

Additionally, natural gas power generation also provides grid stability, with gas turbines providing spinning reserve. Spinning reserve allows for quick response to sudden increases in demand or loss of generation, preventing power outages that can spiral out of control and impact entire regions or states. This has become an increasingly important service with the higher penetration of renewables, which do not provide this ancillary service.

Critically, adding carbon capture and sequestration to natural gas power generation does *not* impact natural gas's ability to reliably meet grid demand and provide grid stability. Thus, NGCCS can play a critical role in ensuring a reliable and clean California grid in 2045 and beyond.

The information and third-party study data presented in this section II.B.4.b directly addresses any concerns related to existing NGCCS's ability to provide: hourly-matching (NGCCS is the only true 24/7 firm dispatchable resource vs. renewables + 4 hour battery storage) and deliverability into California (existing NGCCS are already interconnected to CAISO).

c. NGCCS Is Affordable

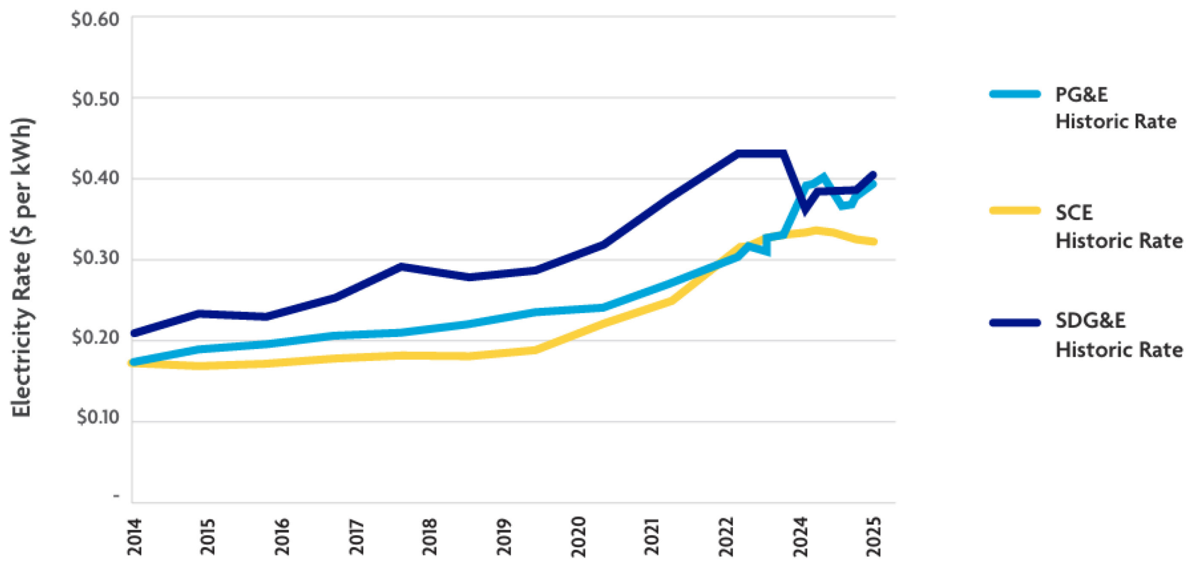
In 2024, Californians paid the highest electricity prices in the Lower 48 states,[45] making energy affordability an important issue as residents and policymakers grapple with how to promote affordability in the State. California average residential electric rates have doubled since 2014 (see Figure 10), during which time the contribution of solar and wind towards

[44] CARB 2022 Scoping Plan at 198.

[45] Energy Information Administration, *Electric Power Monthly*, Feb. 2025, Table 5.6.B (available at:https://www.eia.gov/electricity/monthly/archive/february2025.pdf).

statewide electricity consumption has increased from 12% to 28%[46]. Energy affordability issues must be addressed to avoid hindering electrification goals for transportation and buildings and the imposition of significant costs. It is critical that the costs of meeting SB 1020 and SB 100 goals are minimized by considering all decarbonization technologies.

Figure 10. Average Residential Electric Rates by Utility[47]



Source: Public Advocates Office analysis of utility data showing latest Bundled Residential Average Rates (RAR) as of October 1, 2024.

When evaluating the cost of different clean power generation technologies, it is important to look at the overall system. While small amounts of new, intermittent power generation can displace dispatchable power in a straightforward manner, larger quantities can result in significant additional costs outside of generation, including energy storage, transmission, and backup generation. Thus, while renewables such as solar and wind can have the lowest levelized cost of energy (LCOE), recent data has shown that grids with higher

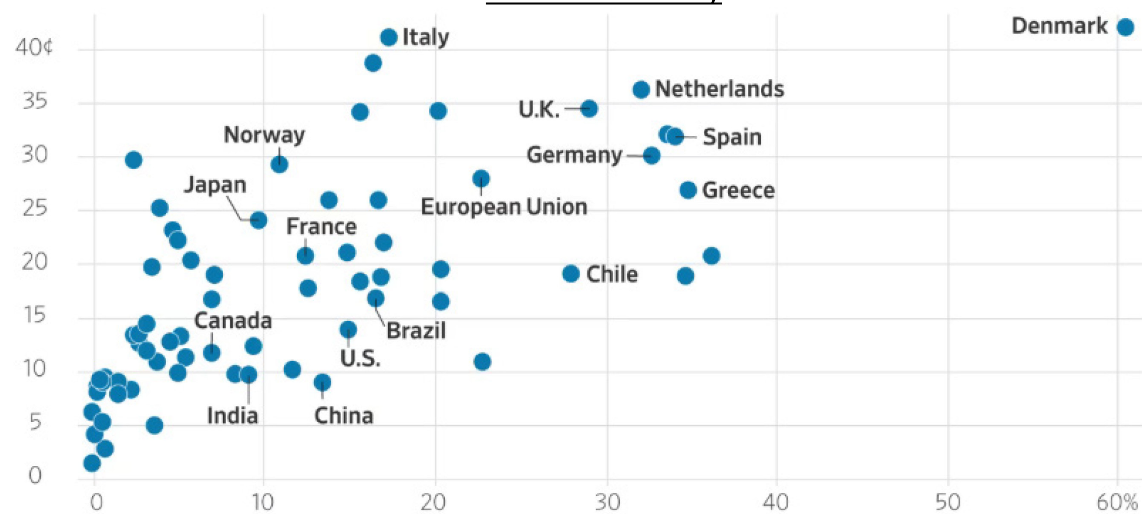
---

[46] California Energy Commission, *2009-2023 Total System Electric Generation Spreadsheet* (available at: https://www.energy.ca.gov/media/7311).

[47] Public Advocates Office, *2024 Annual Report* (available at: https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocates-website/files/press-room/reports-and-analyses/annual-reports/2024-public-advocates-office-annual-report.pdf).

penetration of these intermittent resources have higher power prices. "The International Energy Agency's latest data (from 2022) on solar and wind power generation costs and consumption across nearly 70 countries shows a clear correlation between more solar and wind and higher average household and industry energy prices. In a country with little or no solar and wind, the average electricity cost is about 12 cents a kilowatt-hour (in today's money). For every 10% increase in solar and wind share, the electricity cost increases by more than 5 cents a kilowatt-hour" (see Figure 11 below).

<u>Figure 11. Average Electricity Price per kWh, Industry and Household, Percent Solar and Wind in Electricity</u>[48]

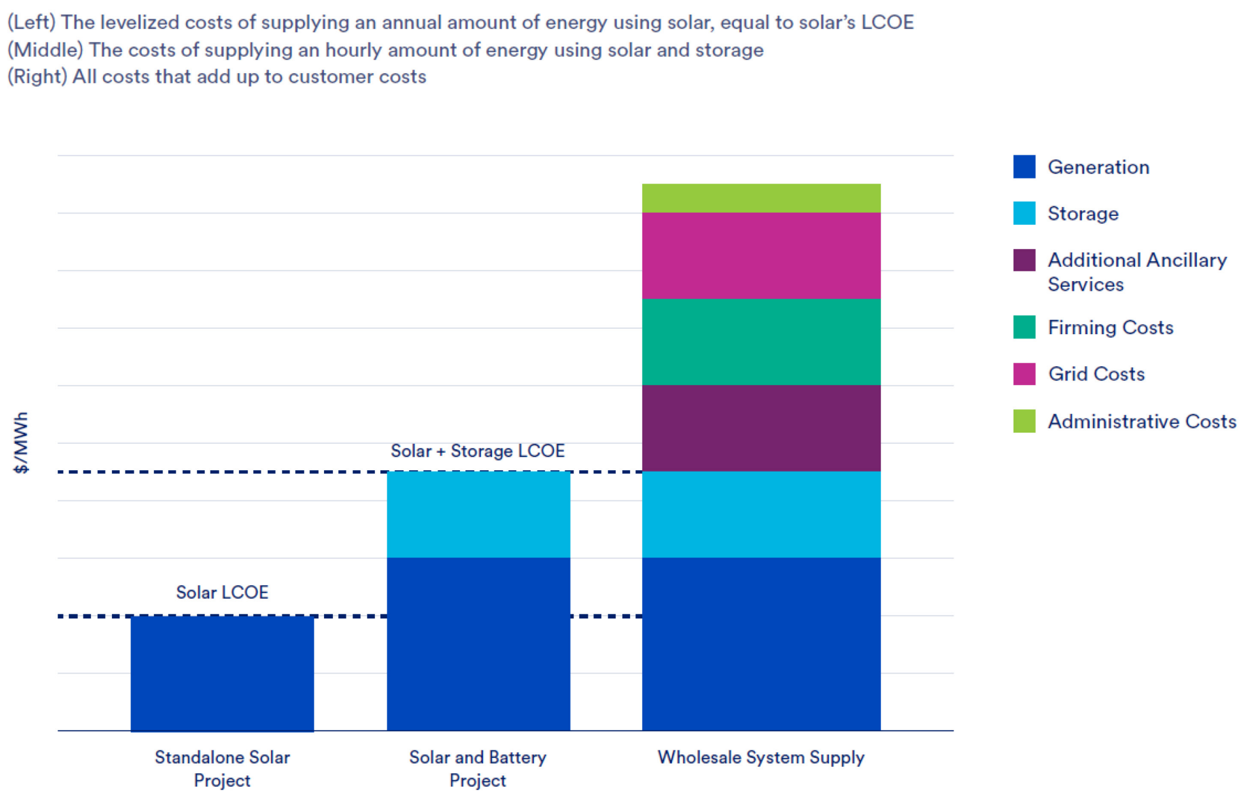


As illustrated in Figure 12, below, additional costs from storage, transmission, and backup generation can often significantly surpass the cost of generation, which makes evaluating impacts based on generation alone misleading. In California, generation composes

[48] Wall Street Journal, *Green Electricity Costs a Bundle*, Jan 2025 (available at: https://www.wsj.com/opinion/green-electricity-costs-a-bundle-wind-solar-data-analysis-power-prices-259344f4?gaa_at=eafs&gaa_n=ASWzDAjqX9hbL_NJPsYXkzNA6wrrArPgAFVHmS1l6x0vouFL8aRXxAYTosqI&gaa_ts=68758a52&gaa_sig=rygCnyKrgIVBOQSF4YU4GECPapNHPdzDXczwITsFR3IGsF6R7xQY-sY2-DboGvIOcqgiws7dwIJJHcAum603Ow%3D%3D).

just 25% of customer electricity costs, with the large penetration of renewables adding significant costs to the electrical system beyond generation. These additional cost categories, such as energy storage and infrastructure buildout, also contribute to lifecycle GHG emissions, increasing the GHG emissions of the entire system. Utilizing existing natural gas generation avoids most of these additional costs and emissions, as it is a firm power source already tied to existing grid infrastructure.

Figure 12. Illustrative Breakdown of Costs from Several Perspectives[49]



SB 1020 (2022) calls for 90% of California retail electricity to be from renewable and zero-carbon sources by 2035, 95% by 2040, and 100% by 2045 (same as SB 100).[50] These goals

---

[49] Clean Air Task Force, *Beyond LCOE: A Systems-Oriented Perspective for Evaluating Electricity Decarbonization Pathways, Clean Air Task Force*, May 2025 at 4 (available at: https://cdn.catf.us/wp-content/uploads/2025/06/12134742/beyond-lcoe.pdf).

[50] Pub. Util. Code § 454.53(a).

will be nearly impossible to achieve by renewables alone, given current renewable and energy storage technology. They would require unprecedented build-out of solar, offshore wind, and battery storage: 400GW to reach 2045 goals according to E3 modeling (see Figure 13, below). The cost of these technologies, paired with the need to overbuild to compensate for their intermittency, would significantly increase the cost of decarbonizing California's grid, exacerbating affordability issues. By adding a clean, firm source of power, NGCCS could reduce the expected amount of renewables needed down to 75-150GW.

Figure 13. Growth of Photovoltaic Capacity Dedicated to California Across a Range of Scenarios Delivering 100% Carbon-Free and Reliable Electricity Supplies by 2045[51]

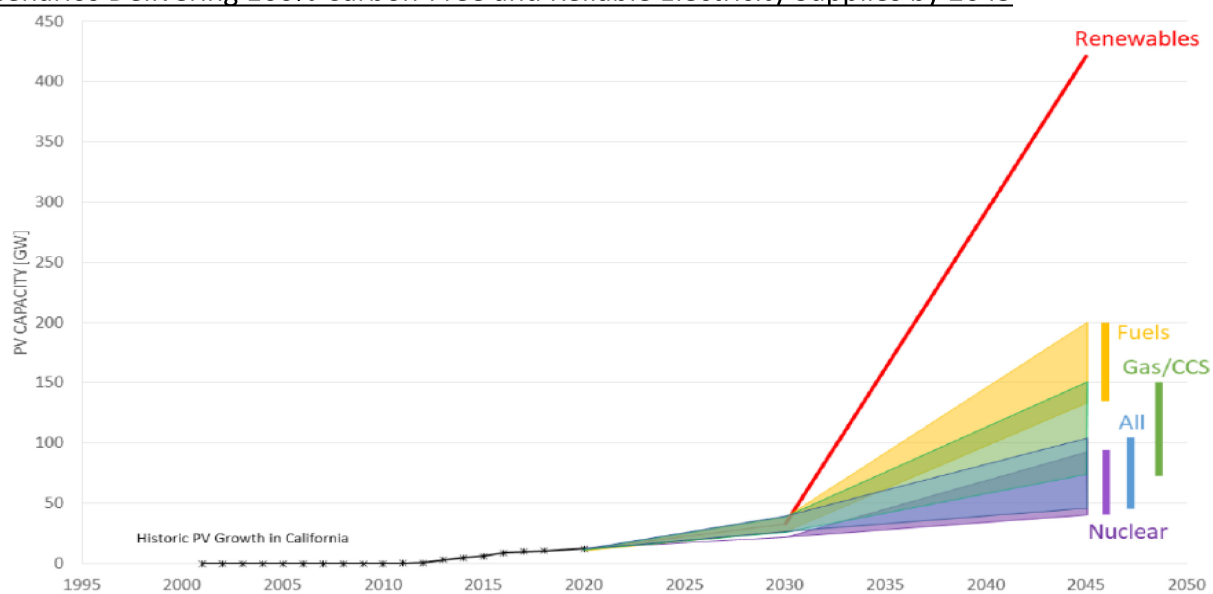
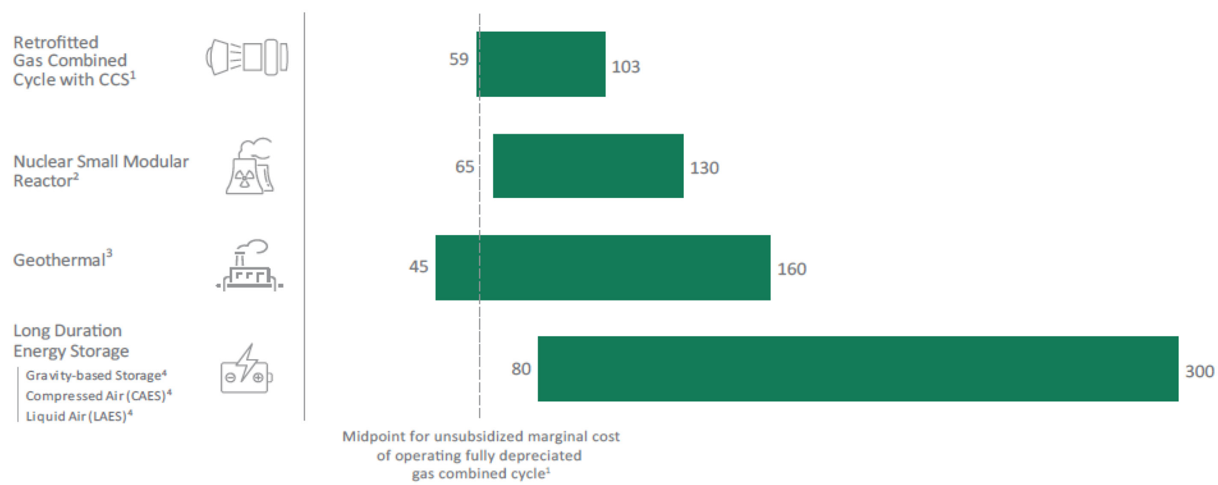


Figure 1. The growth of photovoltaic (PV) capacity dedicated to California across a range of scenarios deliverying 100% carbon-free and reliable electricity supplies by 2045. All cases shown include variable renewable energy and batteries. The case in red labeled "Renewables" did not allow any clean firm power to be built. Other cases allow both renewable energy, batteries and the labeled form of clean firm power. Results shown for mid-range capital cost cases and $33/MMBtu generic zero-carbon fuel. The renewable and batteries-only case was only solved by E3's RESOLVE and RECAP models and includes otherwise redundant solar capacity necessary to ensure reliability through all weather-years. All other cases show the range of outcomes from the ensemble of three models (RESOLVE, GenX, and urbs).

[51] Long et al., *California needs clean firm power, and so does the rest of the world; Three detailed models of the future of California's power system all show that California needs carbon-free electricity sources that don't depend on the weather,* 2021 at 5 (available at:

Natural gas is already one of the cheapest sources of power generation, which along with its dispatchability is why it sets California power prices for much of the year. Adding CCS will increase the price of natural gas power, but the increase can partially be offset by incentives (e.g. 45Q tax credit, avoidance of Cap & Trade fees). Even with the addition of CCS, NGCCS is one of the cheapest sources for clean, firm power generation (see Figure 14, below). This does not account for the fact that CCS in natural gas power plants would utilize existing interconnections and transmission, improving its cost advantage over new-build clean, firm resources.

Figure 14. Estimated Levelized Cost of Energy (LCOE)/Storage (LCOS) ($/MWh)[52]



Sources: 1. Lazard 2. PNNL 3. BCG analysis 4. US DoE

Equally important, adding clean, firm power such as NGCCS to the resource mix will significantly lower the cost of achieving SB 1020 and SB 100 goals by reducing the needed overbuild of renewables. NGCCS also takes advantage of existing transmission and

---

https://www.edf.org/sites/default/files/documents/SB100%20clean%20firm%20power%20report%20plus%20SI.pdf).

[52] Boston Consulting Group, *Unlocking California's Climate Ambition*, Jul. 2024 at 14 (available at: https://web-assets.bcg.com/37/f5/7685135144d38912ab9623dfaf6e/ca-decarbonization-report-2024-07-12.pdf).

interconnections, reducing the significant investments required to upgrade grid infrastructure. Stanford, Princeton, and Energy & Environmental Economics (E3) modeling all show that NGCCS could reduce projected California transmission and distribution costs in 2045 by 33% (see Figure 15, below). Utilizing existing transmission has the added benefit of lowering wildfire risk and costs by avoiding additional transmission buildout.

Figure 15. Wholesale Generation and Transmission Costs for 100% Carbon-Free Electricity for the Year 2045[53]

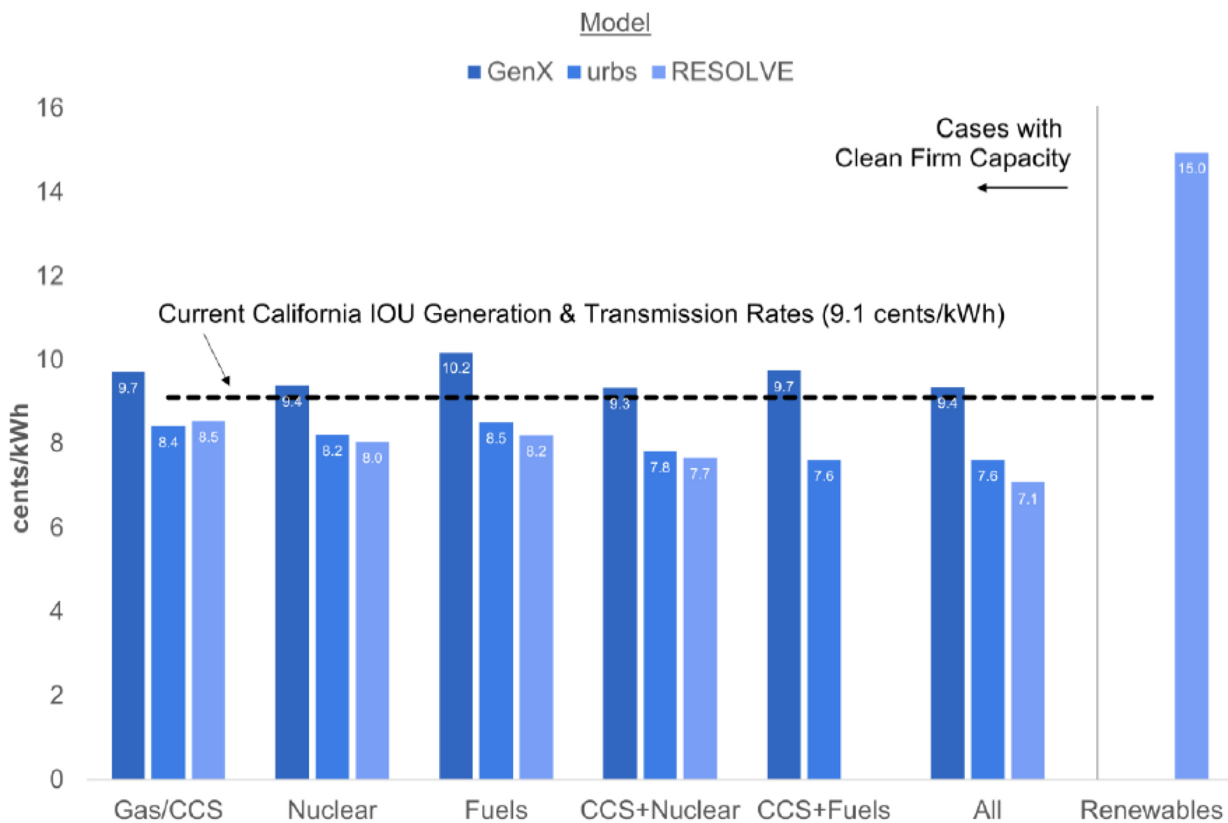


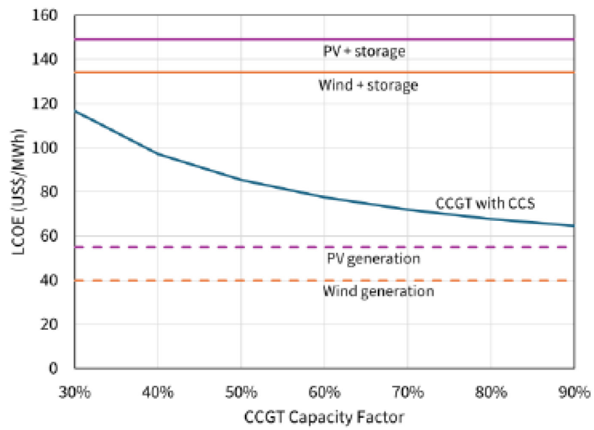
Figure 2. The wholesale generation and transmission costs for 100% carbon-free electricity for the year 2045. All cases shown include variable renewable energy and batteries. The case in red labeled "Renewables" did not allow any clean firm power to be built. Other cases allow both renewable energy, batteries and the labeled form of clean firm power. Results shown for mid-range capital cost cases and $33/MMBtu generic zero-carbon fuel. The renewable and batteries-only case was only solved by E3's RESOLVE and RECAP models to ensure reliability of this portfolio through all weather-years.

---

[53] Long et al., *California needs clean firm power, and so does the rest of the world; Three detailed models of the future of California's power system all show that California needs carbon-free electricity sources that don't depend on the weather,* 2021 at 6.

These findings from multiple studies are further reinforced by a recent Oxford study that shows that NGCCS is more affordable than PV + Storage and Wind + Storage at all NGCC capacity factors above 30% (see Figure 16, below).[54] This conclusion is conservative, given that the renewable build out would require full dispatch and hourly matched supply from clean NGCCS resources to provide firming capacity and stratify demand growth.

Figure 16. LCOE for CCFT with CCS as a Function of Capacity Factor Compared to Renewable Energy With and Without Battery Storage[55]



The information and third-party study data presented in this section II.B.4.c directly addresses any concerns related to existing NGCCS ability to provide affordable clean firm dispatchable energy to California customers (more affordable than renewables + storage, especially when considering total system costs of integration).

d. NGCCS Is Scalable

The CARB 2022 Scoping Plan projects electricity demand increasing by 76% by 2045, due in large part to electrification of transportation, building heating, and industry.[56] This unprecedented load growth will require an unprecedented build out of generation and

---

[54] Oxford Institute for Energy Studies, *Unlocking gas-to-power with life cycle greenhouse gas emissions as low as renewables*, May 2025 at 9.
[55] *Id.*
[56] CARB 2022 Scoping Plan at 203.

transmission. As identified the CARB 2022 Scoping Plan as well as in the Stanford, Princeton, and E3 modeling, the only way to meet this demand affordably while also achieving SB 1020 and SB 100 goals is through the deployment of tens of GW of clean, firm power.[57]

NGCCS is the only clean, firm power technology that can scale in the timelines needed (<5 yrs) through leveraging existing generation, interconnections, and transmission. There is already 1GW of NGCCS under development in the State (CRC Elk Hills and Calpine Sutter).[58] A Stanford study[59] identified 25 California natural gas plants, representing 14 GW of generation that could be retrofitted with CCS in the near-term (see Figure 17, below). Additionally, new NGCCS plants can be brought online relatively quickly, given proximity to existing natural gas and electricity infrastructure and streamlined permitting under the CEC.

[57] *Id.*; *see also* Long et al., *California needs clean firm power, and so does the rest of the world; Three detailed models of the future of California's power system all show that California needs carbon-free electricity sources that don't depend on the weather,* 2021.
[58] *See*, CRC, *CalCapture* (available at https://www.crc.com/carbon-terravault/projects/calcapture); Calpine, *Sutter Carbon Capture* (available at: https://www.calpine.com/carbon-capture-and-sequestration-ccs/sutter-carbon-capture/).
[59] Energy Futures Initiative & Stanford, *An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions*, Oct. 2020 (available at https://efifoundation.org/wp-content/uploads/sites/3/2022/03/CaliforniaCCS_Report_Oct20-1.pdf).

Figure 17. Potential NGCC Retrofit Sites and Existing Gas Power Plant Sites, 2018[60]

This analysis found 25 NGCCs for potential CCS retrofit that could have a combined total annual capture potential of 27.5 $MtCO_2$.
Source: Energy Futures Initiative and Stanford University, 2020.

As the 2035 goal of SB 1020 nears, there are fewer options for lowering electricity emissions given the long lead times for permitting and developing certain generation technologies (e.g. offshore wind, nuclear, hydrogen with storage) and building new

[60] Energy Futures Initiative & Stanford, *supra* at 51.

transmission. Leveraging existing power generation facilities and transmission infrastructure, which NGCCS does, will be key to meeting targets. This has the added benefits of reducing GHG emissions faster, while also lowering the cost of these emission reductions.

CCS has wide support, given its positive environmental impact from emissions reductions and its positive impact on local communities, through the jobs created and retained from construction and continued operations, and associated community benefits plans. For example, the CCS project at Elk Hills saw numerous comments during community meetings from local residents supporting the project.[61] Community support is critical to securing local permits and quickly advancing energy projects, and is another reason why NGCCS can quickly scale to meet California needs.

The information and third-party study data presented in this section II.B.4.d directly addresses any concerns related to NGCCS's ability to provide a scalable solution while avoiding enabling new fossil fuel generation; to be clear, the proposal is to retrofit existing natural gas power plants, per the CARB Scoping Plan, not build new natural gas plants.

5. Are there alternative approaches to GHG reductions that should be considered and why?

a. Lifecycle GHG Emissions Must Be Considered

Consideration of full lifecycle GHG emissions - or carbon intensity - (Scope 1-3) is critical to ensuring that California's grid minimizes its impact on GHG emissions and minimizes leakage. Every power generation and storage resource has a GHG impact (see Table 2, below). Narrowly focusing on Scope 1 emissions misses significant—and sometimes the largest—GHG impacts of

[61] CTV I Elk Hills 26R Storage Project EPA Public Hearing (2024).

power resources. Upstream mining, manufacturing, transportation and construction, land use changes during operations, and downstream decommissioning and disposal, all contribute meaningful GHG emissions related to an energy resource's use.

Table 2. Median Published Life Cycle Emissions Factors for Electricity Generation Technologies, by Life Cycle Phase[62]

	Generation Technology	One-Time Upstream	Ongoing Combustion	Ongoing Non Combustion	One-Time Downstream	Total Life Cycle	Sources
Renewable	Biomass	NR	—	NR	NR	52	EPRI 2013 Renewable Electricity Futures Study 2012
	Photovoltaic[a]	~28	—	~10	~5	43	Kim et al. 2012 Hsu et al. 2012 NREL 2012
	Concentrating Solar Power[b]	20	—	10	0.53	28	Burkhardt et al. 2012
	Geothermal	15	—	6.9	0.12	37	Eberle et al. 2017
	Hydropower	6.2	—	1.9	0.004	21	DOE 2016
	Ocean	NR	—	NR	NR	8	IPCC 2011
	Wind[c]	12	—	0.74	0.34	13	DOE 2015
Storage	Pumped-storage hydropower	3.0	—	1.8	0.07	7.4	DOE 2016
	Lithium-ion battery	32	—	NR	3.4	33	Nicholson et al. 2021
	Hydrogen fuel cell	27	—	2.5	1.9	38	Khan et al. 2005
Nonrenewable	Nuclear[d]	2.0	—	12	0.7	13	Warner and Heath 2012
	Natural gas	0.8	389	71	0.02	486	O'Donoughue et al. 2013
	Oil	NR	NR	NR	NR	840	IPCC 2011
	Coal	<5	1010	10	<5	1001	Whitaker et al. 2012

Notes for Table 1

All values are in grams of carbon dioxide equivalent per kilowatt-hour (g CO_2e/kWh)

[a] Thin film and crystalline silicon

[b] Tower and trough

[c] Land-based and offshore

[d] Light-water reactor (including pressurized water and boiling water) only

NR = Not Reported.

Funding for this fact sheet was provided by the Joint Institute for Strategic Energy Analysis in support of its Energy and Atmospheric Systems Catalyzer, a collaborative effort that explores the multidirectional relationships across climate, air quality, and energy systems.

See Also

General information about life cycle assessments: "Life Cycle Assessment Harmonization," NREL, https://www.nrel.gov/analysis/life-cycle-assessment.html

Data visualization and data downloads: "LCA Harmonization," OpenEI, https://openei.org/apps/LCA/

Additional distributional statistics and subtechnology emissions factors augmenting Table 1: https://data.nrel.gov/submissions/171

Thus, it is important when evaluating the eligibility of power generation and storage resources under the CES to factor in lifecycle GHG emissions. AB 32 (Global Warming Solutions

[62] NREL, *Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update*, 2021 at 3 (Table 1).

Act of 2006) specifies that GHG policies and targets should account for leakage, which is defined as "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside the state."[63] Technologies that result in zero emissions during operation can and do result in increased emissions outside the state due to mining, manufacturing, transport, and later disposal. Intellectual honesty compels consideration of lifecycle emissions for purposes of CES eligibility.

Similarly, the impact of generation resources on the wider electrical system, and the lifecycle GHG emissions of those impacts, should be considered when evaluating CES eligibility. Generation resources impact grid design, including energy storage, transmission, and the need for backup generation for reliability. Lifecycle GHG emissions associated with these design impacts can rival and sometimes exceed the lifecycle emissions of the generation itself. For example, Table 2, above, reflects that storing solar electricity (43 gCO2/kWh) in a lithium-ion battery (33 gCO2/kWh i) nearly doubles the lifecycle GHG emissions of the solar plus battery resource.

Thus, when determining CES and ZEC eligibility, a lifecycle GHG approach should be used. No resources actually have zero lifecycle GHG emissions; accordingly, a benchmark that incorporates RPS eligible resources, along with associated energy storage, could be used to create a threshold under which non-RPS eligible resources would become eligible for ZECs. As noted above, solar electricity stored in a lithium-ion battery would have associated lifecycle emissions of 76 gCO2/kWh . Given that this is an RPS eligible resource with low GHG emissions,

[63] Cal. Health & Safety Code § 38505(j).

it would make sense that non-RPS eligible resources with lower GHG emissions would be eligible for ZECs.

b. <u>Durable Carbon Removals Should Also Be Considered</u>

Local durable carbon removals, such as direct air capture (DAC) and biomass carbon removal and storage (BiCRS), should be considered to allow resources to negate emissions. Again, no power generation technologies are zero emission when considering lifecycle GHG impacts, and so carbon removals are one of the few options that allow these GHG impacts to be mitigated. CARB recognizes the role of carbon offsets for small amounts of difficult-to-eliminate emissions, by allowing emitters to purchase carbon offsets for up to 6% of emissions under the Cap and Trade program.[64] A similar approach could be taken for zero-carbon generation technologies and ZECs. This approach also recognizes that eliminating the last remnants of GHG emissions can be prohibitively expensive and technologically infeasible.

Durable carbon removal represents the highest quality of carbon credits, guaranteeing removal of CO2 from the atmosphere and long-term storage of CO2 for hundreds, if not thousands, of years. By requiring power generators to purchase these types of offsets, it is ensured that the generation facilities have a neutral impact on atmospheric CO2 emissions and are truly zero-carbon. Requiring these carbon removals to be local, for example within 100 miles of the power generating facility, ensures that the positive environmental and community benefits stay close to the source of emissions.

---

[64] *See* 17 Cal. Code Regs. § 95854(b).

6. Should the CPUC further develop a GHG reduction approach through a certain forum (e.g., workshops)? How could guardrails be implemented so that LSEs continue to procure toward future GHG targets while gathering more stakeholder input on an effective and efficient GHG framework?

Yes, further development and details are needed for the GHG reduction approach in the CES, and a workshop and comment process could be helpful. However, given impending SB 1020 targets and long project development timelines, guidance should be provided as soon as possible to send the necessary signals for LSE procurement of low carbon resources. Guardrails could include simple, temporary eligibility guidelines under which procurement could proceed now, with more detailed eligibility requirements applying to subsequent procurement. For example, temporary guidelines could be based upon generic factors and minimum expected emissions reductions (e.g. net 90% GHG reduction from an NGCC), while detailed requirements might include project specific emission factors and lifecycle GHG emission thresholds.

III. CONCLUSION

California Resources Corporation appreciates the opportunity to provide these comments on the RCPPP and urges the Commission to adopt the CES as recommended above.

Respectfully submitted,

Buchalter, A Professional Corporation
By:

Nora Sheriff

Nora Sheriff
Counsel for the California Resources Corporation

July 15, 2025