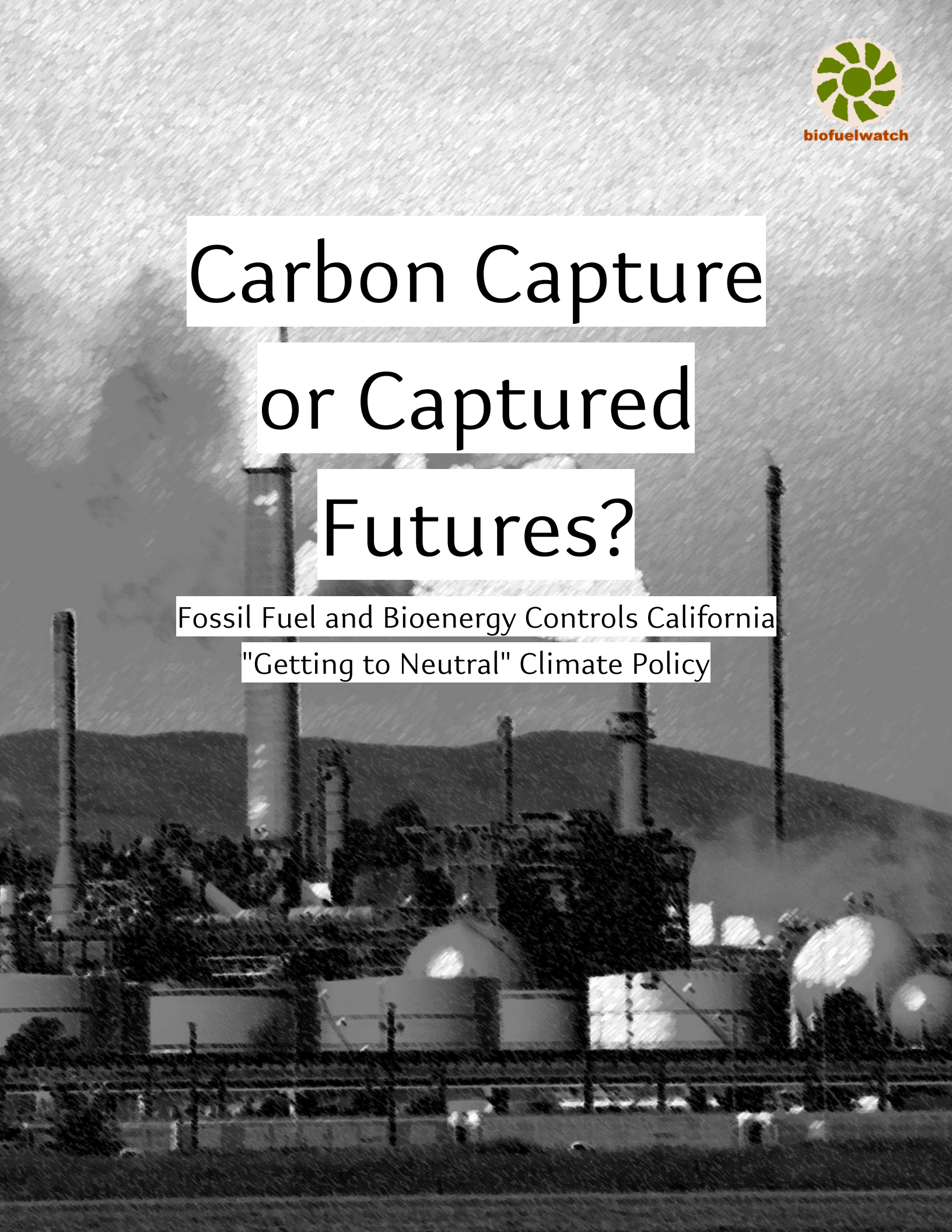

biofuelwatch

Carbon Capture or Captured Futures?

Fossil Fuel and Bioenergy Controls California "Getting to Neutral" Climate Policy

Contents

Report by Biofuelwatch. Cover photo credit: Gary Hughes. Visit www.biofuelwatch.org.uk and www.geoengineeringmonitor.org to learn more. December 2021.

Glossary

An Alphabet Soup of Carbon Capture

BECCS: Bioenergy with Carbon Capture and Storage**.** A CCS technique applied to a bioenergy facility. Capturing CO2 from bioenergy applications and subsequently sequestering that CO2 through either CCS or CCUS.

Cap-and-Trade: The California markets-based compliance mechanism, known officially as the Western Climate Initiative, Inc. Linked with the Province of Quebec in Canada. Covers hundreds of facilities in California that are responsible for 85% percent of the industrial emissions in the state.

CARB: California Air Resources Board, primary agency responsible for air pollution regulation and climate policy in the State of California.

CCS: Carbon Capture and Storage/Sequestration. CCS usually refers to the mechanical capture of CO2 emissions from power plants or other industrial sources. The CO2 is typically captured before the emissions leave the smokestack, generally with a sorbent chemical. The liquefied CO2 is then ostensibly pumped into underground aquifers for long-term storage, or as a stream of gas for EOR or other uses. CCS is not regarded as geoengineering under the UN Convention on Biodiversity's definition.

CCUS: Carbon Capture Use and Storage. The idea that captured CO2 from either industry or the atmosphere can be used as a feedstock for manufacturing, resulting in CO2 stored in products.

CDR: Carbon Dioxide Removal. CDR is a climate-altering approach that is also referred to as carbon removal, carbon engineering, carbon drawdown, greenhouse gas removal and negative emissions. These proposals posit that it's possible to suck carbon out of the atmosphere on a massive scale, using a combination of biological and mechanical methods.

DAC: Direct Air Capture. Extracting CO2 or other greenhouse gases from the atmosphere by chemical and mechanical means, generally using a chemical sorbent and large fans to move air through a filter. The CO2 is then available as a stream of gas for CCS or EOR or other uses.

DACCS: Direct Air Carbon Capture with Sequestration. As above.

EOR: Enhanced Oil Recovery. The injection of captured CO2 into oil and gas wells to increase extraction efficiency. The processing and burning of the extracted oil are likely to produce more emissions than the volume of CO2 that is sequestered by the EOR in the same space.

Geoengineering: Climate geoengineering refers to large-scale schemes for intervention in the earth's geology, ecosystems, oceans, soils and atmosphere with the aim of reducing the effects of climate change, usually temporarily.

IPCC: Intergovernmental Panel on Climate Change. The IPCC is an intergovernmental body that provides assessments of the scientific basis of climate change, its impacts and future risks.

LCFS: Low Carbon Fuel Standard. Markets-based incentives mechanism that asserts that a supposed reduction of overall carbon intensity of liquid fuels used in the state has a climate benefit.

NETs: Negative Emissions Technologies. Technologies designed to ostensibly remove large amounts of greenhouse gases from the atmosphere.

SAI: Stratospheric Aerosol Injection. A form of SRM. SAI proposes to spray large quantities of sulphur particles (e.g. sulphur dioxide) into the stratosphere (the upper layer of the atmosphere) to act as a reflective barrier against incoming sunlight.

SRM: Solar Radiation Management. SRM techniques attempt to reflect sunlight back into space, and include a range of ideas, from orbiting mirrors, tons of sulphates sprayed into the stratosphere, and modifying clouds, plants and ice to make them more reflect more sunlight.

UNFCCC: United Nations Framework Convention on Climate Change. The UN body that is responsible for facilitating international climate diplomacy, and is host of the Conference of Parties global climate meetings.

Forward: Lifting the Veil

This report is offered as a window into the backroom dynamics that drive California climate politics, and the resultant state-facilitated policy agenda, often celebrated as an example for the world to emulate.

With an increasing amount of financial and political capital being invested in markets-based and technology-focused mechanisms to meet climate change mitigation goals, Sacramento has become a key venue for scaling climate policies and frameworks long opposed by the global climate justice movement. These include energy intensive technologies like direct air capture (DAC) and bioenergy with carbon capture and sequestration (BECCS), and increasingly scrutinized market mechanisms like cap-and-trade or the Low Carbon Fuel Standard (LCFS). The goals are framed in terms like "carbon neutrality" and "net zero."

"An elite group of private and public sector specialists has coordinated behind the scenes, setting the state policy table."

Having tracked the development of these dynamics for many years, and as an active participant in the Hands Off Mother Earth (HOME) global campaign against geoengineering, Biofuelwatch has steadily seen more and better information made available for activists to understand carbon removal technologies, their unproven essence, their severe risks, their materials demands, and their clear limitations. This report does not endeavor to offer a clearing house of technical information about these controversial and dangerous technologies.

Instead, this report takes a look behind the scenes where decisions have been made to center these approaches as the focus of California climate planning. By combining extensive research with the leveraging of the California Public Records Act, a bedrock law for promoting transparency in state and local government, this report covers political and regulatory events that have not often been illuminated, some of it never before reported, and that in sum will provide a sobering take on California climate politics, with insights applicable elsewhere.

The main question we attempt to illuminate is this: How did the series of ineffective, unproven and controversial geoengineering approaches of Carbon Dioxide Removal (CDR) come to dominate the climate discourse in California? Was this an organic outcome of demands from the public? Or is the current focus on "net zero" and technical approaches for carbon removal a result of private interests and agency officials working behind closed doors in conjunction with extractive industry, and the energy sector in particular, to advance a particularly polluter friendly approach to climate?

We conclude that it is the latter. An elite group of private and public sector specialists has coordinated behind the scenes, setting the state policy table. Their goal has been to elevate those approaches that best serve the interests of the extractive industries who caused the problem in

the first place, rather than holding them accountable for their track records of polluting communities, devastating landscapes, and spreading climate disinformation.

Lifting the veil to understand more of the intricate and, dare we say, sordid workings of California's climate policymaking apparatus will be nothing short of empowering for activists who are working for public health, ecosystem protection and climate justice.

California: Climate Leader, Leading to False Solutions

On September 10, the last day of the 2021 session for the California Legislature, Assembly Bill 1395 (AB 1395) failed to pass in the Senate. Dubbed the California Climate Crisis Act, the legislation aimed to get the state to "net zero" by "as soon as possible, but no later than 2045."

If passed, AB 1395 would have codified what is already enshrined in an Executive Order signed in 2018 by then-Governor Jerry Brown in his last months of office at the dawn of the highly celebrated Global Climate Action Summit in San Francisco. Additively, the legislation further offered specific direction for how to get to "net zero" by 2045, including "a variety of policies and strategies that support carbon dioxide removal solutions, carbon capture and storage technologies, and nature-based climate solutions."

Governor Jerry Brown signs carbon neutrality Executive Order on Sept. 10, 2018.
Credit: California Governor's Office/Web Archive

The purpose of the legislation was not merely symbolic: it was to provide a legislative mandate for the current California Air Resources Board (CARB) update of its statewide climate policy framework and guidance, officially known as the 2022 Scoping Plan. The Scoping Plan is a policy framework – serving as a roadmap of sorts for all other state agencies, localities, and the California Legislature – for climate and greenhouse gas emissions mitigation policy in California.

The 2018 Executive Order had narrative reach beyond California. It has served as an initial model for nations, states, and municipalities, as well as transnational corporations, to take concepts around "carbon neutrality" that were increasingly being embraced in international climate diplomacy spaces and advance a specific jurisdictional policy framework in North America.

Previous to the Brown Executive Order the United Nations had expressed support for the mitigation framework, and ongoing deliberations regarding "carbon neutrality" by the Intergovernmental Panel on Climate Change (IPCC) had cracked open the Pandora's Box of industry-driven false solutions.

Though certainly not the first attempt to formalize the frame of "carbon neutrality," Brown's high profile announcement to an international audience set loose an avalanche of climate narratives calling for "net zero" and "carbon neutrality" – essentially interchangeable terms – on greenhouse gas emissions.

China, for example, in 2020 announced a goal of becoming carbon neutral by 2060, and oil giant Saudi Arabia has followed suit. The Biden Administration has called for a net zero by 2050 goal. In total, 20 states and Puerto Rico have announced similar goals. The European Union and Canada have also announced carbon neutrality by 2050. The examples from corporations have become too numerous to count.

> "Understanding the sum of the parts reveals a multi-pronged policy assault launched at both the legislative and regulatory agency levels whose ultimate objective is to protect the business interests of extractive industry under the façade of responding to the climate crisis."

As a hot bed of markets-based approaches to environmental management, California emerged as a high-profile example of how to operationalize the "carbon neutrality" frame on climate.

Though the *Sacramento Bee* Editorial Board bemoaned the death of AB 1395 in a September 23 article, writing, "Democratic legislators are redefining climate denialism with their inaction," California has acted consistently as an ambassador for these false solutions.

Even lacking AB 1395, the approach it aimed to codify appears likely to continue under CARB, the state's lead agency on climate matters. That is due to three reasons.

First, AB 1395 largely aimed to legalize what already exists under the 2018 Executive Order and bolster regulatory frameworks already in place or under consideration.

Second, the Legislature passed another bill, SB 27 – which concludes that "technological carbon removal strategies, such as direct air capture, direct water capture, and carbon capture utilization and sequestration...will be crucial to successfully averting the worst impacts of climate change." The SB 27 bill has indeed been signed into law by Governor Gavin Newsom. The legislation will

bolster many of the same policies found in AB 1395, and notably, did not draw any industry opposition of the sort sinking AB 1395 (which prohibited enhanced oil recovery, for example, from counting as an eligible "net zero" solution). In fact, SB 27 received support from several industry and labor stakeholders and passed nearly unanimously in both chambers of the Legislature, with only four dissenting votes in the Senate – demolishing the popular canard that Republicans do not vote for climate legislation.

Governor Newsom signs, among other things, SB 27 into law on Sept. 23.
Credit: California Governor's Office

Third, even as AB 1395 and SB 27 were under consideration by the Legislature, the ARB had already begun workshops on the 2022 Scoping Plan update. Through those workshops, the agency has signaled it aspires to embed many of the same policies seen in both AB 1395 and SB 27 into its state climate policy framework update, including promotion of "engineered carbon removal" and biomass energy.

Understanding the sum of the parts reveals a multi-pronged policy assault launched at both the legislative and regulatory agency levels whose ultimate objective is to protect the business interests of extractive industry under the façade of responding to the climate crisis.

Lobbying filings for the legislation, as well as comments reviewed as part of the nascent CARB Scoping Plan process, unsurprisingly exhibit that the fossil fuel industry and its allies in the wood products, bioenergy and banking sectors are strong backers of California's "carbon neutrality" push.

The "neutrality" framing embedded into the mechanisms is a false solution for addressing climate change because it misses a crucial point about greenhouse gas emissions: they are cumulative and their accumulation means that a ton of carbon released into the atmosphere compounds itself in a way that a ton's removal does not. In that context, cancelling out emissions with supposed removals will never balance the carbon accounting sheet, regardless of the commercial popularity of such a "net zero" formula.

The policies hinge upon allowing greenhouse gases to continue to accumulate, with the empty promise of unproven technofixes coming to the rescue sometime in the future after surpassing the atmospheric GHG concentrations that result in catastrophic warming, an outcome referred to as "overshoot."

Many scientific studies have called this approach into question in recent months, including one article co-written by the former Chair of the IPCC calling the "net zero" premise a "dangerous trap." A growing camp of scholars has also called this paradigm a form of "mitigation deterrence," or a form of kicking the can down the road given the effective climate action needed in the

immediate future and not decades away. Civil society groups have gone further, calling “net zero” a “big con.”

This controversy raises key questions about where exactly the California state focus on “net zero” has come from, who has lobbied for this legislation, what types of false solutions to the climate crisis are they pushing, and what do they have to gain from it becoming state law? The convoluted journey to the answers of these questions requires at least a cursory review of the history of “carbon neutrality.”

"Carbon Neutrality" in the U.S. Has a Biomass UtiliTree

An examination of the historical record on the rhetorical rise of “carbon neutrality” within the domain of domestic politics in the United States shows its roots in a program called the Utility Forest Carbon Management Program and the creation of a nonprofit by the Edison Electric Institute (EEI), a trade association of large electricity-producing companies from across the U.S., called the UtiliTree Carbon Company. The history dovetails with EEI’s own history and linkages to climate denial. It also dovetails with the rise of the push for biofuels within European Union policymaking circles.

UtiliTree was the nonprofit incorporated entity for the Utility Forest Carbon Management Program, launched in 1996, and had between about four to five dozen member companies at its peak. The coalition held itself up as a guardian of forests and biodiversity, saying its fossil fuel electricity generation could be offset via its activities on “natural and working lands,” a theme prevalent within the California Scoping Plan process and also highlighted in SB 27. Utilitree and the Utility Forest Carbon Management Program were also voluntary measures, with no regulatory enforcement mechanism.

"Our industry has demonstrated that a vigorous, voluntary approach toward curbing greenhouse gas emissions is the way to go. We will continue to put these programs in place while opposing government and international mandates that would cost the U.S. economy thousands of jobs," Edison Electric Institute’s President said in a 1996 press statement. "Utilities have met the challenge and are continuing their leadership role in working with the government to find creative and effective ways to improve the environment."

An example of a project within its mission, coalition partner Southern Company boasted in 2000 that it had planted 20 million trees on company land, writing in a press release that “Trees act as

natural filters. They absorb carbon dioxide, converting it to oxygen...We think planting more trees is a cost-effective way to deal with carbon dioxide emissions."

Other examples included the New England Power Company pledged support of a domestic "reduced-impact logging" program, "designed to lessen the damage done by logging to non-harvested trees, soil and waterways" and four utility companies' work alongside The Nature Conservancy "to help preserve an endangered tropical forest totaling 120,000 acres." The latter, called the Rio Bravo Carbon Sequestration Pilot Project, had the support of Wisconsin Electric, Detroit Edison, Cinergy Corp., and PacifiCorp.

"... the biomass industry also began trumpeting its ability to produce "carbon neutral" energy."

The Utility Forest Carbon Management Program, in turn, received endorsement by the Clinton Administration Department of Energy through its Climate Challenge Action Plan. In a 1995 newsletter published by the Global Climate Coalition, the vanguard of that time for climate change denialism, Utility Forest Carbon Management Program pointed to its involvement in the Clinton Administration's Climate Challenge initiative and noted that it has supported projects "that would: enhanced (sic) existing carbon sinks, create new carbon sinks by planting on marginal agricultural lands or degraded forest sites, store carbon in wood products, conserve energy through shade trees, and use biomass as fuel to produce electricity."

In 2001 congressional testimony given by an executive for one of the members of the consortium, American Electric Power, also flagged his opposition to the Kyoto global climate deal signed in 1997, stating that *"any future treaty must include an unconstrained international trading system"* (emphasis ours).

Such a trading system must include the "full credit for the enhancement of natural sinks such as forests and agricultural lands, and a compliance regime that will be an effective deterrent against noncompliance," said the executive before the U.S. Senate Committee on Agriculture, Nutrition, and Forestry, echoing today's "mitigation deterrence" argument made by critics of the "net zero" framework from the vantage point of a corporate executive.

The AEP executive added that, "Properly implemented, these practices are technically proven and can offset a large amount of CO2. In addition, such projects have secondary environmental and social benefits such as the restoration of degraded lands and the protection of biodiversity."

A 1999 paper by the UK social justice NGO The Corner House lambasted the logic of the coalition on its face, writing that it is the "outward expression of the inward logic of business as usual."

"It hides the way land would have to be redistributed in order to produce a new 'export crop' of climatic stability; supplants the notion of equal rights with one of biochemical equivalence; consigns difficulties of plantation scale, centralized management, and the incommensurability of different kinds of carbon pools to the status of mere details which can be worked out over time by

technocrats; morally equates industrialists and subsistence farmers; introduces a new monoculture of carbon; and legitimizes the redistribution of risk, sanctioning the gift of guaranteed carbon credits to the rich in exchange for projects of uncertain benefit to the livelihoods of the poor or to global climatic stability," explained the jeremiad.

UtiliTree would continue as UtiliTree II under the George W. Bush Administration, endorsed at the time by the Bush Administration's Energy Department. While that played out, the biomass industry also began trumpeting its ability to produce "carbon neutral" energy.

In a 1993 op-ed, Jennifer Joy Wilson – who had served as Assistant Secretary of Commerce for Oceans and Atmosphere under President George H.W. Bush – wrote that "Biomass could be the surprise fuel of the 1990s" and that burning it is "carbon neutral." That's the case, wrote Wilson, because "the emissions do not add to the buildup of greenhouse gases in the earth's atmosphere."

Then, in 1995 and at a proposed plant in Wisconsin, U.S. Generating Company said that at its proposed bioenergy electricity generation facility, it would use "dedicated energy crops" and "urban wood waste" as a feedstock and require 50,000 acres of land for its marketization plan. The plan, said U.S. Generating Company, would be "carbon dioxide neutral."

The Utility Forest Carbon Management Program, UtiliTree, and broader rhetorical flourishes around "carbon neutrality" also found a short-lived home in two failed congressional attempts to create a federal cap-and-trade program, one at the end of the Bush Era and another at the beginning of the Obama Era. The IPCC and the United Nations Framework Convention on Climate Change (UNFCCC) had also by this point endorsed the "carbon neutrality" frame in several instances, not without some controversy.

Climate Denial and Disinformation: Exxon Ties to Direct Air Capture

As the cap-and-trade debate played out in Washington between 2009 and 2010, the fossil fuel-funded think-tank American Enterprise Institute created the Geoengineering Project, with the head of the project co-writing a paper in 2009 advocating for the scaling up of direct air capture (DAC) of carbon dioxide from ambient air. The paper was published by the Copenhagen Consensus Center, a group known for its climate denialism founded by Bjorn Lomborg. In 2009-2010, Congress held three hearings on geoengineering techniques, including DAC.

The Center for International Environmental Law took note of the timing in a definitive 2019 report on the history of geoengineering, writing that it came following negotiations over the Kyoto Protocol global climate deal before the United Nations and as a deal was being hashed out for the 2009 global climate summit in Copenhagen.

"AEI was aware of the potential for climate regulation in the United States between 2008 and 2010. Notably, after 2010, when federal climate policy in the United States seemed unlikely to advance, the Geoengineering Project disappeared," wrote CIEL.

At around the same time, those with stated concerns about the climate crisis – and not outright deniers – also began studying and entertaining the idea of scaling direct air capture. Chief among them was David Keith, then a professor at Calgary University, now at Harvard University. Keith, well known for his geoengineering advocacy, even entertained the idea of teaming up with Alberta tar sands oil producers at the time.

"A company could, in principle, contract with an oilsands plant near Fort McMurray to remove CO2 from the air and could build its air capture plant wherever it's cheapest – China, for example – and the same amount of CO2 would be removed," Keith said in a 2008 press release.

Keith's private company Carbon Engineering is now a central part of the push for DAC in California, having officially supported the SB 27 legislation.

> "... direct air capture, once the geoengineering crown jewel of the climate denial machine, is now promoted as a central piece of the climate policy puzzle in California."

In a 2002 paper, paralleling the American Enterprise Institute's writing on DAC, Keith and his co-authors also echoed the American Enterprise Institute in referring to direct air capture as a form of geoengineering.

"Air capture is (arguably) a form of geoengineering because it directly modifies the biosphere and would be implemented with the aim of counterbalancing other human actions," Keith and his co-authors wrote.

Another group of scholars wrote the first known academic paper advocating for direct air capture in 1999, published on behalf of Los Alamos National Laboratory. One of those co-authors, Patrick Grimes, was a former scientist for Exxon.

"[I]t appears to be extremely difficult to stop the growth of fossil energy demand, yet to stabilize CO2 levels requires a drastic reduction in CO2 emissions," wrote Grimes and his colleagues. "The only way out appears to be some means of collecting and subsequent disposing of the gas after it has been generated. If proven feasible, extraction from air would provide a powerful approach to the problem."

Grimes added, "It completely avoids a restructuring of today's infrastructure...Carbon dioxide extraction from air would allow the continued use of carbon based fuels for distributed energy production."

Former Gov. Arnold Schwarzenegger signs AB 32, with current Gov. Gavin Newsom pictured to the back and second to the right.
Credit: California Governor's Office/Web Archive

Some years after, when federal cap-and-trade policy fell to ashes in 2010 and was entirely sidelined after the Republicans dominated in midterm elections – taking over the U.S. House and U.S. Senate – California had picked up the mantle and created its own cap-and-trade program, which began in 2012 under Governor Brown. Almost a decade later, it is still the only statewide cap-and-trade program in existence, though Washington state passed a cap-and-trade law this year, set to go into effect in 2023 or 2024, despite concerns raised by climate justice advocates.

California's Low Carbon Fuel Standard (LCFS) also became state law in 2010 after ratification in 2009. Both cap-and-trade and the LCFS came about as a result of the passage of the Global Warming Solutions Act of 2006 (AB 32), signed into law by Governor Arnold Schwarzenegger.

The state's cap-and-trade program, which enables pollution to continue happening at its source, has had well-documented disproportionately negative air quality impacts in low-income communities and in those with people of color. It received an industry-drafted extension in 2017, despite widespread opposition from the environmental justice movement, representing negatively impacted communities that continue to provide evidence that the program is failing badly and letting California's biggest polluters off the hook.

Cap-and-trade, alongside LCFS, perform as the vital staples of the 2018 Executive Order signed by Brown. The programs laid the groundwork and, despite their fatal flaws, are serving as major cornerstones of the current push to get California to "net zero" by 2045.

And direct air capture, once the geoengineering crown jewel of the climate denial machine, is now promoted as a central piece of the climate policy puzzle in California.

Engineered Carbon Removal: Rebranding Geoengineering

One of the major outgrowths of the 2018 Executive Order was the ascendancy of direct air capture (DAC) of carbon dioxide and, more broadly, a push by powerful proponents of carbon dioxide removal (CDR) and negative emissions technologies (NETs). Once fringe geoengineering ideas left to the margins of climate debate, now they are at the center of it, a product of a well-financed campaign to make it such.

Carbon capture, utilization and storage (CCUS) was also a major winner of the 2018 Executive Order, with the predominant end use of carbon being its utilization for procuring more oil, in which underground storage is a mere aside and the recycling of that carbon through a closed loop system is the dominant way of making use of the commodity. CCUS to facilitate CO2 enhanced oil recovery, studies have shown, can only result in increasing GHG emissions.

> "... over a period of months, institutions with vested interests in the outcome began publishing reports to develop policymaking consensus around carbon removal technologies."

California state officials, as well as industry proponents, have carefully couched their language when discussing these matters and successfully shifted discourse from a decade ago, when these tools were called geoengineering. Linguistically, the closest the rhetoric now gets to that is the term "engineered carbon removal," the term of art used by CARB in an August 2021 workshop for the 2022 Scoping Plan process.

This did not happen by accident. Instead, over a period of months, institutions with vested interests in the outcome began publishing reports to develop policymaking consensus around carbon removal technologies. And never did they use the term "geoengineering."

The intentional avoidance of the term "geoengineering" became apparent during a February 2020 hearing held by the California Legislature's Joint Legislative Committee on Climate Change Policies, a committee created to serve as a climate policy watchdog, but with little bite. At that hearing, the then-Chairwoman of the California Air Resources Board Mary Nichols endorsed the policy tenets advocated for within a report – hot off the press at the time – published by researchers at the Lawrence Livermore National Laboratory and bankrolled by the ClimateWorks Foundation. That report is titled, "Getting to Neutral: Options for Negative Carbon Emissions in California."

Jan Mazurek, until recently the head of the Carbon Dioxide Removal Fund for the ClimateWorks Foundation (now a Senior Director for the organization) and an architect of the state's cap-and-

trade program when working for the Air Resources Board under Nichols, praised Nichols' testimony in an email obtained via the California Public Records Act, calling it "masterful."

The hearing unfolded just as the predecessor bill to SB 27, SB 1323, received an official introduction by Senator Nancy Skinner (D-Berkeley). At the hearing, George Peridas – Director of Carbon Management Partnerships at the Lawrence Livermore National Laboratory – testified that "Removing CO2 from the air is the only way we can be certain to achieve this vital goal" of "net zero" by 2045. "Direct air capture can make as large a contribution to our goal as we choose," he added.

"I am proud to live in a state that enables me to have solar panels on my roof and to drive an electric vehicle," Peridas further stated. "But we cannot confidently tell our children that our efforts to use energy more efficiently, generate power from renewable sources, and put cleaner cars on the road alone will reduce our emissions to zero by 2045."

> "... moving CO2 through pipelines and storing it in communities, contrary to the linguistic gymnastics in the messaging guide, is far from a benign endeavor."

In a 2012 academic paper about geoengineering, Tina Sikka – then a lecturer at the School of Communications at Simon Fraser University – described rhetorical flourishes of the sort as a form of "exceptionalism."

"Exceptionalism, as a kind of discursive construct, is deployed by experts and political advocates of geoengineering to present it as the only option with respect to mitigating catastrophic global warming," Sikka wrote. It is "the process of setting up often false, ominous, and therefore exceptional, scenarios in which we as citizens must choose between two stark and generally unappealing choices. These choices, furthermore, are set up to demand immediate attention and action with whatever information is currently at hand."

Sikka added that, on the contrary, "a transformation in the economic practices of the world is never mentioned."

And in her 2018 dissertation on the concerted years-long effort to move geoengineering from the fringes to epicenter of U.S. climate politics, University of California-San Diego sociologist Brynna Jacobson wrote that the positioning of these tools as a "Plan B" has amounted to a misleading bait-and-switch, of sorts.

"[T]his categorization is misleading in a way since Plan B presumes a Plan A, in this case mitigation; yet the Plan A of mitigation has not been seriously and fully pursued due to obstruction by powerful economic and political interests," wrote Jacobson.

Peridas messaging parallels talking points generated by proponents of direct air capture, according to a carbon dioxide removal messaging guide obtained from CARB under the Public Records Act. That guide suggests a hard stop on calling carbon dioxide "pollution" and a shift

towards naming it “excess carbon” because in “highlighting excess, we can help position the need for removal” without “triggering concerns about how we will store 'pollution' after removal."

"Clean energy alone won't get us there," the guide further details. "[W]e also need carbon dioxide removal." Echoing Peridas, the guide also reads, "Delay is the enemy if we want to win this fight. The longer we wait, the more expensive and difficult deployment will become."

Left out of the lofty, focus-grouped language and green imagery comparing technologies with trees – cooked up by messaging consultancy group Lake Research Partners – is the on the ground reality of what it will take to scale up such carbon dioxide removal infrastructure. That includes a massive array of pipelines and underground storage reservoirs.

The Livermore Lab study envisions a future in which hundreds of miles of CO2 pipelines crisscross the state aimed toward injection wells in the San Joaquin Valley, including via direct air capture facilities in the Salton Sea region in Imperial County. The two areas have high percentage Latino populations. The study further notes that the Central Valley has a “conservative” estimate of 17 billion tons of CO2 storage space in underground reservoirs.

Reaching those reservoirs – and bringing “excess” carbon dioxide “captured” via BECCS, DAC, or CCUS from facilities spread around far-flung corners of the state – would require an extensive pipeline network. Moving CO2 through pipelines and storing it in communities, contrary to the linguistic gymnastics in the messaging guide, is far from a benign endeavor.

CO_2 Transport: Far from a Benign Endeavour

> *In 1975, 11 died* ***from a CO2 enhanced oil recovery well site in Texas****, the second deadliest oil site casualty event – next to the Deepwater Horizon explosion in 2010 in the Gulf of Mexico – in U.S. history.*
>
> *In 1982,* ***a multi-day CO2 leakage at the Sheep Mountain Dome CO2 source field*** *"was the source of one of the largest CO2 leakages and the* ***largest recorded industrial release*** *in human history," the outlet Capital & Main reported.*
>
> *In 1986, an* ***eruption of a natural CO2 pool*** *at Lake Nyos in Cameroon killed* ***1,746 people and 3,500 livestock****.*
>
> *In 2016, a CO2 enhanced oil recovery field in Wyoming leaked and spewed carbon into the atmosphere next to a public school, with air pollution so severe that it took almost the entire school year to return the premises to safety.* ***County air quality test results showed CO2 "levels inside the school were 26 times the recommended limit, which made some areas of the school oxygen-deficient,"*** *Inside Energy reported. "Levels of benzene, which can have serious short and long-term health effects, were 200 times the amount deemed safe by the Agency for Toxic Substances and Disease Registry, a branch of the Centers for Disease Control."*
>
> *In 2017, a* ***CO2 pipeline in West Texas' Scurry County exploded,*** *injuring eight.*
>
> *In February 2020,* ***a CO2 pipeline explosion in Mississippi*** *nearly killed dozens of people, who luckily got to the emergency room prior to asphyxiation. The CO2 extracted from Mississippi's Jackson Dome CO2 field is utilized for enhanced oil recovery.*

Full Circle: Legitimizing the Carbon Capture Money Machine

The "Getting to Neutral" agenda, and everything falling under its umbrella, didn't advance by itself. Rather, cash and copious corporate connections conceptualizing carbon commodification concoctions coaxed it along.

Or, as Jacobson put it in her dissertation, "geoengineering policy reports contribute to the mainstreaming of geoengineering though constructing notions of legitimacy."

Emails show that, perhaps first and foremost, ClimateWorks' Mazurek has proven instrumental at advancing the CDR agenda in Sacramento. The Livermore Lab Foundation, incorporated in 2016 and with an administrative office at the University of California's office in Oakland, received a $400,000 grant from the ClimateWorks Foundation for its work on "Getting to Neutral."

For ClimateWorks, Brown's 2018 Executive Order served explicitly as an impetus to push direct air capture.

"The order certainly laid out quite the potential research agenda, not least of all the removal work Jan is working on," Seth Monteith, the foundation's program manager for advisory and research, wrote in a December 2018 email to Virgil Welch.

Welch (center) and Nichols (right). Credit: University of California-Davis

Welch, at the time, worked as a senior aide and counselor to ARB Chairwoman Mary Nichols. After the release of "Getting to Neutral" in January 2020, Welch referred to it as something that "will be most helpful" to CARB after Mazurek sent a copy of it to him via email.

Mazurek, for her part, formerly worked as a senior staff aide to CARB Chairwoman Nichols and was crucial for getting cap-and-trade passed in the state during her time working for the agency. Gates Ventures, a venture capital firm run by Bill Gates, is among the funders of ClimateWorks Foundation. Gates is also one of the financiers of Carbon Engineering, the first firm working alongside Occidental

Petroleum aiming to construct a DAC facility in the Permian Basin in Texas – the nation's most productive oil field in which the carbon captured out of the ambient air would be used for procurement of more oil there – and slated to use Low Carbon Fuel Standard (LCFS) credits to finance the endeavor. As previously described, Carbon Engineering was founded by Harvard's David Keith, one of the aforementioned godfather proponents of direct air capture and broader geoengineering techniques.

The Gates ties go beyond funding ClimateWorks Foundation. Peridas' Livermore Lab colleague Briana Mordick, who also works on carbon capture and storage issues, formerly served as Gates Ventures' director of advocacy and government relations. Abdu Issa, head of Impact Analytics and Reporting Manager for Gates' new venture firm Breakthrough Energy Catalyst, formerly worked as a senior analyst for Oxy Low Carbon Ventures and as a petroleum engineer for the company focused on tapping into the Permian Basin with CO2 enhanced oil recovery technology. Beyond Gates, ClimateWorks Foundation also won a $50 million tranche from Amazon Founder Jeff Bezos via his newly minted Bezos Earth Fund in November 2020.

Gates also funds the Stratospheric Controlled Perturbation Experiment (SCoPEx), a project co-administered by Keith and based out of Harvard created to advocate for the potential of solar radiation management (SRM), a geoengineering technique by which sunlight-reflecting particles would be shot into the atmosphere into perpetuity as a means of disrupting the global warming effect from the sun onto Earth's atmosphere. The SCoPEx pilot, however, has been put on hiatus in the aftermath of an upswell of global civil society and Indigenous peoples' opposition to recent efforts to operationalize the research project in Sweden.

> "[Governor Newsom] has been really clear that when we have a clear policy direction that aligns with our climate and equity values, he wants us to have a business relationship that he says is red carpet, not red tape'."

In between the introduction of the first iteration of the bill and passage of SB 27, the ClimateWorks Foundation-backed group Carbon180 – formerly known as Center for Carbon Removal – released its own report advocating for the Biden Administration to pursue "engineered carbon removal" within its menu of climate-oriented policies. Carbon180, which formerly featured Governor Gavin Newsom's former top climate aide Kate Gordon as a Board of Directors member alongside Mazurek, also advocated for the U.S. Department of Energy's Office of Fossil Energy to be renamed the Office of Carbon Management in the report.

In July, that renaming happened, and the Office's chief of staff is a Carbon180 alum who also had a role on the Advisory Committee of SCoPEx until joining the Biden Administration. As for Gordon, she now works as a senior advisor to U.S. Secretary of Energy Jennifer Granholm, a job she commenced in July. And former Carbon180 advisory board member Ali Zaidi now works as Deputy White House National Climate Advisor for the Biden White House.

Before leaving Sacramento for the Biden Administration, Gordon explicitly stated that the Newsom Administration would roll out the "red carpet" for carbon dioxide removal technologies, calling them a "necessary part" of responding to the climate crisis. Governor Newsom "has been really clear that when we have a clear policy direction that aligns with our climate and equity values, he wants us to have a business relationship that he says is red carpet, not red tape," Gordon said at the kick-off event for an October 2020 study published by the Energy Futures Initiative, an industry-tied group founded by former Obama Administration Secretary of Energy, Ernest Moniz.

That study, titled "An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions," received funding from several unions with workforces tied to the fossil fuel industry, Calpine Corporation, and the Oil and Gas Climate Initiative, as well as some foundations, one of them the progeny of a former managing director and partner at the Wall Street bank Goldman Sachs, Linden Trust For Conservation, where Gordon worked as a consultant prior to beginning work for Newsom. Its namesake, Larry Linden, was a major donor to President Biden's 2020 presidential campaign.

The Oil and Gas Climate Initiative (OGCI) is a consortium of executives from multinational oil and gas companies founded in 2014 to advocate for and finance infant-stage CDR technologies, particularly CCUS and DAC. Among those in its investment portfolio is Elk Hills Carbon LLC, which will aim to capture carbon at the Elk Hills Power Project natural gas power plant in Kern County on behalf of California Resources Corporation and utilize that carbon to facilitate more oil drilling in one of California's largest and still-expanding oil fields. Called CalCapture, California Resources Corporation has said it hopes to build the carbon capture add-on to the power plant by the end of the decade. It would be the first CCS facility in California.

The "Getting to Neutral Team; Peridas back left, Aines left of poster, Mazurek far right. Credit: Lawrence Livermore National Laboratory

Calpine, for its part, is the largest natural gas producing electricity company in the United States, with a major presence in California. Out of its 76 power plants in the United States, 34 of them sit in California.

In August 2019, emails show that Gordon met with the lead author of the Livermore Lab study, Roger Aines. Reporting back to Mazurek on how the meeting went on the "Getting to Neutral" study, Aines said Gordon expressed a keen interest in the potential to scale up CCS and infrastructure pertaining to it, such as pipelines, as a selling point of the agenda.

"The most interesting aspect of our material was bringing jobs, oil, just transition, and land use together," Aines wrote to Mazurek, who forwarded the email to Welch, of his takeaways from the rendezvous. "She is interested in actions that motivate and advance CCS in the oil patch," an allusion to scaling up increased oil production via CO2 enhanced oil recovery.

In the lag time between the introduction and eventual pandemic complicated demise of SB 1323 in 2020 and the subsequent rise of SB 27 and AB 1395 in 2021, CARB also released its own report in October 2020, setting the stage for the 2022 Scoping Plan process.

Titled, "Achieving Carbon Neutrality in California," the report weighs the possibility of scaling up DAC and BECCS for achieving carbon neutrality by 2045. The group Energy and Environmental Economics conducted the report on behalf of ARB. Known also as E3, its clients have included the likes of Calpine, San Diego Gas & Electric, Pacific Gas & Electric, and Worley Parsons – the latter the firm with the engineering contract to build Oxy Low Carbon Ventures' DAC facility in Texas' Permian Basin – as well as a long list of others.

"The focus and research around CDR options has grown significantly over the past 10 years with large bodies of research and funding focusing on these options," reads the E3 report. "Today it is still unknown which strain of these solutions will be most cost-effective by mid-century. However, there is a consensus on the need to maximize the use of existing land use and management solutions to remove as much carbon dioxide as possible, which will vary in potential by region. Negative emissions technologies such as BECCS and DAC with CCS (also known as DACCS) are also expected to become viable options in the 2040-2050-time frame."

During that same lag time period in 2020, researchers from the law schools at University of California-Berkeley and University of California-Los Angeles (UCLA) released their own study in December, advocating for similar approaches found in both the Livermore Lab and ARB-commissioned E3 studies. Aines, one of the co-authors of the Livermore Lab report, is thanked for his assistance in the study, titled, "Capturing Opportunity: Law and Policy Solutions to Accelerate Engineered Carbon Removal in California."

Others thanked for their participation in the report include leaders from all of California's environmental, climate, and energy regulatory agencies, plus a senior Newsom Administration official tasked with climate and environmental issues. Additional gratitude is expressed to representatives from the Western States Petroleum Association, the California Independent Petroleum Association, SoCalGas, as well as the corporate-funded environmental groups Environmental Defense Fund, Energy Futures Initiative, and The Nature Conservancy. The Nature Conservancy employee who interacted with the researchers for the study, Myra Batres, now works as Associate Director of the CDR Program at the ClimateWorks Foundation under Mazurek.

Noticeably missing from consultation for the report: the frontline communities who would be directly impacted by the large-scale buildout of this envisioned infrastructure.

Bank of America, a major financier of fossil fuel projects and one of the largest transnational financial institutions on the planet, served as the report's financial sponsor. Anne Finucane, the Vice Chair of the Board of Directors for Bank of America, is thanked specifically for her assistance on the report. The report explicitly endorses BECCS and DAC.

"Biomass conversion could capture roughly 84 million tons of carbon dioxide per year in California as soon as 2025," reads the report. "While California has no bioenergy with carbon capture and sequestration facilities to date, the technology offers the potential to reduce the state's emissions while promoting wildfire resilience and jobs in rural areas of the state."

Bank of America, the report's sponsor, is also a major investor in Occidental Petroleum. Through its subsidiary Oxy Low Carbon Ventures, the company is seeking to commercialize the first ever large-scale DAC plant in world history in the Permian Basin. DAC proponents profess that the technology can vacuum carbon dioxide in the atmosphere as ambient air through a chemical process with massive fans.

Records obtained via the Texas Public Information Act show that Oxy Low Carbon's first proposed DAC facility will sit within a stone's toss of a massive sea of oil wells in Ector County, Texas, a major oil production county.

Ector County oil field.
Credit: James St. John Flickr

Occidental says the carbon captured via the ambient air will be used to extract more oil out of the nextdoor oil wells. DAC was amended into the LCFS protocol in 2018, the same year as the Brown Executive Order, and allows for out of state projects like the one proposed by Occidental to earn LCFS credits under the protocol. Carbon Capture and Storage was also included as part of the LCFS protocol in 2018.

Both Occidental Petroleum and Carbon Engineering advocated in support of the LCFS protocol update in comments submitted to CARB in 2018, while Occidental and a broader array of entities commented in support of CO2 enhanced oil recovery's inclusion in the protocol (which it failed to achieve) in 2017.

Signatories to the 2017 letter included representatives from Occidental, Chevron, Shell, California Resources Corporation, and the Global CCS Institute (which has a broad swath of fossil fuel industry members); Deepika Nagabhushan of Clean Air Task Force; Bob Perciasepe, President of the Center for Climate and Energy Solutions (C2ES co-founded the Carbon Capture Coalition, which had a broad swath of fossil fuel industry members – including Occidental – and also oversees the Business Environmental Leadership Council, with a similar corporate demography), who served as Deputy Administrator for the U.S. Environmental Protection Agency under the Obama Administration; Jeffrey Brown, Research Fellow at the Steyer-Taylor Center for Energy Policy and Finance at Stanford University (financed by climate philanthropist and Newsom donor, Tom Steyer, who ran for president in 2020); former Principal Deputy Assistant Secretary for the Office of Fossil Energy for the U.S. Department of Energy under the Obama Administration, Julio Freidmann, now CEO of a consultancy named Carbon Wrangler; and LLNL's George Peridas, then working for the Natural Resources Defense Council.

> Laying dangerous CO2 pipelines in populated communities and pummeling unprecedented amounts of carbon into rock formations, suffice to say, is a scenario different in substance and style than building large-scale solar installations in the desert."

Mere months after CARB board approval of the 2018 LCFS amendments, Carbon Engineering secured millions in financing from the oil companies Occidental Petroleum, Chevron and BHP to scale up direct air capture at its proposed west Texas air capture facility.

As CARB's 2022 Scoping Plan process began to heat up, another group formed and published a report calling for solutions in the same vein. Calling itself the Coalition for Negative Emissions and naming its June 2021 report "The Case for Negative Emissions: A Call for Immediate Action," the group's member companies include Bank of America, Worley Parsons, Carbon Engineering, and 1PointFive – the latter one of the financiers of the Carbon Engineering's slated DAC facility in West Texas. Other members include those in the biomass space, such as Drax, Biomass UK, Enviva, and the U.S. Industrial Pellet Association. The Drax Power Station in Yorkshire is one of the largest wood pellet burning facilities in the world and receives more than 2 million pounds of renewable subsidies from the UK government every day, while emitting close to 13 million tons of CO2 every year. The promotion of BECCS is central to the effort of Drax to present itself as a green leader. The report argues for a beefing up of both DAC and BECCS to the scale of "gigatonnes of supply."

"The world is way off track in scaling negative emissions for a 1.5°C pathway," reads the report. "The scientific need for negative emissions is clear. This creates a need for a rapid and massive scale-up of negative emissions technologies such as BECCS [and] DAC."

The Livermore Lab Foundation and Lawrence Livermore National Laboratory, not to be outdone, also produced a sequel to "Getting to Neutral," focused specifically on carbon capture technology.

Released as SB 27 and SB 1395 first began advancing in their respective legislative chambers in Sacramento, the February 2021 study authored by Peridas titled "Permitting Carbon Capture & Storage Projects in California" calls for expedited permitting for scaling the state's carbon capture industry.

In the report's introduction, the report's author George Peridas writes that the state should act expeditiously to "increase internal efficiency and coordination, secure adequate staffing and resources for the task, assign experienced process leads, expand its collaboration with relevant federal agencies, and adopt a small number of technical regulatory and legislative changes."

Those changes include reforms to both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) as it pertains to the permitting of carbon capture projects. Bedrock environmental laws, both are fundamentally important for the democratic participation of stakeholders within project proposal regulatory processes.

Peridas further wrote that the pathway forward for scaling carbon capture should be smooth sailing, given that "the CEQA process is smoothest when large and diverse coalitions of actors coalesce toward a common objective," comparing the dynamics he foresees for carbon capture to that of the Desert Renewable Energy Conservation Plan.

Laying dangerous CO2 pipelines in populated communities and pummeling unprecedented amounts of carbon into rock formations, suffice to say, is a scenario different in substance and style than building large-scale solar installations in the desert.

"This would not be Peridas' first instance of attempting to reshape the regulatory landscape in favor of those backing market-based solutions to the climate crisis."

This would not be Peridas' first instance of attempting to reshape the regulatory landscape in favor of those backing market-based solutions to the climate crisis.

Peridas, the Director of Carbon Management Partnerships at the Livermore Lab, explains on his LinkedIn page that he was "responsible for initiating a rulemaking" that included CCS into the 2018 LCFS extension when he worked as a staff scientist and advocate for the Natural Resources Defense Council. He also boasts of being "Chiefly responsible for initiating a major new rulemaking by the U.S. Environmental Protection Agency to promulgate regulations for underground storage of CO2" and for getting a federal tax incentive passed to boost the CCS process. Further, Peridas served on the California Carbon Capture and Storage Review Panel convened from 2010-2011 by the California Public Utilities Commission, California Energy Commission, and ARB to consider state CCS policy. He sat on that body alongside the President of Southern California Edison and the head of the Western States Petroleum Association.

The Energy Futures Initiative, Calpine, Occidental, California Resources Corporation, and DTE Energy all receive thanks in the report's prelude. Calpine has two carbon capture pilot projects planned in California.

In August 2021, Peridas once again co-signed onto a letter written to CARB by various industry stakeholders, endorsing engineered carbon removal. Signatories included representatives from Shell, Aera Energy (a joint venture between ExxonMobil and Shell), DTE Energy, California Resources Corporation, Carbon Engineering, the Global CCS Institute, and again the Center for Climate and Energy Solutions (C2ES).

“The need for CCS and CDR has been extensively analyzed and documented, for California specifically, for the U.S., and for the globe,” they wrote to the ARB. “No credible analyses show that mid-century carbon neutrality goals can be met without CCS and CDR.”

In mentioning the “extensively analyzed and documented” nature of technologies primed to achieve carbon neutrality, the signatories came full circle. They pointed to a major chunk of the aforementioned studies, including the ones by E3, Energy Futures Initiative, and "Getting to Neutral.” Those signing on called the citations examples of the “multitude of independent, expert institutions and individuals have unambiguously spelled out the need for these technologies in the climate portfolio.”

Revolving Doors and Elite Access: Meet the Lobbying Interests Backing the Agenda

Like the emergence of carbon removal technologies as a focus of CARB, the rise of SB 27 and AB 1395 did not take place by happenstance. Instead, their movement through the California Legislature was the byproduct of a lobbying campaign by those with a financial interest in its outcome.

According to state lobbying disclosures, lobbying interests engaged on SB 27 included Valero, California Poultry Federation, Agricultural Energy Consumers Association, the State Building & Trades, and the Chevron-financed carbon capture company Blue Planet Systems. Its predecessor, SB 1323, also had the attention of Valero, and the biofuels company POET.

AB 1395 attracted an even bigger cast of characters.

They included Valero, Phillips 66, the Western States Petroleum Association, the Agricultural Energy Consumers Association, Aera Energy, Independent Energy Producers Association, Calpine, Amazon, Shell, Chevron, Airlines for America, Western States Petroleum Association, the California State Pipe Trades Council, PBF Energy, Sempra Energy, and Marathon Petroleum. While the fossil fuel industry engaged on AB 1395 with the aims of brokering a deal for its passage, language in the bill allowing for enhanced oil recovery using carbon captured via CCUS but prohibiting such EOR as being counted as an emission reduction in overall 'net zero' carbon accounting balance sheets was a bridge too far for Big Oil, and ultimately led to the bill's demise for the 2021 session in the aftermath of a failed Senate floor vote.

Some of those lobbyists lined up for these companies, unions, and trade associations have connections to the upper-echelons of policymaking in Sacramento.

For example, Kim Craig of the firm Arc Strategies now lobbies for Calpine, and for years served as a senior aide to Senate Pro Tempore Toni Atkins dating back to her time as a City Councilwoman in San Diego. Alberto Torrico, who represented Airlines for America in lobbying for AB 1395, formerly served as Majority Leader for the California Assembly. And Jason Kinney, a close friend of Governor Newsom who helped Newsom pick his administrative team members, lobbied on behalf of Marathon pertaining to AB 1395.

"Some of those lobbyists lined up for these companies, unions, and trade associations have connections to the upper-echelons of policymaking in Sacramento."

Federal lobbying records also show industry engagement on issues such as DAC, NETs, CDR, and engineered carbon removal, as well. Entities lobbying to advance the technologies in Washington in recent quarters have included Microsoft, the International Union of Operating Engineers, National Rural Electric Cooperative Association, Occidental, Carbon180, Carbon Engineering, American Petroleum Institute, General Electric, ExxonMobil and the Linden Trust For Conservation's LTC Action.

Carbon Engineering has hired Waxman Strategies, a firm founded and run by former U.S. Rep. Henry Waxman (D-CA), for federal lobbying duties. U.S. Rep. Waxman is perhaps best known in climate circles as co-author of the American Clean Energy and Security Act, which in shorthand is known as Waxman-Markey. The co-author of that bill, cap-and-trade legislation which failed to pass in 2009 and 2010, was U.S. Rep. Ed Markey (D-MA). He is now in the U.S. Senate and is one of the leading climate policy legislative leaders on Capitol Hill.

Michael Goo, a lobbyist advocating for Carbon Engineering on behalf of Waxman Strategies, was formerly a senior aide to U.S. Rep. Waxman as Staff Director for the House Energy and Commerce Environment Subcommittee Chaired at the time by Waxman. He also "drafted and facilitated passage" of the Waxman-Markey legislation when working as Staff Director to the House Select

Committee on Energy Independence and Global Warming, according to his Waxman Strategies biography.

Prior to working for Waxman Strategies, Goo worked for AJW Inc., a key firm embodying the rise of DAC and LCFS alike. AJW is also the former employer of Virgil Welch.

During his time at AJW – where he worked for a two-year period in between eight-year and three-year stints at the ARB – Welch lobbied for the 2017 cap-and-trade extension on behalf of the International Emissions Trading Association (IETA), a fossil fuel and mining industry-funded group that is a major international actor in spaces such as UN global climate negotiations and which maintains a consistent presence in Sacramento, including having a seat on the board of directors of the Climate Action Reserve. The Climate Action Reserve is one of the key architects of California's carbon market, performing as one of the world's largest carbon offset registries and as host of the annual North American Carbon World pollution trading industry conference. The IETA has a long track record of promoting offsets and, as the name clearly implies, emissions trading.

Welch also notes on his LinkedIn profile that during his time spent as an attorney for the Environmental Defense Fund, "he helped lead the Environmental Defense Fund's successful sponsorship of Assembly Bill 32," the landmark legislation giving rise to cap-and-trade, the Low Carbon Fuel Standards, and California's markets-based climate policy apparatus.

Jan Mazurek speaks at launch of "Getting to Neutral" on Jan. 30, 2020 at the State Capitol in Sacramento.
Credit: Lawrence Livermore National Laboratory

Nichols, Mazurek's former supervisor and Welch's boss at the time, also appears to have supported DAC work from the onset. In a meeting with grantees held in San Francisco in March 2019 for ClimateWorks Foundation's CDR Fund, Nichols was the guest of honor at a cocktail reception held at the restaurant China Live. In August 2019, Welch and Nichols also received a briefing – also attended by Mazurek and hosted by the prominent Sacramento lobby firm Conservation Strategy Group – on the looming Livermore Lab study.

As part of the goal to achieve carbon neutrality by 2045, the idea of carbon capture and storage (CCS) received an airing at the August briefing, with the group of climate policy foundation leaders in attendance with Nichols and Welch asking "How significant is the 'greenwashing' communications challenge?" and "Does the 'just transition for the oil industry' narrative or similar provide sufficient counterbalance?," according to a meeting agenda. The agenda also posed the question "[H]ow can California best develop and export these [technologies and policies] for broader benefit?" and "What role can California play as a subnational demonstration for the world?" The meeting also pondered the "biofuels solution," asking "Are we concerned about technology dependence (i.e. future markets rely on biofuels)?"

Not everyone was on board with the direct air capture push, though.

Noticing the Joint Legislative Committee on Climate Change Policies February 2020 hearing content once posted online, Katie Valenzuela – then the political and policy director for the California Environmental Justice Alliance (CEJA) and the original staffer heading up the joint committee's work when chaired by Assemblyman Eduardo Garcia (D-Coachella) – sounded the alarm on an email list for Sacramento and legislative affairs based climate groups.

"The lobbying by Welch has unfolded despite a state Fair Political Practices Commission (FPPC) policy mandating a one-year "cooling off" period for state officials between governmental service and directly lobbying an agency for which that official served."

"Oh wow, that's worse than I thought. [Western States Petroleum Association] has been pushing carbon capture sequestration as a way for oil extraction and production to be 'carbon neutral,'" wrote Valenzuela, now a City Councilmember in Sacramento, to the list. "Slippery slope doesn't even come close to the level of concern we have with that concept."

Mazurek, a member of that email list, took notice and forwarded the email onto Welch.

"Yep we got some work ahead of us on the political front," Welch responded. Mazurek responded by writing, "Let me know where I can help."

Welch, for his part, has now found a new way to help.

Having left CARB in March 2021, after the departure of Chair Nichols and the arrival of the new CARB Chair, Liane Randolph, Welch began working as a lobbyist a month later for the firm Caliber Strategies. According to lobbying disclosure forms for quarter one and quarter two, Welch and his Caliber Strategies colleagues lobbied on behalf of the biofuels company POET and carbon removal via bio-oil underground sequestration company Charm Industrial. More specifically, the disclosure forms state that Caliber Strategies has lobbied the ARB on issues such as "sequestration and low carbon fuels" on behalf of both clients.

The lobbying by Welch has unfolded despite a state Fair Political Practices Commission (FPPC) policy mandating a one-year "cooling off" period for state officials between governmental service and directly lobbying an agency for which that official served. Caliber previously came under FPPC investigation in 2017 due to ethically suspect lobbying activity of one of its principals who formerly worked as Chief-of-Staff to both Governor Gray Davis and Governor Arnold Schwarzenegger.

POET is the leading bioethanol producer in the U.S., having recently grown even bigger in size after the acquisition of the ethanol division of Flint Hills Resources, a subsidiary of Koch Industries – itself a company well known for its long history of funding climate change denial campaigns.

Fitting in the vein of the California policy at-play, the company recently pledged to go "carbon neutral" by 2050.

Charm Industrial, for its part, accepted the invitation to present at CARB's August 2021 workshop on "engineered carbon removal." The company says it will produce bio-oil via "excess sawdust and wood that would have rotted otherwise," adding that "In the future we expect to use waste agricultural residue. For example, corn stover, rice straw, sugar cane bagasse and almond shells." The company will then, under its vision, heat those substances at 500°C absent oxygen in a process called pyrolysis — often associated with the production of biochar — creating the bio-oil. The bio-oil will then be pummeled back underground in injection wells located at or near legacy oil wells in places such as Oklahoma and Kansas.

Some have critiqued the notion of Charm Industrial's model counting as "carbon removal," given its primary focus on avoided emissions, pointing to the possibility of its technology being gamed by partners and offsets systems to avoid mitigation of emissions.

The ClimateWorks Foundation-funded Carbon180, meanwhile, receives federal lobbying representation from CO2Efficient Group, a firm which focuses on "stakeholder engagement services specialized in managing energy and environmental risks and investments."

Thomas Hassenboehler, a lobbyist for the firm and on behalf of Carbon180, formerly worked as Chief Counsel for Energy and Environment on the Republican side for the U.S. House Committee on Energy and Commerce, while also previously serving as a senior executive lobbyist for America's Natural Gas Alliance (ANGA). ANGA was the national lobbying voice of the fracking industry until being enveloped into American Petroleum Institute in 2015.

Food to Fuel and Manure Worth More Than Milk: The Lobby for Bioenergy

Those lobbying for these policies, logically, have something to gain from advancing the 'net zero' policy apparatus.

> "...legacy oil refiners are also now pursuing conversion into bioenergy refineries, despite the community impacts and illusory air quality and climate change benefits."

The Agricultural Energy Consumers Association is a case in point. Representing the large-scale family dairy farms predominantly located in the Central Valley of California, the group advocates for the scaling up of what has been greenly coined "renewable natural gas" (RNG). Sometimes also referred to as biogas or biomethane, the energy is created via the absorption of methane-rich cow manure waste in lagoons, from which the methane is captured and distributed via pipelines or trucks to the broader energy and electricity grid. Adding to the terminollogy confusion and climate disinformation, proponents of RNG hail it as a "carbon negative" energy resource that also serves to clean up the stench in working class agricultural communities in the Valley.

In reality, close scrutiny of RNG paints a more complex picture. Heavily subsidized by the state government under the California Department of Food and Agriculture's Dairy Digester Research & Development Program (DDRDP) and incentivized by the ARB-administered LCFS, environmental justice and frontline groups have pointed to DDRDP as a giveaway to both Big Ag and Big Oil/Gas, the latter of which sells the product to market. CalBioGas, a subsidiary of Chevron, says it aims to create a cluster of dairy digesters in Kern County, Tulare County, and Kings County. Chevron is also one of the top oil drillers in that same geographic region. Groups have also pointed to the fact that the state's biogas incentives system actually subsidizes environmentally toxic concentrated agricultural feeding operations (CAFOs) to become even bigger. Environmental justice advocates and frontline communities view CAFOs as problematic for a number of reasons: animal cruelty, air and climate impacts, water and groundwater impacts, and the broader environmental impacts on surrounding communities.

Despite these impacts, under the banner of cutting down on "short-lived climate pollutants" like methane – a greenhouse gas 86 times more potent than carbon dioxide during its first 20 years in

the atmosphere, the key time period during which time-sensitive climate action must be taken – CARB is actively considering scaling up RNG for the 2022 Scoping Plan consideration process. Over half of California statewide methane emissions come from dairy farms and its over 1.7 million cows. The push for RNG serves the dairy industry in suggesting that the pollution can be adequately managed after it is created, rather than instigating changes in food systems that reduce reliance on destructive CAFO facilities.

Methane digester on a dairy in California Credit: USDA Natural Resources Conservation Service.

Sam Wade, Director of Public Policy for the Coalition for Renewable Natural Gas, was one of the presenters at the September 8 ARB workshop on short-lived climate pollution. Wade is the former Deputy Director of Legislative Affairs and Chief of the Transportation Fuels Branch for CARB. The Coalition for Renewable Natural Gas' members include Chevron, Marathon, SoCalGas, Southern Company, Enbridge, Dominion, Duke Energy, BP, Williams Companies, and Citibank, among others. Michael Boccadoro, Executive Director of the Agricultural Energy Consumers Association, also presented at the workshop.

Utilizing the incentives provided by the LCFS, legacy oil refiners are also now pursuing conversion into bioenergy refineries, despite the community impacts and illusory air quality and climate change benefits. Those proposing the retooled refineries also have advocated for SB 27 and AB 1395.

Among those is Valero, which through its subsidiary Diamond Green Diesel, aims to construct one of the largest renewable diesel refineries in the U.S. Like the Permian-based proposed DAC facility, it would be in Texas, this one in the oil and gas refining company town of Port Arthur. It aims to open in 2023 and would rely upon LCFS credits via its biodiesel pathway incentives system to stay financially afloat. Valero aims to produce just under 1.2 billion gallons (78,000 barrels of oil equivalent) of renewable diesel per year if the Port Arthur facility is constructed, produced from used cooking oil, animal tallow, and distillers corn oil. The company already has one such facility in Louisiana.

Though 1.2 billion gallons a year sounds big, the reality is more complicated from an emissions mitigation and energy production perspective.

"For a company with a refining capacity topping 3.2 million barrels per day, that's a drop in the bucket rather than a business transformation," *San Antonio Express News* reported, with a quoted industry financial analyst calling it "small potatoes."

Within California, bioenergy refineries that would utilize LCFS credits are also under review. One of those, the Martinez refinery owned by Marathon Petroleum Company, which shuttered as a

petroleum refinery in August 2020, aims to utilize feedstocks such as animal fat, soybean oil and corn oil to produce 'renewable diesel.' Biofuelwatch and other organizations have called for a full environmental review of the Martinez proposal, as well as of the massive project proposed by Phillips 66 for their Rodeo refinery along the San Fransciso Bay coastline. Rebranded by Phillips 66 as "Rodeo Renewed," the energy giant aims to refine renewable diesel and alternative jet fuel from used cooking oil, fats, greases, sewer sludge and – predominantly – high deforestation risk soy. Its goal: become the largest single refinery of its sort on the planet and produce 800 million gallons a year of biodiesel. Scoping Plan discussions with CARB have emphasized the importance of these refinery conversions for meeting state "carbon neutrality" goals. The simultaneous October 2021 release by land use authorities in Contra Costa County of draft environmental review documentation for the two refineries demonstrates a certain disinterest of regulatory agencies in giving these proposed refinery conversions to biofuels the scrutiny they deserve.

Following California's lead, as with the 'drop-in' diesel and jet fuel facilities, the LCFS has proven crucial for out-of-state companies to receive financing credit for biodiesel projects. Perpetuating the climate leader myth, other states have followed California's lead in implementing an LCFS, with one implemented in Oregon and one set to go into effect in Washington in 2023, and proposals under consideration in New York and New Mexico.

"Carbon Neutrality" Neutralizes Real Climate Action

On top of the fact that heavy industry stands to gain from the contours being set up to achieve "carbon neutrality," the climate science of scaling up DAC, BECCS, and other NETs is also – perhaps unsurprisingly – dubious. A 2020 literature review study titled "Assessing Carbon Capture: Public Policy, Science, and Societal Need" concluded that most of the scholarly work on the subject of direct air capture fails to do a full lifecycle analysis (LCA) of the biophysical and energy consumption needs to facilitate direct air capture.

For example, the review points to one study published in 2015 that says it would take the aggregate of electricity consumed in the United States in 2017 to vacuum in one gigaton of carbon. The outlet *Carbon Brief* reported – pointing to another 2019 study – wrote that under global-scale development by 2021 envisioned by direct air capture proponents, "it would be

equivalent to the current annual energy demand of China, the US, the EU and Japan combined – or the global supply of energy from coal and gas in 2018."

"For public policy purposes, only studies that perform a full LCA are relevant," they write. "Although a partial LCA may suffice for investors interested in profit maximization, it is not of use for policymakers who want to address the collective biophysical need of absolute atmospheric CO2 reduction."

Another study, published in Oct. 2019 by Stanford University Mark Jacobson, concludes that "averaged over 20 and 100 years, 89.5% and 69%, respectively, of all CO2 captured by the AC equipment is returned to the air as CO2e." That's due, Jacobson writes, to the "mining, transporting, processing, and burning the natural gas used to power the equipment."

"...we see clear evidence that emissions reductions can be deterred or delayed by efforts and suggestions to use NETs to sustain fossil fuel use."

When that study came out, exemplifying the lack of public engagement with scholarship and activism critical of CDR, Mazurek wrote in an email to Welch and Peridas to not respond to it and "let it die quietly," while scare-quote mocking it as a "study" and calling it "bullshit."

Even the recent IPCC report on the need to drastically reduce global greenhouse gas emissions by 2030 to stay within 1.5 degrees Celsius temperature rise, which NETs proponents point to as endorsing technofixes falling under that umbrella, did not actually endorse them. Instead, the report offered words of caution about NETs, arguing that they "remain largely unproven to date and raise substantial concerns about adverse side-effects on environmental and social sustainability."

Given that vast technological uncertainty, scholars at Lancaster University in the UK who have written multiple papers about the politics of geoengineering, said the promise of NETs actually has an ulterior motive: "mitigation deterrence."

"Some argue that it shouldn't matter how carbon dioxide levels are abated—whether through reductions in fossil fuel combustion, or through [negative emissions technologies]," explains a 2019 paper on the topic. "Yet we see clear evidence that emissions reductions can be deterred or delayed by efforts and suggestions to use NETs to sustain fossil fuel use. To have any hope of achieving a 1.5°C objective, decarbonization must be accelerated."

A follow up paper by Lancaster University's Duncan McLaren, a co-author of the 2019 study, concludes that if NETs like DAC are used to facilitate additive oil drilling and fail technically to do what proponents say they will do, it could add an extra 1.4°C into the atmosphere, well beyond the limits of what scientists says constitutes a safe level of global warming.

Even Harvard's David Keith warned about the potential for mitigation deterrence in his 2002 co-authored paper, writing that "Because air capture may provide some insurance against climate

damages, it presents a risk for public policy: the mere expectation that air capture can be achieved reduces the incentive to invest in mitigation."

The "carbon intensity" metric underlying LCFS, too, has come under scrutiny in academia and by environmental groups.

As an example, a 2007 briefing by the Canada-based climate-focused David Suzuki Foundation, pointing to a climate policy similar to LCFS north of the border, concluded that between "1990 and 2004, Canadian industry improved its GHG-intensity by 6 per cent while its emissions grew by 13 per cent." The briefing said this is the case because "intensity is a ratio of greenhouse gas emissions per unit of economic activity (GDP or unit of production such as barrel of oil" and as "economies and many industries grow, GHG intensity can decline while GHG emissions continue to rise."

"Experience with bioenergy so far clearly demonstrates that the basic concept of carbon negative BECCS is a myth."

Additionally, multiple studies have pointed to CO2 EOR – the end use of the first major envisioned DAC facility in West Texas – as a greenhouse gas and pollutant emitting endeavor, and not a carbon neutral or negative one, as touted by its industry and allied proponents. In that same vein, the framework at-play continues to rely on the state's cap-and-trade program, which as California's central climate policy tool, has repeatedly proven inept at abating emissions commensurate with the unprecedented civilizational scale of the climate crisis.

And BECCS, as *Biofuelwatch* pointed out in our 2015 report, is also a false solution to the climate crisis.

"For carbon negative bioenergy to be possible, it would not be enough to keep bioenergy-related emissions down: Land-based ecosystems remove 23% of all the CO2 emitted through fossil fuel burning and cement production," that report detailed in the introduction. "Damaging natural carbon sinks for the sake of trying to create a new, unproven artificial one through BECCS would be highly dangerous. Experience with bioenergy so far clearly demonstrates that the basic concept of carbon negative BECCS is a myth."

Many scholars agree with that assessment. A February 2021 open letter written by 87 economists and scientists pointed out the grim reality of BECCS, given biomass plants emit twice as much carbon dioxide per unit of electricity than coal and more than twice that of natural gas units.

"Even if forest regrowth were to remove the previously emitted carbon dioxide from all sources, proper carbon accounting shows it cannot do so during the short climate mitigation window of one to three decades from now," details the open letter. "In the case of whole trees and other large diameter materials, it can take anywhere from 40 years to several centuries for forest regrowth and the associated carbon accumulation just to reach emissions levels associated with fossil fuels."

Given the greenhouse gas footprint of scaling bioenergy, the letter added that "burning wood for energy is not carbon neutral in relevant time frames, capturing the carbon dioxide will not make it carbon negative."

The "Big Con" report (co-sponsored by *Biofuelwatch)*, puts it even more tersely in describing "net zero" as less than zero.

"'Net zero' schemes risk supplanting proven and meaningful action and instead locking in a polluting and destructive economy for decades to come," reads the report. "The planet and its people depend on world governments doing everything they can now to cut emissions to real—not net—zero. Anything else will have deadly consequences for billions of people's lives and livelihoods."

Closing: Countering the Threat of Oligopoly in California Climate Politics

In taking a close look at the behind the scenes maneuvering to make "net zero" and "carbon neutrality" a prominent focus in Sacramento, this report illuminates the confluence of interests that have coordinated efforts to advance the carbon capture of climate policy development in California. By having information and clarity about how and why these approaches have become so dominant, advocates will be better prepared to counter the fallacies of the prevailing narrative and successfully advocate for the holistic solutions that their communities design and support.

"The threat of oligopoly in California climate politics is a real and present danger."

Sociologist Brynna Jacobson, in concluding her dissertation, explains the dynamics at-play aptly in contrasting the politics of oligopoly versus those of democracy.

"In contrast to the potential of life politics as a transformative and multilateral response to the climate crisis, geoengineering detracts from this democratic turn, regressing toward a renewed threat of oligopoly in climate politics," she writes. "The concept of geoengineering serves powerful political and economic interests by deflecting urgency in emissions reductions, facilitating the notion that growth may continue within the carbon-intensive energy economy, and by creating a new market for high-tech, high-cost technological research and development."

The threat of oligopoly in California climate politics is a real and present danger. Understanding the push for carbon capture for what it is and where it has come from is an important step in responding to these powerful interests as they manipulate genuine public concern about climate change to capture our imaginations, capture our democracy and capture our futures.

In that sense, a recalibration of grassroots engagement on California climate politics is certainly timely. Such a political awakening bodes well for a visionary movement organizing for a truly transformative response to the growing political, economic, public health, ecological and climate crises bearing down on our communities.

Appendix 1: Power Map

Big Money Interests Fuel California "Getting to Neutral Policy" from [Little Sis]

To explore the full interactive power map visit: [https://littlesis.org/oligrapher/7259-big-money-interests-fuel-california-getting-to-neutral-climate-policy]