

California Cap-and-Trade: History, Design, and Effectiveness

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Introduction

California's Cap-and-Trade Program (henceforth referred to as "the Program" or "the California Program") is unique when it comes to U.S. subnational approaches to carbon pricing. To its credit, the California Program is the most comprehensive emissions trading program in the United States. It covers not only the electricity sector – as the Regional Greenhouse Gas Initiative (RGGI) also does – but also manufacturing, production and processing facilities associated with a wide variety of industries, from cement production to food processing, as well as transportation fuels including gas, oil, and liquefied petroleum refineries and distributors. The California Program, which has been ramping up annually since it was first instituted in 2013, now covers more than 80% of statewide greenhouse gas (GHG) emissions, and directly caps emissions from more than 400 entities within the state, with an additional 200 smaller entities legally required to *report* their emissions, but not necessarily reduce them (Sutter et al. 2018).

California was not the first U.S. state to implement a cap-and-trade program (RGGI preceded it by several years), but it was the first to authorize one legislatively, through its 2006 Global Warming Solutions Act, also known as Assembly Bill 32 (AB 32). Thus, California can rightly claim "first mover" status within the U.S. in its commitment to ensure GHG emissions reductions through a carbon price, even though the long-term effectiveness of the Program is less known compared to RGGI, since it remains in a stage of relative infancy whereas RGGI has been in full force for more than

a decade. Nonetheless, taking a “long view” of the California Program, by tracing it back to the birth of the 2006 law that made it all possible, offers two analytical advantages.

First, it reveals a unique political history, which is unusual in light of the larger U.S. context. This political history in California features the rare bipartisan collaboration of a Democratic legislature and a Republican governor in enacting climate policy. While renewable portfolio standards have been enacted in some states with the support of Republican politicians, Republicans in the U.S. generally oppose carbon-pricing policies (Fowler and Breen 2013; Stokes 2015). The California Program also features an important story about administrative capacity and the delegation of policymaking power by the Legislature to the Executive. Second, taking the long view allows us to better understand the Program’s complex administrative design, which has been somewhat of a moving target ever since its inception.

This chapter thus takes the long view, and begins with a recounting and analysis of this unique political history, beginning with the 2005-2006 legislative session and ending with the recent legislative re-authorization of the Program through at least the year 2030, which occurred in 2017. Then, the chapter goes on to discuss the unique design of the Program, how it has been phased-in over time, and the mechanisms that have preserved flexibility in its design. Next, the chapter analyzes the effectiveness of the California Program in terms of achieving its policy goals of reducing GHG emissions without compromising economic growth. Finally, the chapter concludes with a discussion of the implications of the Program’s history and design for the politics of carbon pricing more generally, and in particular, for the study of business influence in climate policymaking.

Political History

Two features of the California Program's political history are especially noteworthy. First, the concept was ultimately embraced not only by the Democrat-controlled state legislature, but also by a Republican governor. Second, although the legislature had the audacity to set a GHG emissions reduction target that was legally binding, and to *require* the state to achieve these reductions through regulations, the tough political decisions regarding such critical details as the carbon price, the exact timeline of implementation, the method of allocating allowances, and how the burdens associated with compliance would be distributed across particular industries, were left to the discretion of a non-elected state agency: the California Air Resources Board (CARB). Such decisions were both delegated and deferred until such a time that many of the legislators who enacted the law were no longer in office.

At the time that AB 32 was under consideration in the legislature, the CARB had already gained the reputation of being a world-class regulatory agency for the work it had done to curb air pollution from both stationary and non-stationary (motor vehicle) sources. It was deemed to have extensive enforcement capacity (Vogel 2018). For this reason, CARB had the full confidence of AB 32's proponents in the legislature (Fran Pavley, pers. comm., Jan. 7, 2019). However, the CARB had not been involved with policymaking specifically to address the threat of climate change until AB 32 became law, and the agency increased its staff by roughly 10% (hiring an additional 125 staff) in order to take on the significant added responsibility of designing a market-based system for reducing GHG emissions – a responsibility that the legislature had entrusted to it with the passage of AB 32 (Edie Chang, pers. comm., Nov. 8, 2018).

The 2005-2006 legislative session in California, during which AB 32 passed, coincided with a period in which concerns about climate change reached unprecedented heights among the public, with the release of Al Gore's film, *An Inconvenient Truth*, among other critical events. In 2005, eighty-six percent of Californians considered global warming a threat, and the majority (57%) believed its effects were already taking place. Sixty-two percent believed global warming was caused by human activity, and an even greater percentage (69%) supported the state government setting GHG emissions reduction targets (Baldassare 2005).

In this context, Fran Pavley, a Democratic Assemblywoman from the Los Angeles area (which had been at the center of air pollution concerns for years) who had ambitions for higher office, introduced AB 32, which proposed to make the state's 2020 GHG emissions reduction target legally binding. The bill also required the state to determine how best to achieve this objective through regulation, offering a "market-based compliance mechanism" as one possibility to consider (CAL. HEALTH & SAFETY CODE §38500). Pavley, who, as a freshman legislator a few years prior, had championed Assembly Bill 1493 (AB 1493), California's landmark vehicle emissions law (Hanemann 2007), was likely eager to cement her legacy of achievement on global warming policy before running for the state senate when California's term limits required that she move on from the Assembly.

The legislative leadership of the Democratic Party, which controlled both legislative chambers, was quick to embrace Pavley's AB 32. But it was a Republican governor, Arnold Schwarzenegger, who was in charge of California's executive branch. Especially given the enormous responsibility the bill placed in the hands of the

Executive, and the lack of a Democratic legislative supermajority which would have been necessary to overrule a gubernatorial veto, it is reasonable to conclude that Schwarzenegger's support was a necessary condition for the enactment of AB 32, and ultimately, for the California [cap-and-trade] Program as we now know it (Hanemann 2007).

In the U.S., climate change has been a hyper-partisan issue, with Republicans generally resisting Democrat-led attempts at carbon regulation (Coley and Hess 2012; Fowler and Breen 2013; Vasseur 2014), though Republicans have been relatively more willing to pass laws to incent renewable energy development in jurisdictions in which doing so is the most economically beneficial (Zarnikau 2011). The idea of a Republican governor endorsing a bill like AB 32 is certainly the exception rather than the rule. And yet, crucially for California's ability to claim the status of U.S. Climate Policy Leader, this is precisely what happened.

Aside from Schwarzenegger not being a "traditional Republican" in a number of respects (including his résumé as a Hollywood movie star), one explanation, proposed by Hanemann (2007), for Schwarzenegger's willingness to break with the traditional Republican stance on climate policy relates to how he first won office. He did so in an unusual "recall" election of the previous Democratic Governor, Gray Davis. In California, when a sitting governor is recalled, there is no Primary; there is only a general election. This creates an unusual opportunity for moderates from both parties, who do not need to pander to the more extreme positions within their parties as they would typically need to do in order to win their respective party's primary. For

Schwarzenegger, who had always considered himself a moderate, this was a significant part of his calculus that led to his decision to run (Schwarzenegger 2012).

Furthermore, as governor, Davis had proceeded very cautiously when it came to environmental and climate policy, and Schwarzenegger likely noticed global warming as an issue that he could use to differentiate himself from Davis, winning over key Independents, and even some Democratic voters, in the process (Hanemann 2007, 2008). It also likely helped that Schwarzenegger selected Terry Tamminen, an avid environmentalist and friend of Al Gore's, to be one of his closest campaign advisors. Under the Schwarzenegger Administration, Tamminen would go on to lead California's Environmental Protection Agency (CalEPA), the umbrella agency containing the CARB, to which regulatory responsibility for the Program was ultimately assigned. Although Schwarzenegger withheld his support from the initial drafts of AB 32, until certain legislative compromises were made, he ultimately signed the bill with a great deal of pomp and circumstance, and importantly, he kept the ball rolling once it was in the Executive's court (Hanemann 2007, 2008).

In doing so, he angered fellow Republican legislators, who tended to be more loyal to the party's base when it came to the climate issue. But Schwarzenegger presided over a period of time during which the strength of the state's Republican Party was steadily declining. That reality, combined with the good working relationship he had developed with the Democratic Assembly Speaker and his strategic determination that the best way to win reelection was to demonstrate his ability to work effectively across the aisle, led him to take consistently pro-climate policy positions while in office (Don Perata, pers. comm., Nov. 19, 2018; Schwarzenegger 2012). He was "all in" on the

climate issue, not only supporting AB 32 and the subsequent California Program for emissions trading, but also defending the state's tailpipe emissions law, AB 1493, from legal assault (Fran Pavley, pers. comm., Jan. 7, 2019).

A second noteworthy characteristic of the California Program's political history, besides for the Republican governor's support, is that the real work of designing the policy was performed by the CARB rather than the state legislature. This fact alone is not entirely surprising, considering the significant technical expertise required, and CARB's successful track record with regulating automobile emissions and other air pollutants. Indeed, RGGI, the other successful cap-and-trade system in the United States, was largely a collaborative effort of state agencies (executive branch), not state legislatures. There are all kinds of reasons, both political and technical, that a legislature might choose to delegate policymaking power to an executive agency (Huber and Shipan 2002). Nevertheless, given that California's state legislature is the most professionalized in the country, a characteristic political scientists associate with *less* delegation rather than more (Kousser 2005; Squire 1992, 2007, 2017), it is somewhat surprising just how little direction the legislature provided to CARB, and just how much authority it ceded to an agency that, at least at the time, was part of a Republican administration.

In 2010, just as CARB was in the midst of the lengthy process of developing regulations to govern the California Program, AB 32 faced its first serious political challenge. A coalition of industry players, many from out-of-state, and funders such as the Koch Brothers, launched Proposition 23, a major ballot initiative campaign to repeal AB 32. Despite an expensive effort to convince Californians that the cap-and-trade system that AB 32 had triggered, if implemented, would spell economic doom, prevailing

public opinion won the day, and the measure was defeated by a comfortable margin of 61%-39% (Rabe 2016).

In that same year's election, Democrat Jerry Brown bested Republican Meg Whitman in the contest to succeed Schwarzenegger as California's governor. AB 32 became a key campaign issue in that race, and Whitman took a more traditional Republican stance, staunchly opposing a cap-and-trade system, while Brown enthusiastically embraced it. The dual victory of Brown winning the governorship and Californians defeating Proposition 23 turned the 2010 election into a referendum on cap-and-trade, and the result was clear: the significant majority of Californians wanted the state to move forward with its leadership on carbon pricing (Rabe 2016).

However, while the 2010 election results proved remarkably positive for California's climate leadership, other jurisdictions in the western United States yielded election results that hindered the potential for a regional cap-and-trade system, as had been achieved in the Northeast by RGGI. In the aftermath of the passage of AB 32, seven western U.S. states and four Canadian provinces had entered into an informal agreement to work together toward a regional approach to carbon pricing and/or regulation. Beyond California, the Western Climate Initiative (WCI) received initial buy-in from Executives in Arizona, Montana, New Mexico, Oregon, Utah and Washington state, as well as the Canadian provinces of British Columbia, Manitoba, Ontario and Quebec. However, gubernatorial transitions in Arizona, Utah and New Mexico as a result of the 2010 elections coupled with the hope of federal legislation to address GHG emissions (which was the preference, at least rhetorically, of many business interests

throughout these states) led to the collapse of the WCI, leaving California to go it alone with its cap-and-trade Program (Rabe 2016).

But as the politics of California's neighboring states, and the political landscape federally, began to shift in a markedly anti-climate-policy direction, with Republicans taking control of the U.S. House following the defeat of federal cap-and-trade legislation in the Senate, Gov. Schwarzenegger and his hand-picked leadership team at CARB remained steadfast in moving ahead with the regulatory process in California. In December 2011, CARB finalized regulations establishing the California Program. In November 2012, California held its first emissions allowance auction (California Air Resources Board 2012). By January 2013, the California Program was fully in effect (Environmental Defense Fund 2014).

However, industry opponents of the Program hardly rested on their laurels in the wake of the 2010 defeat of their ballot initiative to reverse course. Instead, they turned to another tool in their toolbox of tactics: litigation. Between 2010 and 2017, CARB was forced to defend the Program against three separate lawsuits, which sought to undermine various aspects of the Program, using different legal arguments. The CARB prevailed in each case.

The most significant of these lawsuits was *California Chamber of Commerce et al. vs. State Air Resources Board*, in which industry plaintiffs argued that the allowance auctions under the Program constituted an illegal tax under the California Constitution, and that such a tax was could not be authorized on the basis of AB 32 alone. The California Court of Appeals rejected this industry argument, and the state's Supreme Court declined to consider the case on appeal (Megerian 2017; Sutter et al. 2018),

marking a major victory for the Program and its supporters in the environmental community.

The California Program achieved another significant milestone in terms of its durability when, in 2017, the state legislature extended it through the year 2030, choosing the Program as the primary mechanism for guaranteeing that the state reach its legally binding 2030 GHG emissions reduction goal of 40% below 1990 levels, which was established in legislation modeled on AB 32 that passed the previous year, in 2016. Assembly Bill 398 (AB 398), the bill extending the Program through 2030, reduced the maximum percentage of reductions that can be achieved through “offsets,” a concept that will be explained in the next section but, at the same time, it contained key compromises to lessen industry and Republican opposition. These included the expansion of tax breaks for manufacturers using a portion of the revenue raised at auction and, most significantly, the reversal of plans to decrease over time “industry assistance” in the form of free allowances allocated by the state to assist with Program compliance. We will discuss this compromise in greater depth later on. Overall, however, AB 398 remained strong enough that one environmental lawyer and Professor of Law at UC-Berkeley called it “a compromise worth making” (Biber 2017).

Very significantly, AB 398 was passed with a two-thirds legislative supermajority, which included the necessary amount of Republican support (seven Republican votes in the Assembly and a single Republican vote in the Senate). Even the Republican Minority Leader of the Assembly, Chad Mayes, threw his support behind the bill, stating, “California Republicans believe in climate change and [we] believe in markets” (Burtraw 2017). However, only the minority of Mayes’ caucus followed him;

the majority of Republicans (seventeen in the Assembly and twelve in the Senate) refused to support the bill. Still, the fact that the bill garnered sufficient Republican support to pass with a supermajority is significant because it helped immunize the Program from further legal challenges predicated on the claim that revenues raised from the Program constituted a “tax” rather than a “fee.” As noted before, the California Constitution requires a two-thirds supermajority to impose any new tax (Next Ten 2012).

Having reviewed the political history of the California Program, a couple of key points are worth re-emphasizing. First, the Program has been characterized by an unusually high level of bipartisan support, exemplified both by Republican Gov. Schwarzenegger’s strong support of AB 32 and subsequent executive branch rulemaking and by the Republican legislative support which, more recently, gave the Program’s reauthorization its highly coveted super-majority. Second, while the California legislature repeatedly signaled its support for cap-and-trade -- first when it passed AB 32 and again more recently when it passed AB 398 -- the nuts and bolts of the Program itself were the work of CARB and CARB alone. We will return to discuss the significance of these points later in the chapter, but for now, we turn to explore the “nuts and bolts” that CARB came up with in designing the regulations governing the Program.

Policy Design

Economists from across the political spectrum – from N. Gregory Mankiw, who served in George W. Bush’s administration, to Gilbert E. Metcalf, who served in Barack Obama’s – agree on the merits of a carbon tax for addressing climate change. But the policies these economists ideally envision, besides being revenue-neutral rather than revenue-positive, are remarkably simple and elegant (Mankiw 2007; Metcalf 2018).

Enter Politics, and in particular the politics of the largest and most diverse state economy in the U.S. (California), and the result is something rather different.

The California Program -- far from being a “clean” Pigouvian tax that incorporates a single, social cost of a metric ton of CO₂e into the price of all goods and services sold -- is a complex patchwork of rules (262 pages of regulations, to be exact!). These rules provide various mechanisms to guarantee flexibility to regulated entities, exact different costs for the same level of pollution depending on the industry, and allow firms to meet their compliance obligations without actually reducing their own emissions, through a mechanism called “offsets.”

The types of GHG emissions that are covered under the Program are comprehensive, and that has been one constant that has remained the same even as other aspects of the Program have been amended over the years. These regulated GHGs include carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydroflourocarbons, perflourocarbons, nitrogen triflouride, and other fluorinated GHGs. For administrative ease, volumes of these gases are converted to/measured in a single unit of measurement (CO₂e, or “carbon dioxide equivalents”), as is typical of carbon pricing schemes around the world (CAL. CODE REGS. tit. 17, § 95810 (2012)). Any entity in California that emits more than 25,000 tons of CO₂e annually has compliance obligations under the Program, and any entity that emits between 10,000 and 25,000 tons of CO₂e annually is required to *report* their exact emissions levels to the State, but does not have obligations beyond reporting (Sutter et al. 2018).

However, which particular polluting industries the Program covers has changed over time, across what CARB calls “compliance periods.” Compliance periods are multi-

year timeframes within which the regulatory environment remains constant, but between which significant changes occur. The first such period was 2013-2014, during which only electricity-generating sources and large stationary sources (e.g. large manufacturers, oil refineries, etc.) were covered by the Program. Only at the start of the second compliance period, covering the years 2015-2017, were other polluters, such as distributors of transportation fuels, natural gas, and other fuels covered. And then, of course, some emissions sources, such as automobiles and airplanes, remain beyond the scope of the Program even as it has now entered the third compliance period, covering the years 2018-2020. However, even though the Program does not regulate automobile emissions, it should be noted that California has addressed these emissions separately, through a suite of complementary policies, such as its low carbon fuel standard and its vehicle emissions standards, which are currently under attack by Trump's Environmental Protection Agency (Bade 2018).

The basic structure of the Program is as follows. For each compliance period, CARB sets an overall GHG emissions cap for all covered entities throughout the state. It does so by releasing a finite number of allowances into the emissions trading market. One allowance corresponds to one metric ton of CO₂e that can be emitted by a market participant (CAL. CODE REGS. tit 17, §95800-96023 (2012)). The method of allocating these allowances is extremely important, since it determines, in part, their value to specific firms, which, in turn, determines the degree of incentive a particular firm has to curb its own emissions.

In an ideal system, devoid of politics and special interests, every allowance under the cap would be sold at auction to the highest bidder. This would maximize the

incentive to require fewer allowances, which in turn means less pollution (i.e. a smaller contribution to global warming). However, in practice, the California Program only auctions a relatively small portion of its allowances, with the State essentially giving the remainder away for free through one of two allocation methods, known as “fixed allocation” and “output-based allocation.” Fixed allocation is simple; the State literally gives a fixed number of allowances to a firm for free, with no strings attached. Output-based allocation works differently. The State still provides the allowances for free, but the quantity of free allowances is determined by formula, and is based on the actual output of the firm in the prior period (Schatzki and Stavins 2012).

The major argument in support of the output-based allocation method is that this method safeguards (at least to a degree) the interstate competitiveness of Californian firms while still incentivizing emissions reductions. This is because output-based allocation allows California-based firms to maintain their output prices relative to out-of-state competitors but, at the same time, incentivizes California-based firms to reduce their emissions per unit of output because the marginal cost of emitting continues to be the allowance price, which increases along with overall demand for allowances in the emissions trading market (Goulder and Schein 2013; Schatzki and Stavins 2012). Of course, a major pitfall of either method of free allocation is that it is free. The idea of free allowances is antithetical to the very logic of carbon pricing, but output-based allocation is clearly preferable to fixed allocation.

Nevertheless, the CARB decided to rely on an ever-shifting hybrid of all three methods of allowance allocation (auction, fixed, and output-based). While CARB’s motivations for designing the Program in this way are beyond the scope of this chapter,

one would have to imagine business lobbying played a significant role. It certainly was not academic economists that were advising the state to give large quantities of allowances away for free.

In the end, CARB decided that the transportation fuel sector would be the only sector *not* to be awarded any allowances for free (they would need to utilize auctions for any needed allowances). Most industrial facilities, on the other hand, including oil refineries, initially received 90% of their allowances using output-based allocation; they needed to rely on auctions for only the remaining 10%. Finally, the electric utility sector received 100% of its allowances for free from the State using fixed allocation. The percentage of free allowances given to electric utilities was originally supposed to decrease gradually over time, but this has not yet happened -- perhaps a testament to the lobbying power of the utilities (Sutter et al. 2018).

Meanwhile, with regard to industrial facilities, the CARB's original plan had been to categorize all regulated industries into three buckets on the basis of two factors: 1) the degree to which they were deemed to be "energy-intensive," and 2) the degree to which they were deemed to be "trade exposed." Energy intensity and trade exposure are two risk factors that economists associate with two potential unintended consequences of the Program. These unintended consequences include "emissions leakage," which occurs when emissions regulation in one jurisdiction (i.e. California) leads to increased emissions in other, proximate jurisdictions (i.e. other states), as well as declining economic competitiveness of California firms relative to competing firms in other states (Alex Jackson, pers. comm., Nov. 8, 2018).

CARB's original plan had been to allocate different quantities of free allowances

to different industries on the basis of how energy intensive and trade-exposed they were (i.e. which of the three buckets the particular industry fell into). Industries in all three buckets were to start off with the vast majority of their allowances allocated for free, and then the percentage of free allowances was to decline over time at different rates for each bucket (i.e. the most energy intensive and trade exposed industries would continue to receive a relatively high percentage of their allowances for free while industries that were less so would be responsible for purchasing a greater share of their allowances) (Alex Jackson, pers. comm., Nov. 8, 2018).

However, interest groups representing various industries have successfully lobbied first the CARB, and then the state legislature, to 1) delay this planned, gradual decline in free allowances for all industries, and 2) abandon this categorization scheme and award the same share of free allowances to less energy-intensive and trade-exposed industries as to more energy-intensive and trade exposed industries. First, CARB extended the level of assistance (i.e. the percentage of free allowances) provided in the first compliance period (2013-2014) to the second compliance period (2015-2017) rather than decreasing it as originally planned. Then, in 2017, just as the second compliance period was coming to a close, as part of the legislative compromise resulting in the supermajority vote to extend the Program until 2030, the legislature required the CARB to abandon its categorization scheme and instead distribute free allowances equally liberally to all industries (excluding the electric utility sector and transportation fuels). Naturally, environmental groups viewed this as a major concession, creating windfall profits for companies that manage to reduce emissions and alleviating regulatory pressure on those that do not. (Alex Jackson, pers. comm., Nov. 8, 2018).

Another set of “impurities” in the California Program were intended to pacify business concerns by increasing the flexibility they could exercise in meeting their compliance obligations and also by safeguarding against allowance price volatility. One such mechanism of flexibility is the ability of regulated entities to “bank” emissions allowances both within and across compliance periods. Within compliance periods, as long as firms maintain compliance over the two-year or three-year period, they face no penalty if their emissions increase from one year to the next. In addition, some firms are also entitled to flexibility *across* compliance periods through the Program’s “banking and borrowing” provision. Under this provision, firms may obtain additional allowances in present compliance periods (at a known price) but only elect to use them in future periods (when the price cannot be known for certain). Similarly, firms may apply already-obtained-but-not-yet-used allowances from the current period toward future periods rather than having to purchase the allowances in those future periods, at an unknown price (Center for Climate and Energy Solutions, n.d.).

Banking and borrowing are not the only mechanisms the Program offers as a protection against carbon price volatility. In addition, the California Program features a “price ceiling” for allowances, guaranteeing to firms that the allowance market will not result in emissions prices that are extremely and/or unpredictably high. On the other hand, to ensure that the price of allowances on the market never drops too low, thus undermining the overall effectiveness of the Program, CARB also instituted a price floor.

Both the price ceiling and the price floor increase by 5% annually plus inflation. As of January 2018, the price floor was \$14.53 (California Air Resources Board 2018a) while the price ceiling was \$54.26, \$61.06, or \$67.83, depending on which of three

regulatory categories a particular firm falls under (California Air Resources Board 2018b). In the last quarter of 2017, the average price of an allowance was \$15.06 (California Air Resources Board 2017), and by August 2018, it had remained virtually flat at \$15.05 (California Air Resources Board 2018c). It is noteworthy that not only did the allowance price remain relatively flat for the better part of a year, but also that it landed far closer to the price floor than the price ceiling. This suggests that, while the Program is certainly having a positive effect in incentivizing decreased GHG emissions, it is imposing a significantly lower cost of compliance on regulated businesses than its opponents had feared/warned, and also a lower cost than environmentalists would prefer.

A final mechanism of flexibility that the Program provides for is known as “offsets.” Offsets are alternate ways that firms can achieve compliance under the cap without necessarily reducing emissions from their own facilities. Instead, they can receive “offset credits” by developing energy conservation projects, or methods of carbon sequestration, including out-of-state. Firms can then apply these credits toward their compliance obligations, if such projects are approved by CARB. In addition, there is an “offsets” market, just as there is a regular allowance market, and firms can trade offset credits amongst one another. The only catch is that firms are only permitted to use offsets to account for up to 8% of their total compliance obligations (Environmental Defense Fund 2012).

Offsets are not total “giveaways” to businesses, since, in order to be approved, they are required to have demonstrable climate change mitigation impacts. Furthermore, they are supported by environmentalists to the extent they encourage innovation in new technologies to reduce pollution. On the other hand, as with so many of the Program’s

design features, CARB has found itself needing to balance competing policy objectives, and ultimately decided that capping offset use at 8% of total compliance was the best way to ensure sufficient direct reductions from emissions sources while providing flexibility to businesses through a robust offsets market.

Even though, as already discussed, many allowances are distributed to firms for free, those that *are* sold at auction of course generate revenue for the State. A portion of this revenue is returned to utility ratepayers (both households and firms) through what the State calls the California Climate Credit, which appears on ratepayers' utility bills. The remainder is deposited into what is called the Greenhouse Gas Reduction Fund (GGRF). Some GGRF monies are invested into other state efforts to mitigate climate change while the rest goes to environmental justice initiatives, which are focused on low-income communities (Sutter et al. 2018).

As this section has shown, the design of the California Program is littered with signs of special interest influence. At the same time, it is difficult to critique the state that has instituted by far the most comprehensive cap-and-trade program in the country. Furthermore, no other state agency in the nation has the staff, resources and technical expertise of CARB, and none have been able to design and reliably enforce such a complex, albeit imperfect, program. Even those that critique the Program's design admit that concerns about emissions leakage and interstate competitiveness are valid; the disagreements center on how best to balance environmental objectives with these economic risks.

Effectiveness

For all of the compromises that were made within the Program's design (discussed above), early indications are that the Program has been a net positive in reducing the state's overall GHG emissions without slowing overall economic growth. During just the first full year of the Program's implementation (2013), GHG emissions from sectors regulated under the Program fell by 3.8% while GHG emissions from sectors not regulated under the Program did not change (Rabe 2018). Between 2006, when AB 32 passed, and 2018, when the Program entered sixth year of operation, California's overall GHG emissions decreased by 9%. Examining per capita emissions levels, California is also a success story. Per capita emissions levels in California are far lower than in the U.S. nationally (Sutter et al. 2018), and only New York and Washington, D.C. have lower per capita emissions levels than California (Rabe 2018). Estimates from the environmental community suggest California is on track to meet or even exceed its 2020 emissions reduction target, which it must do under AB 32 (Sutter et al. 2018).

And importantly, this success in reducing GHG emissions has not come at the expense of economic growth, as opponents of the Program had warned. In the first year of the Program's operation alone (2013), California's GDP grew by 2%, surpassing the GDPs of Russia and Italy. Between 2006 and 2016, California's GDP grew by more than 15% (Sutter et al. 2018). In 2013, California experienced 3.3% job growth, which was significantly higher than the national job growth rate for that same year, which was 2.5% (Hsia-Kiung and Morehouse 2015).

All of that being said, there is an important caveat to note when it comes to evaluating the California Program's effectiveness. Since California has led the nation not

only on cap-and-trade, but on a whole suite of other climate-related policies, it is difficult to assess the extent to which each of these policies are driving the overall, statewide emissions reductions that have been reported. In other words, it is not possible to know what percentage of the state's GHG emissions reductions are attributable to the Program alone. Between 2016 and 2020, state officials estimate that roughly 23 of the 80 million metric tons of CO₂e reductions expected will come from the cap-and-trade system, but these are only estimates and there is no way to evaluate for certain what is driving these reductions (Rabe 2018).

Still, there is a growing body of evidence that suggests the Program is working, even if it could be working even better (in terms of emissions reductions) without the various exemptions, giveaways and flexibility mechanisms described in the “Policy Design” section. Martin and Saikawa (2017) were able to distill the effects of seventeen state-level policies on emissions reductions from electric power plants alone, and found that the California Program was the most effective of all seventeen. Meanwhile, Sutter et al. (2018) write:

“While it is difficult in California to discern which program [policy] is responsible for a [given] ton of emission reductions, what is clear is that cap-and-trade is the insurance policy that guarantees the state will meet its legally-required emission reduction target.” (Sutter et al. 2018, 5).

Perhaps the largest disappointment of the California Program is that it was never successfully extended to the ten other U.S. states and Canadian provinces that had formed what was known as the WCI. Of course, this is not California's fault; it was due to politics beyond California's borders (Rabe 2016). Nevertheless, the collapse of the WCI surely prevented a more regional, and therefore more impactful, policy response to climate change from taking hold.

Even so, California found an unexpected partner in the Canadian province of Quebec, which linked up with the California Program and began holding joint emissions allowance auctions in 2014. Quebec is geographically distant from California and is located much closer to the RGGI states. In fact, Quebec was initially an “observer” of the RGGI program. However, ultimately it made more sense for Quebec to link up with California than with RGGI, since RGGI only covered the electric power sector and ninety-seven percent of Quebec’s electric power came from hydropower, not associated with GHG emissions. Therefore, given the Quebec’s emissions profile, joining California was the more reasonable option (Mazzacurati 2013).

Conclusion & Implications

This chapter has examined some of the more distinctive aspects of the largest U.S. state’s policy to price carbon. First, it pointed out the unique political history of the California Program, dating back to its legislative authorization in 2006. It is noteworthy that seven years elapsed between when the state legislature simply required the CARB to ensure a specified level of GHG emissions reductions by the year 2020 and when the CARB implemented a cap-and-trade program governed by 262 pages of complex regulations.

This delay has political significance, as it allowed legislators who were wary of angering opponents of carbon pricing to vote for the bill (AB 32) and take credit from the environmental community when it passed, but, at the same time, keep their fingerprints off of the Program itself. Thus, legislators were able to spare themselves from being caught in the middle of fights over which firms should be given free allowances and which ones should have to pay. Ultimately, many of these legislators would leave office

before such decisions were ultimately made by CARB. Even Schwarzenegger, the Republican governor who boldly broke ranks with his party's stance against GHG regulation, would no longer be in office by the time the Program actually went into effect. Yet Schwarzenegger deserves enormous credit for signing AB 32 and overseeing CARB as it conducted the necessary legwork to get the Program off the ground. Indeed, the California case suggests what a positive difference it can make for climate policy when Republicans can be brought on board.

The environmental policy literature is increasingly taking up the longstanding concern of political scientists and sociologists about the extent to which American public policy has been captured by corporate interests rather than serving the majoritarian interests of the American public (Gilens and Page 2014; Kamieniecki 2006; Kraft and Kamieniecki 2007). So what light can the case of the California Program shed on this question? On the one hand, business interests were unable to stop the passage of AB 32, and have been unable to prevent California from leading on climate policy more generally. On the other hand, when it came to the *design* of the California Program, the concerns of the business community seem to have been more influential than during the initial legislative process.

Yet one question that future research should answer more definitively is whether it was really the "business community" as a whole that weakened CARB's regulations (from an environmental standpoint) or whether it was specific firms and industries. A bird's eye view of the political development of the Program, which is all that the present chapter seeks to provide, would seem to suggest the latter. After all, diverse business associations such as the California Chamber of Commerce tried hard to dismantle the

Program altogether, but were ultimately unsuccessful.

This chapter's empirical examination of the California case has theoretical implications when it comes to the study of carbon pricing efforts more generally. First, it suggests the positive results of bipartisan collaboration. Second, it suggests that legislative delegation of important policy decisions to executive branch state agencies can have political advantages that make the implementation of policies like cap-and-trade more viable. At the same time, it remains an open question whether business interests would have been more or less effective in watering down the details of the policy were they to have been written by the California legislature rather than by CARB.

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