

A PATH FORWARD ON ENERGY POLICY

October 27, 2015

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STATES RESHAPING THE ENERGY LANDSCAPE

Energy law is a quintessential case study of federalism at work. The jurisdiction that state governments hold over all distribution-level energy activities results in a variety of innovative approaches to addressing energy issues based on the needs and resources of the particular states. This panel, comprised of high-level state government officials, will discuss how their states are navigating cutting edge issues affecting the energy sector, such as growth in renewables, hydraulic fracturing, and climate change. A particular focus of the panel will be on how state energy and environmental law interacts with federal energy and environmental law to address these key issues.

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State hears comments on new fracking regulations

APRIL 30, 2015 | 9:31 AM

BY REID FRAZIER, THE ALLEGHENY FRONT



REID FRAZIER/ ALLEGHENY FRONT

About 100 people attended a hearing over the state's newest proposed fracking regulations.

Note: This story is from The Allegheny Front, a public radio program covering environmental issues in Western Pennsylvania.

The Wolf administration heard for the first time public comment on its newer, tougher proposed rules for the fracking industry.

More than 70 speakers were signed up to speak at the Department of Environmental Protection (DEP) hearing in Washington, Pa. Wednesday. It was the first of **three hearings** scheduled for the latest round of proposed changes to Pennsylvania's drilling regulations.

The DEP initially released the rules in 2013, but added proposed **changes** to the rule shortly after Gov. Tom Wolf took office this year. The rulemaking **process** began in 2011.

The proposal would ramp up regulations for noise, drilling near schools and playgrounds, reporting, and groundwater protection.

The industry says the rules are redundant and

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StateImpact Pennsylvania is a collaboration between **WITF** and **WHYY**. Reporters **Marie Cusick** and **Susan Phillips** cover the fiscal and environmental impact of Pennsylvania's booming energy economy, with a focus on Marcellus Shale drilling. Read their reports on this site, and hear them on public radio stations across Pennsylvania. This collaborative project is funded, in part, through grants from the Heinz Endowments and William Penn Foundation.

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unnecessary and it's **challenged** the way the Wolf administration has handled a technical advisory board charged with overseeing the proposed rule changes.

Jim Welty, vice president of government affairs for the Marcellus Shale Coalition said many of the new provisions are new and may hurt the state's economy.

"We're looking at regulations that are entirely new to this industry and seem to over-regulate this industry," he said.

Welty said he was unsure if the department even had the authority to regulate noise, for instance, and said reporting requirements were tougher on the gas industry than other heavy industries.

But others who came to the meeting wanted the state to either maintain the proposed rules or go further.

Jane Worthington, of Mt. Pleasant, Pa., said she she would like to see greater setbacks from schools. Her daughter goes to Fort Cherry Elementary School, less than a half-mile from a Marcellus shale gas well. Her 11-year-old recently began experiencing health effects Worthington attributes to 'the environment'.

"What changes (were made) in the environment? What has changed is that we are drilling very close to our school," she said.

Worthington would like to see a mandatory setback of "at least" one mile from schools. The new rules don't impose a setback, but make schools a "public resource", like wetlands. Permits for wells nearby would be subject to more restrictions.

The biggest changes to the rule may be those that govern the storage and handling of the 1.8 billion gallons of fracking wastewater drillers produce each year in Pennsylvania.

The new rules would ban temporary fracking waste storage pits at well sites and increase requirements for ponds used as way stations for drilling waste.

Last year, the agency fined two companies Range Resources and EQT more than \$4 million each for large leaks out of impoundments.

The rules apply to unconventional oil and gas wells drilled into deep, carbon-rich formations like the Marcellus and Utica shales. With over 9,000 shale gas wells drilled, Pennsylvania is the **second largest** natural gas producer in the country. In only 10 years of active drilling, the Marcellus Shale has become the country's **most productive** gas formation.

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Mr. Welty states the regulations seem to "over regulate this industry." There are a couple of key words here and one is the word "industry." What other industry has the permission to operate in zones other than an "industrial zone?" People choose where they want to live based on zoning and covenants and this is a big game changer that permits this industry to be their close neighbor. What else needs to be said?

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Jackson Morris's Blog

REV-ing it up in New York: A Look Under the Hood of the Reforming the Energy Vision Track I Order



Posted March 9, 2015

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There are big goings-on in the Empire State these days related to how to move to a 21st century electric system. And while there is much work ahead, the early results are noteworthy.

On February 27, the New York State Public Service Commission (PSC), which regulates New York's utilities, issued its [Track I order](#) that is the first major step in outlining the Reforming the Energy Vision (REV) initiative. The REV is an effort Governor Cuomo initiated more than a year ago to make New York's electric system cleaner, more resilient, and more affordable. Considering the scale and scope of the REV when it was first launched, there was certainly the possibility that it could fizzle as the details began to emerge. And while there are some very significant details yet to be hammered out, the PSC's Track I order represents a significant step forward toward achieving just what the governor planned. It can significantly curb greenhouse gas emissions, make the air our kids breathe cleaner, create new jobs in New York, and help keep energy dollars in the state's economy. (The other option: sending them elsewhere to buy fossil fuels. In 2012, New Yorkers sent a whopping \$39 billion in energy expenditures out of state, the [New York State Energy Research and Development Authority](#) [NYSERDA] estimates.)



New York has big power needs. The Track I order the state's Public Service Commission issued recently can help supply them in a way that's cleaner, less expensive and more resilient, if it continues to prioritize clean energy. (photo: Prathamesh Kale)

Shortly after the order was issued, my colleague [Kit Kennedy](#) provided NRDC's initial, high-level thoughts on the 328-page document. This post digs a bit deeper and also sets the context: New York's foundational renewable energy and [energy efficiency standards](#), both of which have made New York a clean-energy leader, are set to expire on December 31. That means the stakes here are high, because the decisions made by the PSC in the coming months--including this Track I REV order, a Track II order down the road, and the related forthcoming Clean Energy Fund proposals--will establish whatever comes next.

Another piece of the New York Clean Energy puzzle should also be mentioned: the governor's office is expected to release this spring its legally mandated [New York State Energy Plan](#). That plan will contain additional policy commitments; NRDC continues to advocate that these should include clear targets for carbon reductions, as well as energy efficiency and renewable energy deployment for the near-, medium-, and long-term.

But let's take a look at what we've got so far from the Track I order:

The Six Commandments of REV: Everyone needs rules to live by. Here is the impressive REV credo, verbatim: "1) Enhanced customer knowledge and tools that will support effective management of the total energy bill; 2) Market animation and leverage of customer contributions; 3) System wide efficiency; 4) Fuel and resource diversity; 5) System reliability and resiliency; and 6) Reduction of carbon emissions."

It's an admirable list of objectives for the electric system and NRDC looks forward to helping make sure the rules that implement this set of principles will help the list live up to its vast potential.

To DSPP or Not to DSPP? That is the Question: A central tenant of the REV is that New York will have a system operator at the *retail*--that is, at the distribution--level (similar to how the [NYISO](#) operates the "bulk system" of *wholesale* energy from large centralized power plants and transmission lines). Dubbed the Distributed System Platform (DSP) Provider, this entity will serve as a retail-level dispatcher for a grid supplied not only by traditional power plants, but also by a vastly expanded fleet of Distributed Energy Resources (DER). These resources are defined in the REV order as "including end-use energy efficiency, demand response, distributed storage, and distributed generation. DER will principally be located on customer premises, but may also be located on distribution system facilities." In other words, more rooftop solar arrays, targeted energy-efficiency solutions in our buildings, and ramped up demand-response programs that enlist consumers to cut their energy use at times when demand on the grid is high.

One of the basic questions in the REV proceeding has been what type of entity will fill that role. The answer in the Track I order is that local service providers--utilities such as Con Edison and National Grid--will do the job. As that plan is developed further, we will, of course, weigh in, as we have in our formal comments, about the need to mitigate market power and to coordinate this new market as seamlessly as possible with NYISO's wholesale electricity markets.

Who Can Own DERs?: Primarily, not utilities, except in circumstances where the market does not respond cost-effectively to meet the grid's needs. This is no surprise, given that utilities were granted the DSPP role. Adding sweeping utility ownership of DER in addition to the DSPP role would essentially re-integrate New York's utilities at the retail level, making them both generators and distributors again, a connection the PSC sundered nearly two decades ago. Additional clarity around the precise conditions under which utility ownership will be permitted must be provided in order to fulfill this directional commitment by the PSC.

What Will Happen to Energy Efficiency?: New York currently invests roughly \$360 million a year on energy efficiency programs, not including programs on Long Island. Half are administered by utilities and the other half by NYSERDA. These are incredibly cost-effective programs, with [NYSERDA efficiency programs alone returning \\$3 in energy savings for every dollar invested](#). (That figure doesn't include health savings that result when power plants produce less pollution or savings that come from mitigating the dangers of global warming, by the way. Were those counted, the benefit-to-cost ratio would be even higher.) Last week's order continues that cost-effective spending in 2016 by establishing dollar budgets and megawatt-hour savings targets for utility programs that are consistent with 2015 levels. The REV order also establishes a cycle of annual filings for utility efficiency program updates, on a 3-year rolling basis. That's good news, even if many details of what will happen to utilities' efficiency programs in the future are still to be clarified.

NYSERDA's programs, meanwhile, remain less defined as they shift away from a more traditional role--acquiring energy efficiency resources--toward a "market transformation" role. Under such an approach, NYSERDA will work more in an upstream environment, doing things like facilitating the funding of energy efficiency, and helping create the market conditions to that can deliver it, rather than procuring energy efficiency resources directly. (For more on this discussion regarding evolving approaches to capturing energy efficiency, take a look at this excellent trilogy of posts from [ACEEE](#), as well as this one from the folks at [America's Power Plan](#)).

This half of the New York's current energy-efficiency pie--NYSERDA's half--will continue to be mapped out in the parallel but inextricably linked Clean Energy Fund (CEF) proceeding in the coming months. Based on filings to date, it does appear that NYSERDA will retain a traditional energy efficiency resource acquisition role in the low to moderate income sector. In the meantime, here's some very encouraging language about that from the Track I order: "***[W]e expect that the utility targets established here in addition to NYSERDA metrics established in the CEF proceeding will equal or exceed the current aggregate of utility and NYSERDA energy savings.***"

In other words, New Yorkers should expect energy savings to reach or surpass current levels. And while NRDC knows those levels can be effectively scaled up further to aggregate levels of 2 percent annual savings based on best practices in other leading states, *at a minimum* maintaining current levels is a good start.

What remains? The forthcoming Clean Energy Fund proposals and subsequent PSC actions in the REV must ensure New York delivers on this promise and avoids any backsliding on energy efficiency. (That's a concern conveyed by our friends at [ACEEE](#), in [this blog post](#)).

What Will Happen to New York's Renewable Energy Incentives?: The current CEF proposal would fully fund the \$1 billion, 10-year [NY-](#)

10/8/2015 REV-ing it up in New York: A Look Under the Hood of the Reforming the Energy Vision Track I Order | Jackson Morris's Blog | Switchboard, from NRDC [Sun Initiative](#), designed to drive installation of 3,000-plus megawatts of solar power in New York state, along with the jobs, clean energy, and cost-savings that come with it. The giant question mark after 2015, with the expiration of our renewable energy standard, is what will happen to incentives for utility-scale renewable energy projects, such as on- and offshore wind farms and larger solar arrays. (NY-Sun's current design supports everything from rooftop to larger on-site systems in the 2 megawatt range. All of these are still "behind-the-meter." In other words, they serve on-site demand, rather than selling wholesale power to the grid).

Here, the Track I order directs NYSERDA to issue at least one more 2016 solicitation to procure utility-scale, renewable energy resources. That's important to avoid a cliff for the utility-scale market at the end of the year. It also establishes a spinoff, stand-alone "Large Scale Renewable (LSR) track" process that will decide how to drive post-2016 development of these resources, with NYSERDA directed to compile an "options paper" to submit to the Commission by June 1st for stakeholder feedback. Even as we continue to work through the precise mechanics of this next generation RPS, we will continue to advocate for a standard that requires New York to get [50 percent of its electricity from renewable resources by 2025](#).

Energy Efficiency Programs for Low- to Moderate-Income (LMI) Consumers: While the order doesn't offer an explicit energy-savings target for multifamily affordable housing, or, for that matter, for low- to moderate-income consumers in general, we anticipate additional clarification around that in the aforementioned Clean Energy Fund proceeding.

On the positive side, the order does explicitly recognize the unique challenges these consumers face in relation to the evolving REV plan. It also states that, as the REV transition evolves, NYSERDA should use more traditional energy-efficiency programs to meet the efficiency needs of these consumers, who spend far more than average New Yorkers on energy costs. In addition to including provisions intended to ensure LMI customers reap the benefits of the REV transition, the order included this very positive commitment to guard against disparate environmental impacts: "We require measures to avoid or mitigate potentially harmful emission concentrations from distributed generation or demand response in environmental justice areas."

We'll know more about these plans in the coming months, as the CEF details emerge, but we are cautiously optimistic.

And, of course, Electric Vehicles! While there weren't a lot of details in the order on policies to promote electric vehicles, there was an encouraging affirmation of New York's commitment to EV deployment, ensuring the REV will support Governor Cuomo's [Charge-NY Initiative](#). From the order: "DSP markets can assist a transition to electric vehicles by turning what could be a strain on distribution systems into a valued asset. Electric vehicles present great opportunity if coordinated with grid functions to provide storage and voltage support. Electric vehicles can also increase utility sales and reduce rate pressure caused by infrastructure needs." NRDC will work actively with utilities, third parties, and other stakeholders to build on this objective, with specific programs and price signals that capture the value EVs provide to the grid.

Moving Ahead: The Track I order established an ambitious set of requirements for utilities, from the already-in-process requirement to create retail, demand-response programs statewide, along with separate energy efficiency plans for 2016, to their REV pilots for innovative and targeted efficiency efforts. All of these proposals are due to the PSC by the end of the year.

But if the core REV objectives are to be realized, their success will hinge on how we set the rules of the road. The upcoming REV Track II order--a straw proposal is due out from the PSC on June 1st--will dig into a suite of regulatory issues, including but not limited to performance based ratemaking reforms. There are options for fundamentally changing the way utilities make money so that they are chasing clean energy resources like renewables and energy efficiency with the same vigor that they currently invest in traditional "poles and wires" infrastructure. The REV Track II order will also determine whether and how we can change, at a basic level, the ways consumers receive and use electricity and utilities maintain and build out their systems, even as utilities are presented with a value proposition to remain economically viable.

NRDC is hard at work on these proceedings, making sure the governor's proposal lives up to its potential. We're also working to ensure New Yorkers help lead the nation with a new way of organizing the state's electric system.

Game on.

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State Roles in the Clean Power Plan

A Primer for States

Kate Konschnik and Ari Peskoe
8/19/2015



State Roles under the Clean Power Plan

As architects of compliance plans and primary enforcers of performance standards, states will play lead roles under EPA's Clean Power Plan. This document outlines these roles.

The Clean Power Plan does not impose federally enforceable requirements on states or non-emitting entities, as the proposed rule contemplated. Only affected electric generating units (EGUs) have federally enforceable obligations in the final rule. Yet state decisions will determine pathways for EGU compliance and affect state and EGU obligations. Moreover, a well-designed plan can set market conditions that will attract investment in cleaner generation, energy efficiency, and electric system enhancements that will reduce CO₂ emissions.

I. Background

For more than forty years, the Clean Air Act (CAA) has taken “a cooperative-federalism approach to regulate air quality” (*Oklahoma v. EPA*, 723 F.3d 1201 (10th Cir. 2013)). Typically, EPA sets a “federal floor” for air quality or source performance standards, and states lead on implementing and enforcing these requirements.

The Clean Power Plan is consistent with this approach. EPA set performance targets two sub-categories of EGUs (Subpt. UUUU, Table 1); states will craft plans that set and implement EGU standards at least as stringent as the targets. EPA will then review each state plan to ensure it meets the CAA's requirements, as detailed in the rule. If a state does not file a satisfactory plan, EPA will regulate the EGUs in that state under a federal plan. Congress detailed this procedure in Section 110 of the CAA, and referenced it in Section 111(d).

An approved plan is “federally enforceable,” meaning that the implementing state *and* EPA may initiate an enforcement action when an EGU has violated a specific requirement or prohibition (42 U.S.C. §7413(a)(1), (b)). In addition, if EPA finds that violations “are so widespread that they appear to result from a failure of the state to enforce the plan or program,” (§7413(a)(2)), EPA can assume all plan enforcement. Congress also empowered citizens groups to file a civil action against an EGU who has violated or is in violation of a CAA emission standard or limitation (§7604(a)(1)).

II. Initial Submittal to EPA

By **September 6, 2016**, each state with at least one affected EGU is expected to submit either a final plan or a request for a two-year extension to submit a final plan (40 C.F.R. §60.5760).

An extension request must: 1) identify the plan approaches that the state is considering and describe progress toward a final plan; 2) explain why the state needs an extension; and 3) describe any opportunity for public comment and meaningful engagement with stakeholders, including vulnerable communities, on the initial submittal and going forward (§60.5765). Appropriate reasons for an extension include a state's intent to coordinate with other states and its legislative or administrative rulemaking schedules.

By **September 6, 2017**, a state receiving an extension must submit a report to EPA that commits to a plan approach and includes draft or proposed legislation and/or regulations (§60.5765(c)).

A state's extension request will be considered granted unless EPA notifies the state within 90 days that its submittal is deficient (§60.5765). EPA will promulgate a federal plan within one year of a deficiency notification (§60.5720). If a state makes no submittal, EPA will promulgate a federal plan within one year of the submittal deadline. A state can still submit a plan at a later date, to replace the federal plan.¹

III. Final Plan Submittal to EPA

By **September 6, 2018**, each state is expected to submit a final plan.² EPA proposes to inform a state within 60 days whether the submittal is complete;³ then, EPA will approve or disapprove a state's submittal within one year (§60.5715). If EPA disapproves a state's plan, EPA will promulgate a federal plan within one year (§60.5720).⁴

The required elements of a plan are similar regardless of the type of plan (§§ 60.5740–.5750, .5770–.5835, .5860). The core elements of a state plan, which will be federally enforceable, are: identification of affected EGUs and their CO₂ emissions from the most recent calendar year; emission standards for each affected EGU; triggers for corrective measures and backstop emission standards for state measures (in both cases where necessary, see part IV); EGU monitoring, reporting, and recordkeeping requirements. The plan will also describe the state reports that will be submitted to EPA throughout the compliance period.

States opting to participate in a multi-state plan may file one joint submittal, a joint submittal addressing common plan elements *and* individual submittals to address state-specific elements, or individual plans with “materially consistent” plan elements (§60.5750). Single-state “trading-ready” plans also permit EGUs to trade with EGUs in other states, provided they use an EPA-approved allowance registry or credit tracking system and comply with other requirements (Clean Power Plan (CPP) at 1197–98, 1293–95). States have two additional basic design decisions:

- First, states may set emission standards that are “rate-based” (limiting the pounds of CO₂ per megawatt hour of electricity produced) or “mass-based” (limiting the total tons of CO₂ emitted).
- Second, states must decide on one of two basic enforcement models. An **emission standard plan** requires each EGU to meet federally enforceable rate- or mass-based emission limits. Emission standards must be quantifiable, verifiable, non-duplicative, permanent, and enforceable (§60.5775(a)). A **state measures plan** identifies measures that the state adopts, implements, and enforces as a matter of state law and which are not federally enforceable. A state measures plan must include a backstop of federally enforceable emission standards that is automatically triggered if state measures fail to meet certain milestones (see part IV) (§60.5740).

¹ EPA proposed that under some types of state plans, it would delay the transition from a federal plan to a state plan until after the end of an interim step compliance period, to minimize disruption for EGUs. EPA's default interim steps end on December 31 in 2024, 2027, and 2029. A state may establish shorter interim steps (§60.5880).

² Pending state approvals, EPA proposes that a state may submit a draft plan to expedite review and provide an opportunity for the state to consider EPA's comments prior to submission of a final plan (proposed §60.27(g)).

³ See proposed §60.27(g)). These proposed criteria are similar to the final rule's submittal requirements (§60.5745).

⁴ EPA also proposes to allow for a partial approval and partial disapproval of a state plan as well as conditional approval. If EPA partially disapproves a state plan, EPA would issue a federal plan to cover the disapproved portion of a state's plan.

IV. State Roles During Compliance Periods

Regardless of the type of plan that it submits, a state will monitor compliance, submit reports to EPA, and take enforcement actions against EGUs if necessary. Under some plan designs, EPA will require more reporting and additional state responsibility during implementation, to ensure achievement of the standards.

State Roles under All Plan Designs:

1. *Basic Monitoring and Reporting:* A state must submit a report by **July 1, 2021** to demonstrate that it is on track to implement the approved plan (§60.5740). Once compliance periods begin, a state must submit reports by **July 1 of the year** following each interim step period and **biannually by July 1** during the final period. These reports must include each EGU's actual emissions performance and compliance status, and projections about whether it will meet the plan's goals. Reports must also address "all aspects of the administration of the state plan and overall program" (§60.5870).
2. *Enforcing the Plan:* The state assumes primary responsibility for determining compliance and taking enforcement actions, if necessary. EPA defers to a state's interpretation of its plan so long as it is reasonable and does not conflict with the CAA.⁵

Additional State Roles under Some Plan Designs:

Overseeing Emission Reduction Credits: If a state's rate-based plan allows EGUs to hold ERCs to demonstrate compliance, the state must ensure the ERC market's integrity. The state or its agent must evaluate eligibility applications from entities seeking to generate ERCs; review measurement and verification reports submitted by those entities; and issue ERCs through an EPA-approved or -administered tracking system (§60.5805, .5810). Further, the state must approve at least one accredited independent verifier to review each ERC provider's reported results. A state could perform these functions jointly with other states, even absent a multi-state plan (CPP at 1294–95).

Regulating New Sources: If a state chooses a mass-based plan, it must address the potential for emissions leakage to new sources. The state could subject new sources to an emissions budget under state law in conjunction with federally enforceable emission limits for affected EGUs (§60.5790(b)). EPA provided mass emissions goals for states that choose this option (Subpt. UUUU, Table 4). Other options for addressing leakage might require additional demonstrations to EPA at the outset, but might not require as much ongoing involvement by the state during the compliance period (§60.5790(b); CPP at 1175–76).

Submitting Corrective Measures: Depending on the form of the emission standards in its plan, a state may need to provide for corrective measures, to make up for any shortfall and assure achievement of future goals.

- Under a rate-based plan, corrective measure provisions are required if the state does not apply the subcategory emission rates (Table 1) to each affected unit or the statewide rate (Table 2) to all units.
- Under a mass-based plan, corrective measure provisions are required if the state allows for interstate trading or does not include state-enforceable limits on new sources.

These types of plans must include the corrective measures or identify triggers that would require the state to notify EPA and propose corrective measures within two years (§60.5785). Triggers listed in the rule

⁵ See, e.g., *Wisconsin's Env'tl Decade, Inc. v. Wis. Power & Light Co.*, 395 F. Supp. 313, 323 (W.D. Wis. 1975).

include if aggregate EGU performance is deficient by at least ten percent during the interim step 1 or step 2 periods, or if EGUs miss the interim 2022–2029 goal or any final goal period starting in 2030 (§60.5740).

Implementing State Measures: If a state chooses a mass-based plan, the state may include measures the state will design, implement, and enforce to help EGUs meet the required performance standards (§60.5780). These “state measures” could include renewable energy programs, state-run market-based emission budget trading programs (such as RGGI), or a state fee on CO₂ emissions from EGUs. They are not federally enforceable.

As noted, any plan containing state measures must include a backstop of federally enforceable emission standards to be imposed on affected EGUs if triggered or when state measures miss a programmatic milestone (§60.5740). In addition to the basic reporting requirements, the state must submit a separate state measures progress report annually beginning in 2022 and biannually beginning in 2032 (§60.5870).

V. Federal Plan

While the Clean Power Plan is final, EPA’s federal plan is proposed.

The Supreme Court has held that “Congress may urge a State to adopt a legislative program consistent with federal interests” by preempting state regulation or attaching conditions to Federal funding.⁶ The CAA tracks this framework. Congress “offer[s] States the choice of regulating [an] activity according to federal standards or having state law pre-empted by federal regulation.”⁷ Here, if a state does not act, EPA will promulgate a federal plan that imposes equivalent standards directly against EGUs (§60.5720).

Under other CAA programs, Congress conditioned federal funding on state cooperation. However, the Clean Power Plan prohibits EPA from withholding federal funds (§60.5736). Neither is EPA’s proposed federal plan intended to be a punitive response to states choosing not to submit plans; instead, it is designed as a parallel track for program implementation. In fact, EPA proposes that a state could seek a delegation of authority to implement the federal plan (proposed federal plan at 334–336). Moreover, EPA has proposed to allow any state to replace EPA’s allocation of mass-based tradable emission allowances with a state-developed allocation (proposed federal plan at 307–318). A state could also submit a state plan at any time, to supplant a federal plan (§60.5720).

EPA has proposed both a rate-based and mass-based federal plan, but expects to finalize one option as the final plan in the summer of 2016. EPA will promulgate a federal plan in any state that (1) does not timely submit a complete plan or revision; or (2) submits an unsatisfactory plan (§60.5720; proposed §60.27(c)).

VI. EPA Calls for Plan Revisions

EPA proposes to adapt the so-called “SIP Call” mechanism that EPA has used for state plans under section 110 (proposed § 60.27(j)). A “call” for revisions may be necessary if a state plan is “substantially inadequate”, or if a state were not implementing or enforcing its own plan. Under the proposed terms of the “call,” EPA would notify a state of deficiencies; within 18 months, the state would need to submit revisions to correct the problem or EPA would impose a federal plan (proposed §60.27(j)).

⁶ New York v. United States, 505 U.S. 144, 166-67 (1992).

⁷ Id., 505 U.S. at 167.



Carbon Market California

A COMPREHENSIVE ANALYSIS OF
THE GOLDEN STATE'S CAP-AND-TRADE PROGRAM

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The complete report is available online at edf.org/california-cap-and-trade-updates.

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Executive summary

In 2006, the state of California made a bold commitment to tackle climate change with the signing of the Global Warming Solutions Act, commonly referred to as AB 32. AB 32's main purpose is to decrease the emission of dangerous, heat-trapping greenhouse gases which contribute to climate change. The law centers on an overarching, ambitious mandate: reducing the state's greenhouse gas pollution back to 1990 levels by the year 2020.

To achieve this goal, lawmakers and regulators have pursued a comprehensive suite of policies, implemented as part of AB 32 and subsequent measures. A cap-and-trade program, which now applies to almost 85% of California's greenhouse gas emissions, was launched in 2013 and is widely considered the centerpiece of the program. While cap and trade as a concept predates the signing of AB 32, California's version of it is without precedent, as it covers the vast majority of the state's economic sectors. The other major cap-and-trade system in North America, the Regional Greenhouse Gas Initiative (RGGI), comprises nine Northeastern states, but only applies to the electricity sector.

Because of its sweeping scope, many observers called California's carbon market a "grand experiment." Almost two years into the experiment, all signs are pointing to the overarching conclusion that the experiment—an economy-wide cap-and-trade program in the world's eighth largest economy—is in fact working. California is proving that it is possible to limit, price, and reduce the state's greenhouse gas pollution while spurring continued growth of the state's economy. Even more encouragingly, some of the fastest economic growth is taking place within the "green" portion of the economy—defined by jobs and revenues generated from the accelerated adoption of cleaner energy solutions.

California's experiences must be well-documented, and will be increasingly scrutinized, as more and more cities, states, and countries consider the potential of cap and trade to address carbon pollution. The passage of future climate change and clean energy policies in other places will rely on lessons learned from California and other jurisdictions that have already taken action. It will be essential to analyze emissions reductions side-by-side with a robust economic analysis, given that much of the opposition to laws that curb emissions comes from companies

Photo below: United Nations Secretary General Ban Ki Moon (center) with Sam Kahamba Kutesa, President of the sixty-ninth session of the General Assembly (left), and Robert Orr, Assistant Secretary-General for Strategic Planning.



UN Photo/Cia Pak

claiming that fossil fuels are vital to economic health and growth. Indeed, a staggering portion of the world's economy *does* still depend on the use of fossil fuels, and breaking this dependence will require a clear understanding of benefits beyond emissions reductions, such as the health and economic prosperity of individuals and states.

This report contains a thorough analysis of several key indicators of whether California's cap-and-trade program is working, including the health of California's economy, the state's emissions level, how the carbon market is functioning under the regulatory framework, and the level of political support the program enjoys. It is the second in a series; the first report, released in January 2013, analyzed the first year of the cap-and-trade program, and provided an early overview of how implementation was going.

This report has the advantage of a second year's worth of data and analysis on the carbon market's operations and on the current state of California's economy. In addition, the end of 2014 officially marked the conclusion of "Compliance Period One," the first phase of the market program established by the California Air Resources Board (CARB). While important milestones still lie ahead for California's cap-and-trade program—most notably, the inclusion of transportation fuels under the cap starting in January 2015—this executive summary highlights several key conclusions that will be discussed in more depth in the full report.

1. The latest data shows that California's economy is thriving and emissions regulated by cap and trade have decreased since the program launched (see "Economic and emissions analyses," page 4).

California's gross domestic product (GDP) increased by over 2% in 2013. Overall job growth outpaced the national average, and this trend is expected to continue despite persistent claims that climate policies and carbon prices would interfere. Meanwhile, according to emissions data released by CARB in November 2014, "capped emissions" decreased by almost 4% during the first year of the program. "Capped emissions" are those produced by facilities covered under the cap since the program's launch.

2. California's carbon market has remained stable and strong since its inception, as demonstrated by the level of activity and participation in the quarterly auctions and secondary market (see "Market updates," page 10).

Cap and trade places a total cap on emissions and then issues a limited number of allowances, or permits, for those emissions. The total number of permits in the market corresponds to the overall statewide cap, which declines every year to help California reach 1990 emissions levels by 2020. In California's program, a percentage of allowances are auctioned off through quarterly auctions. While the idea of issuing permits for continued pollution seems counterintuitive at first glance, carbon allowances under a cap-and-trade program actually provide a mechanism to set a carbon limit for an entire economic system and create incentives for companies to decrease emissions over time. In order for the mechanism to work, however, regulations for the market need to be strict and enforced, and entities need to participate. The results of the nine quarterly auctions through November 2014 demonstrate that companies are taking this program seriously and factoring a carbon price into their business strategies. Between the state-run auctions, daily trade activity on the secondary market has been characterized by stable allowance prices and increased trading volumes. These metrics point to a healthy, well-regulated, and active carbon market, which is a positive sign that California's cap-and-trade program is going well, and that the state is on track to meet the 2020 emissions target set by AB 32.

3. Regulated companies are actively engaging in the program and complying with the rules that require them to limit and decrease their emissions (see "Allowance surrender," page 17).

Companies regulated by the cap-and-trade program are required to purchase enough allowances to cover their greenhouse gas emissions, and must relinquish these allowances at a required

time or face severe penalties. All of the entities regulated under California's cap-and-trade program during the first compliance period (2013–2014) retired the correct number of allowances by the first deadline in November 2014, which demonstrates that companies can comply with the program while incorporating cap-and-trade mechanisms into regular business practices.

4. California's government leaders in the executive and legislative branches have maintained a steadfast commitment to the cap-and-trade program (see "Regulatory and agency updates," page 23).

Despite well-financed efforts from some industry groups, which have ramped-up in opposition to transportation fuels coming under the cap in January 2015, California's government leaders have remained strong supporters of the economy-wide cap-and-trade program. The 2014 California legislative session closed without the passage of any bills to significantly weaken the program, and both Governor Brown and state legislative leaders continued to show strong leadership on climate and clean energy policies, including AB 32. Against the backdrop of strong political support, state regulators took steps to strengthen the program, including adopting additional offsets protocols to expand the pool of available emissions reduction opportunities.

5. California's cap-and-trade program will result in investments in innovative projects that benefit communities throughout the state (see "Cap-and-trade auction proceed investments," page 18).

While the primary purpose of AB 32 is to achieve the 2020 target for emissions reductions, the state's cap-and-trade program is designed to yield other benefits, too. Beginning in 2015, proceeds from the quarterly auctions of carbon allowances will be available for re-investment. This money, a total of \$902 million budgeted through mid-2015, has gone into California's Greenhouse Gas Reduction Fund (GGRF). Under a set of rules and criteria, the GGRF will invest in projects that achieve even greater emissions reductions, while creating jobs, improving communities, and slashing other harmful pollutants. The Fund will also direct a minimum of 25% of proceeds to benefit disadvantaged communities disproportionately affected by climate change and pollution.

6. Global momentum for climate action is growing and California continues to be both a model and willing partner for other states and nations eager to move on climate policies (see "California: A proving ground for global climate action," page 30).

California has formed working, two-way partnerships with ten other jurisdictions around the globe, including high-profile agreements with Mexico and China, in which the signing parties commit to share information and lessons learned about climate policies, with a special focus on emissions trading programs. These partnerships are a vehicle for California to share its climate policy knowledge while forming vital intellectual and commercial links with leaders around the world.

In addition to expanding on these conclusions with relevant data and analysis, this report illustrates past milestones, charts the year ahead, and contains interviews with market experts who possess unique vantage points and perspectives on how California's "grand experiment" is working.

While the implementation of California's cap-and-trade program is far from finished, this report shows that all indicators for success are pointing in the right direction. Steady progress towards ambitious climate goals is exactly what's needed, as the United States and other countries begin to take long-overdue steps to combat the worst effects of global warming and stimulate low-carbon economic growth around the world.

To read the full report online, to read the first report of the series, or for more background information on California's cap-and-trade program, please visit EDF's website at edf.org.

A close-up photograph of a person's hand plugging a white charging cable into the charging port of a white electric vehicle. The background is a blurred green landscape, suggesting an outdoor setting. The image is partially covered by a dark blue banner at the top.

CHAPTER 1

Economic and emissions analyses

The hyphenated term **cap-and-trade** is used throughout as an adjective modifier, while the unhyphenated term **cap and trade** is used as a noun. For all intents and purposes, the hyphenation differences do not change the meaning of the term.

During the first year and a half of the state's cap-and-trade program, California added 491,000 jobs, a growth of almost 3.3%, outpacing the national growth rate of 2.5% during the same time period.

On January 1, 2013, California inaugurated a **cap-and-trade** program—overseen by the California Air Resources Board (CARB)—that made the Golden State the first in the U.S. with a stringent, economy-wide cap on carbon pollution and a price on carbon.

Under **cap and trade**, polluters must obtain one allowance for each ton of greenhouse gas pollution they emit, a system that allows the state to put a limit on the total amount of statewide pollution while holding each polluter accountable. The system rewards businesses who can find low-cost opportunities to reduce pollution by allowing them to sell excess allowances to other entities in the program. The cap-and-trade system is a key element of the Global Warming Solutions Act of 2006 (AB 32), a law requiring California to cut statewide greenhouse gas emissions (GHGs) to 1990 levels by 2020.

During the past two years, California's economy flourished, giving California one of the fastest recovery rates among all states following the recent recession. California is proving strong economic growth can occur with, and even be facilitated by, aggressive action on climate change. While many sectors across the conventional economy have posted large job gains over the past two years, the state's green economy (solar installation and clean technology manufacturing, for example) has helped spur statewide economic recovery, growing at a faster rate than traditional economic sectors such as manufacturing, which itself has posted large job increases over the past two years. Economic growth is outpacing emissions growth by a factor of almost five, breaking the link between economic output and carbon pollution, an essential characteristic of any future path to state, national, or global low-carbon economic development. At the same time, the state is reinvesting hundreds of millions of dollars generated by the cap-and-trade program to further reduce carbon pollution and deliver health, economic, and environmental benefits to California's communities.

Economic analysis

As California implemented one of the most ambitious cap-and-trade programs in the world, the state's economy grew faster than the national average, and the state's green economy grew even faster.

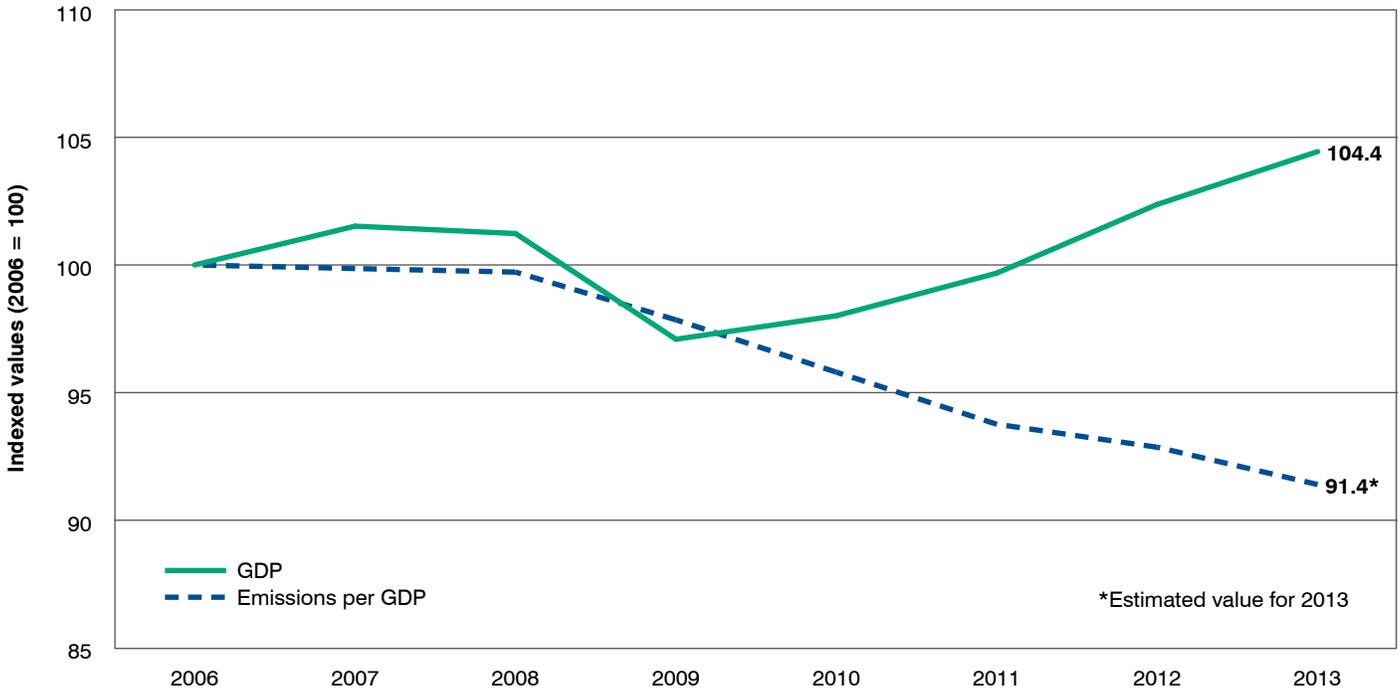
Overall economic growth

Job loss was one of the most crippling aspects of the recent recession, and unemployment rates are only now returning to pre-recession levels. During the first year and a half of the state's cap-and-trade program, California added 491,000 jobs, a growth of almost 3.3%, outpacing the national growth rate of 2.5% during the same time period (see Figure 1-1, page 6).¹ These gains were built on several years of strong economic growth: California has posted robust job gains in each of the past four years, adding more jobs than any other state from 2010 to 2013 and ranking sixth in job growth per capita among all states including the District of Columbia, according to Economic Modeling Specialists International research.² Studies predict an increasingly bright employment future for the state, with unemployment projected to decline over the next two years from 7.7% in 2014 to 5.9% in 2016.³ Among the fastest growing industries in the state are construction and the service and trade industry.⁴

As job growth continues to rise, Californians are enjoying growth in per capita personal income that is outpacing the rest of the nation. Between 2009 and 2013, California per capita personal income increased by 8.5%, while income across the entire nation only increased by 5.9%.⁵ These gains are not confined to higher-income earners: Governor Brown signed a bill in 2013 to raise the minimum hourly wage for the state's workers from \$8 to \$10 by 2016.⁶ The average California worker gets paid 12% more than the national average and produces 13% more output.⁷ Higher-paying, green jobs are contributing to this trend: workers building solar arrays earn an average of \$78,000 per year plus health and other benefits.⁸

FIGURE 1-1

California economy continues to grow while becoming more efficient



California	3.3%	California	\$21,000,000,000
Rest of nation	2.5%	Rest of nation (total)	\$19,000,000,000
<p>From January 2013 until June 2014, California added 491,400 jobs, which represents a 3.3% growth, outpacing the job growth in the rest of the nation of 2.5% during the same time period.</p>		<p>Between 2006 and 2013, when AB 32 was signed into law, California has received more clean technology venture capital investment than all other states combined (\$21 billion in California vs \$19 billion total for the rest of the U.S.)</p>	

Source: California Air Resources Board,⁹ California’s Department of Finance,¹⁰ the Bureau of Labor Statistics,¹¹ and Next 10¹²

Green economic growth

California’s ambitious climate change and clean energy policies have created a thriving clean economy that is growing faster than the overall economy and attracting considerable amounts of investment. In December 2014, the Advanced Energy Economy Institute pronounced California home to the largest advanced energy industry in the country. Advanced energy jobs grew 5% in the past year, which is more than double the overall state job growth rate.¹³ Green economic momentum has been building for some time: in the decade between 2002 and 2012, jobs in California’s “core clean economy” (including businesses that provide innovative products and services that allow the economy to transition away from fossil fuels) grew ten times faster than employment in the overall state economy.¹⁴ Since 2006, when AB 32 was signed into law, California has received \$21 billion in clean technology venture capital investment, more than all the other states combined (see Figure 1-1). The suite of California’s groundbreaking policies—including mandates on cleaner energy, fuels, cars, and buildings—has helped venture capital investment become more diverse and more evenly spread across multiple segments in 2013 compared to previous years, according to Next 10, a non-partisan, non-profit organization.¹⁵ California continues to grow as a hub of innovation,

ranking first in the nation in clean tech patent registrations (1,434 in 2012-2013 period), more than twice as many as the next leading state, Michigan.¹⁶

Gross Domestic Product is commonly used as a measure of an economy's health, and represents the total dollar value of all goods and services produced by that economy.

Breaking the link between emissions and economic growth

California's **Gross Domestic Product (GDP)** increased by over 2% in 2013, and the state surpassed Russia and Italy to become the world's eighth largest economy, as measured in total GDP.¹⁷ Between 2010 and 2013, California's GDP increased by almost 6.6%, passing the \$2.0 trillion mark,¹⁸ and the state outpaced national GDP growth in 2011, 2012, and 2013.¹⁹

Historically, it's been assumed unquestioningly that economic growth is accompanied by proportionate growth in GHGs (for example, burning more fossil fuels to create more goods).²⁰ As the pace of economic growth accelerates, particularly in the developing world, the future must look substantially different if the world is to succeed in averting the most dangerous impacts of climate change. California is demonstrating a different, more efficient path that breaks the link between economic and emissions growth by creating a more efficient, lower-carbon economy that produces more while burning fewer fossil fuels, a trend that will be essential to scale up globally.

California's GDP has increased steadily since 2009, but emissions have not increased proportionally (see Figure 1-1, page 6). Overall, California's economy produced approximately 6.6% less greenhouse gas pollution for every dollar of GDP in 2013 as compared to 2009.²¹ In 2011, California ranked fifth in the nation for lowest carbon intensity, or emissions per dollar of GDP, trailing only Connecticut, Massachusetts, New York, and Oregon.²²

Companies covered under California's cap-and-trade program reduced their 2013 emissions by 3.8%, or about 5.53 million metric tons of carbon dioxide equivalent (MMTCO₂e), a level that is 11% below the 2013 cap.

Emissions analysis

California companies covered by cap and trade reduced their emissions nearly 4% in the first year of the program, successfully becoming more energy efficient.

2013 GHG emissions data: On November 4, 2014, CARB released data submitted under the state's Mandatory Greenhouse Gas Reporting Rule (MRR) showing that companies covered under California's cap-and-trade program reduced their 2013 emissions by 3.8%, or about 5.53 million metric tons of carbon dioxide equivalent (MMTCO₂e), a level that is 11% below the 2013 cap. The data, which includes a minute increase in emissions not covered by cap and trade, suggests companies are responding to the price on carbon by taking steps to utilize clean energy and energy efficiency.²³

The reduction observed in 2013 of emissions capped in the first compliance period was driven largely by the decline of emissions from imported electricity. CARB has not completed a full analysis of the emissions yet, but it's likely that utility companies have begun to locate and import electricity from cleaner, renewable sources and that more importers are specifying where their power comes from in order to take credit for this cleaner generation. The data also shows small reductions in capped emissions from in-state electricity generators, while the biggest percent increases occurred from oil and gas producers and hydrogen plants. Emissions from transportation fuel and natural gas suppliers, which will be regulated during the second compliance period, stayed virtually constant.

Overall emissions reported under the MRR (including sources that are too small to be included in cap and trade) did not change significantly from 2012 to 2013, despite the noted reduction in capped emissions. This was due to an uptick in emissions not covered by the program. The largest absolute increases were observed in non-covered emissions from oil and gas producers, electricity importers, and transportation fuels. The decrease in covered emissions combined with the increase in uncovered emissions provides a strong argument for implementing the broadest possible GHG emissions cap.



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Energy efficiency opportunities and challenges

Under a regulation approved in 2010, CARB has been investigating energy efficiency opportunities and corresponding co-benefits available in four of the large industrial sectors covered by cap and trade in California: refineries, cement, hydrogen, and oil and gas production/mineral production.²⁴ The facilities in these sectors were required to conduct one-time assessments to determine potential emissions reduction opportunities, including those for criteria pollutants and toxic air contaminants. The first report, covering 12 refineries, identified 401 energy efficiency improvement projects that were completed, ongoing, scheduled or under consideration. In total, these projects would reduce GHG emissions from these 12 facilities by about 9% annually, or 2.78 MMTCO₂e.²⁵ Similar analysis for the other three sectors also revealed substantial current and future energy efficiency initiatives.

The Climate Policy Initiative (CPI) completed a similar study last year focused on the barriers and opportunities for emissions reductions in the cement sector. The report identifies three barriers that prevent cement companies from implementing cost-effective efficiency improvements, including the need for more predictability on the availability of alternative fuels, the short payback period criteria used by cement firms, and lack of influence over purchasing practices of customers (see interview with John T. Bloom, Jr. in Chapter 4 for more information on the cement industry). Despite these barriers, the report concludes that “the carbon price signal is making a difference in how firms approach abatement decisions,” and companies participating in the study confirmed that they are currently factoring in an expected carbon price into their investment decisions and emissions reduction strategies.²⁶



CHAPTER 2

Program progress

The last day of market data collection for this report was November 30, 2014.

Market updates

After two years, California's carbon market is now fully linked with Quebec's, and is growing increasingly strong, based in large part on the successful quarterly auctions, stable prices, robust activity on the secondary market, and 100% compliance in the first phase of the cap-and-trade program.

Quarterly auctions

An **allowance** is a limited tradable authorization, like a permit, to emit up to one metric ton of carbon dioxide equivalent.

In each auction, two types of allowances are sold: **current vintage and future vintage**.

Current vintage allowances can be used for compliance starting the year they are sold and thereafter. In 2014, the current vintage allowances auctioned had a vintage year of 2014 and could be used for compliance in 2014 or beyond. Future vintage allowances can only be used three years after they are sold. The future vintage allowances sold in 2014 had a vintage year of 2017 and could only be used for compliance starting in 2017. Market participants submit bids for both types of allowances at the same time, in what is called the current and advanced auctions.

The **floor price** is the minimum bid a company can place for allowances in the auctions. In 2014, the floor price was \$11.34 and this will increase every year by 5% plus the rate of inflation.

CARB held four successful quarterly auctions in 2014 during which **allowances** were offered for sale to the market. The first three were California-only auctions, while the fourth was the first joint auction with Quebec, the Canadian province to which California has linked its cap-and-trade system. The results of all four auctions reveal a healthy market with strong participation by regulated companies and stable allowance prices. Just over 82 million **2014 vintage allowances** and 27.8 million **2017 vintage allowances** were sold, a small portion of each type coming from the Quebec program in the last auction of the year.

Settlement price: The price for 2014 vintage allowances stayed extremely steady throughout the three California-only auctions, only fluctuating by two cents (\$11.48 to \$11.50) and staying 15 cents above the **floor price** on average (see Table 2-1). This lack of any significant price change throughout the year suggests that California companies have a good understanding of their market position and their cost of compliance, and are comfortable with the use of auctions to purchase allowances.

The price of 2017 vintage allowances has remained at, or very near, the floor price through the three auctions, with a portion of these allowances going unsold in the last two California-only auctions in May and August (see Table 2-2, page 11). This is not surprising given that 2017 allowances can only be used three years in the future and many companies incur some small cost to hold these allowances in their accounts over that period of time. Future vintage allowances are inherently less valuable than current vintage allowances because they can be used for compliance for a shorter period of time. These results underscore the current expectation that prices will remain close to the floor into the next compliance period, another disincentive to buy 2017 allowances early.

All price projections are based on variable market data and are updated frequently. Before the program began, some analysts predicted allowance prices would soar to \$70 or more.

TABLE 2-1
Current auction results
California-only and first joint auction with Quebec

	2012/2013 SUMMARY	FEB 2014	MAY 2014	AUG 2014	NOV 2014 (JOINT)
Floor/reserve price	\$10.00 (2012) \$10.71 (2013)	\$11.34	\$11.34	\$11.34	\$11.34
Settlement price	\$12.00*	\$11.48	\$11.50	\$11.50	\$12.10
# allowances offered	81,052,928	19,538,695	16,947,080	22,473,043	23,070,987
% purchased	100%	100%	100%	100%	100%
# bids: # offered	1.67	1.27	1.46	1.14	1.73

*Volume-weighted average

Source: California Air Resources Board²⁷

TABLE 2-2

Advance auction results

California-only and first joint auction with Quebec

	2012/2013 SUMMARY	FEB 2014	MAY 2014	Aug 2014	NOV 2014 (JOINT)
Floor/reserve price	\$10.00 (2012) \$10.71 (2013)	\$11.34	\$11.34	\$11.34	\$11.34
Settlement price	\$10.81*	\$11.38	\$11.34	\$11.34	\$11.86
# allowances offered	77,690,000	9,260,000	9,260,000	9,260,000	10,787,000
% purchased	47.2%	100%	44%	70%	100%
# bids: # offered	0.64	1.11	0.44	0.70	1.92

*Volume-weighted average

Source: California Air Resources Board²⁸

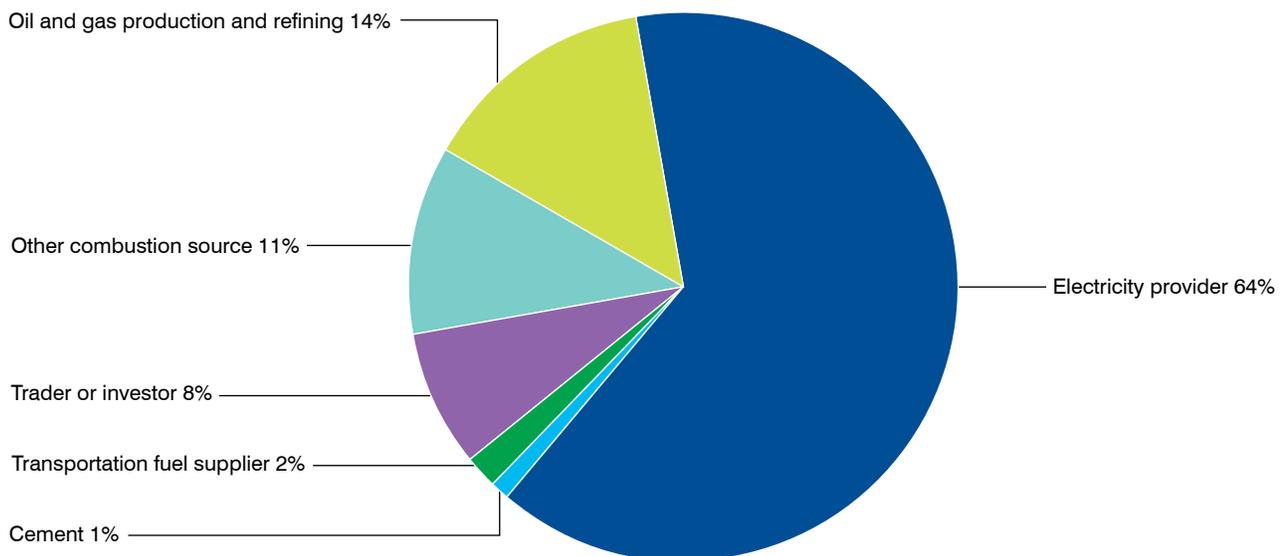
The fact that prices in both the current and advanced auctions have been at or slightly above the floor price suggests that regulated entities will be able to reduce their emissions at lower costs than previously expected. Though modest, the current \$11.34 floor price will continue to rise gradually every year, creating an incentive for companies to make early GHG reductions to lower their overall compliance costs.

Volumes purchased: All 59 million current vintage allowances that were offered for sale in the three prior California-only auctions of 2014 were purchased by auction participants, and 100% of current vintage allowances were sold in the five prior California-only auctions. These results indicate California companies are confident in the integrity and strength of the current program and are using the auctions to buy the allowances they need to comply with the regulation. Over these three 2014 auctions, there were approximately 27.5% more bids on 2014

FIGURE 2-1

Qualified bidders in quarterly auctions

California-only by sector, average



Source: California Air Resources Board²⁹

TABLE 2-3
Qualified bidders in quarterly auctions
 California-only

	2012/2013 AVERAGE	FEB 2014	MAY 2014	AUG 2014
Number of qualified bidders	80	71	74	71
% of qualified bidders that are regulated	80.9%	78.9%	79.7%	83.1%
% of current allowances that went to regulated companies	94.0%	84.5%	89.5%	87.7%

Source: California Air Resources Board³⁰

vintage allowances than actual allowances, reflecting a healthy level of interest and competition for allowances. Of the 27.8 million 2017 vintage allowances offered for sale in these auctions, 71% were purchased. Although a portion went unsold, this level of demand for allowances that can only be used three years from now shows market participants are preparing for the future.

Qualified bidders are entities that have been approved to participate in the quarterly auctions. Whether or not the approved participants actually submit bids in the auction is confidential information.

Participation: An average of 72 “qualified bidders” registered for each of the three California-only auctions in 2014, a slight decrease from the first five auctions, which had 80 registered bidders on average. Across all eight California-only auctions, 157 unique companies have registered to participate in at least one, showing that a large group of companies are becoming familiar with the auction process and are planning to use the auctions to help fulfill their compliance obligations.

The majority (64%) of qualified bidders in the eight California auctions were electricity providers, (see Figure 2-1, page 11) which includes companies responsible for in-state electricity generation, imported electricity, and cogeneration. The heavy participation of the electricity sector is unsurprising since electricity providers constituted the largest share of emissions during the first compliance period and will be second only to the transportation sector when the new compliance period begins. Between 75% and 89% of the qualified bidders in each auction were covered entities that must surrender allowances to CARB to comply with the program. Between 84.5% and 97% of the allowances offered for sale at each auction actually went to covered entities (see Table 2-3).

First joint auction with Quebec: In the last auction of 2014, entities from the California and Quebec cap-and-trade programs bid on the same pool of allowances, and results showed the auction was overwhelmingly successful. Credits from the two programs have been fungible since the beginning of 2014, meaning a California company could use an allowance that originated from Quebec’s program to meet their obligation under the program, and vice versa. The joint auction was the final step in complete harmonization, or linkage, of the two programs. In preparation for the first joint auction, CARB and its counterpart agency in Quebec, the Ministry of Sustainable Development, Environment and the Fight against Climate Change (MDDLECC), held a practice auction. This dry run enabled interested parties to become familiar with the processes and materials required to participate, and test out and provide feedback on the updated features of the auction platform, which was refined to support bidding from both jurisdictions.

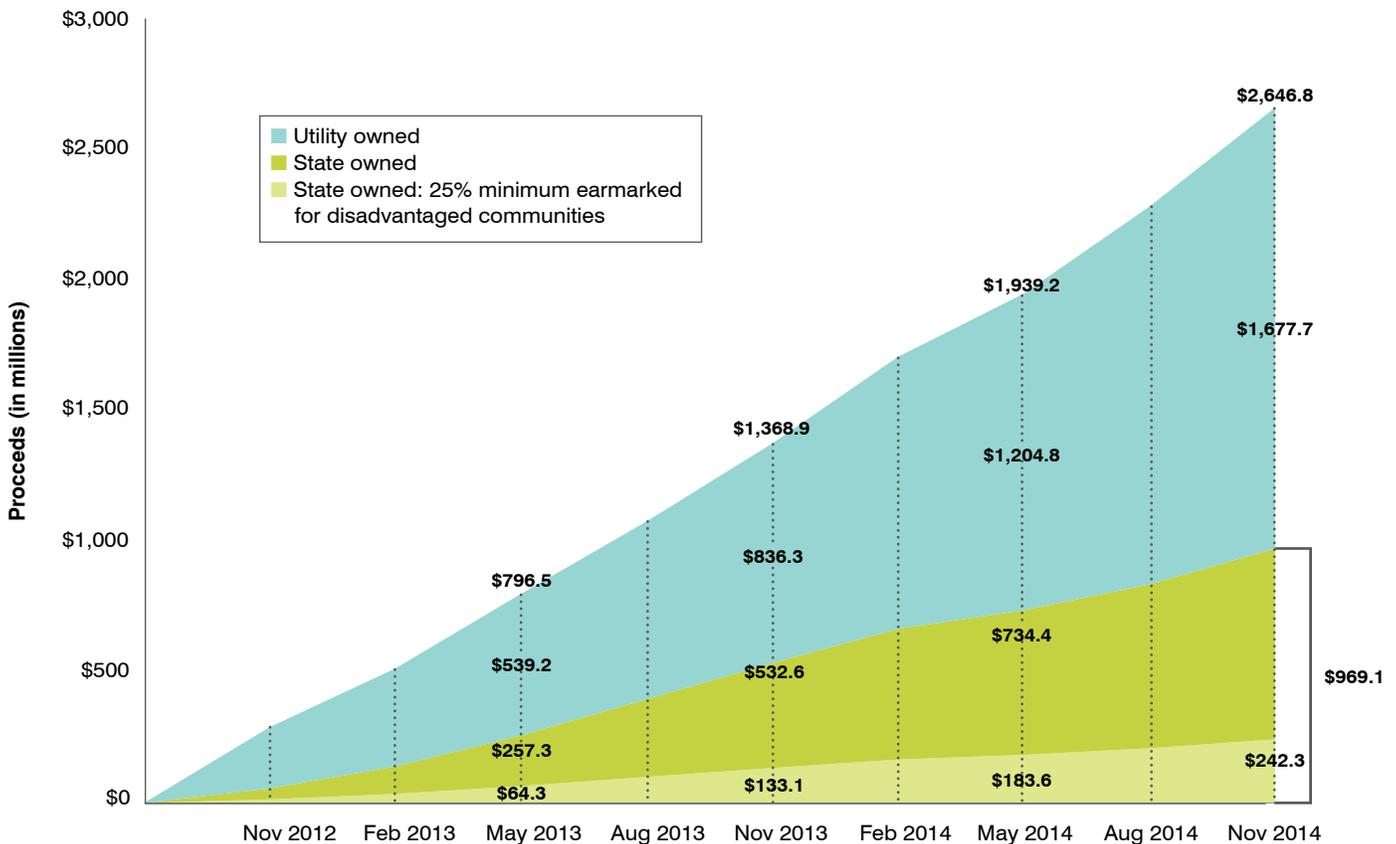
The practice auction ran smoothly, but the system experienced a technical glitch when it came time for the real auction. On November 19, the day the first joint auction was to take

place, some participants were unable to log into the system, prompting CARB and MDDLECC to postpone the auction to ensure everyone had an equal opportunity to bid. The auction was held five days later and results suggested no adverse impacts from the delay. All of the 23.1 million 2014 vintage allowances offered for sale were purchased at \$12.10 per allowance, 76 cents above the minimum allowable bid price of \$11.34 (see Table 2-1, page 10). In addition, all of the approximately 10.8 million 2017 vintage allowances offered were purchased at \$11.86 (see Table 2-2, page 11), demonstrating confidence among market participants that the linked cap-and-trade program has a long, healthy future.

The high level of demand for allowances in the inaugural joint auction was driven by several factors, all of which show that participants are preparing for the future. The first driver of demand was companies preparing for the start of the second compliance period on January 1, 2015, at which point transportation fuel suppliers will be regulated under the program. This expands the size of the market by more than a factor of two. In addition, the minimum allowable bid price was set to increase on January 1, 2015 to \$12.10, driving demand for allowances in this auction while the lower minimum bid price was still in place. Strong demand for 2017 vintage allowances is a promising indicator of confidence in the future of the program, which was buttressed by increasing discussion in California about the establishment of a long-term, post-2020 GHG reduction target in the near future.

Auction proceeds: Over the history of the program, a total of \$2.65 billion has been collected through the sale of allowances in the quarterly auctions (see Figure 2-2). \$969.1 million of

FIGURE 2-2
Cumulative proceeds from quarterly auctions



Source: California Air Resources Board³¹

this total, from the sale of state-owned allowances, has been placed in the Greenhouse Gas Reduction Fund for investment in projects that further reduce GHGs in California. At least 25% of this (\$242 million), must be allocated to projects that benefit disadvantaged communities (see “Cap-and-trade auction proceed investments,” page 18). The remaining portion (\$1.68 billion) represents allowances sold by utilities who will use the proceeds for the benefit of their ratepayers.

Secondary market

The strength and stability of the state-run auction system has been complemented by a healthy and maturing **secondary market** for allowances, characterized by stable prices and robust trading (see “Offset market,” page 15 for discussion about offset trade on the secondary market). In 2014, the clearing prices for **futures contracts** were much more stable than in previous years (see Figure 2-3, page 15). The price of the most heavily traded contract varied by just \$0.89 during the entire year, a sharp contrast to the fluctuations of \$4.82 in 2013 and \$8.55 in 2012 (see Table 2-4). The trend towards more stable, predictable prices is good for businesses, which are more able to develop a plan for compliance and make decisions about long-term investments.

TABLE 2-4

Measures of secondary market strength

MEASURE	2012	2013	FIRST HALF OF 2014	SECOND HALF OF 2014
Price fluctuation, year*	\$8.55	\$4.82	\$0.89 [†]	\$0.89 [†]
Average weekly volumes	226,058	1,348,604	2,838,154	3,757,476

*Price fluctuation over the year is measured as the difference between the highest and lowest settlement price over the year for the contract type that had the highest volume of trading over ICE.

[†]This value is for all of 2014, not just the first or second half of the year, to make the number comparable to the previous years' values.

Source: Intercontinental Exchange, Inc.

The secondary market also experienced a dramatic increase in the volume of trades during the course of 2014, an indicator of market **liquidity**, which is another good sign of market health. Average weekly trading more than doubled from 2013 to the first half of 2014, then increased again by almost 33% in the second half of 2014 (see Figure 2-3, page 15, and Table 2-4). The increase in trading is likely due to market participants becoming more familiar and comfortable with the program while preparing for the start of the second compliance period, when the market doubles in size. Regulated companies were also required to surrender allowances for the first time at the beginning of November 2014, which may have driven market activity.

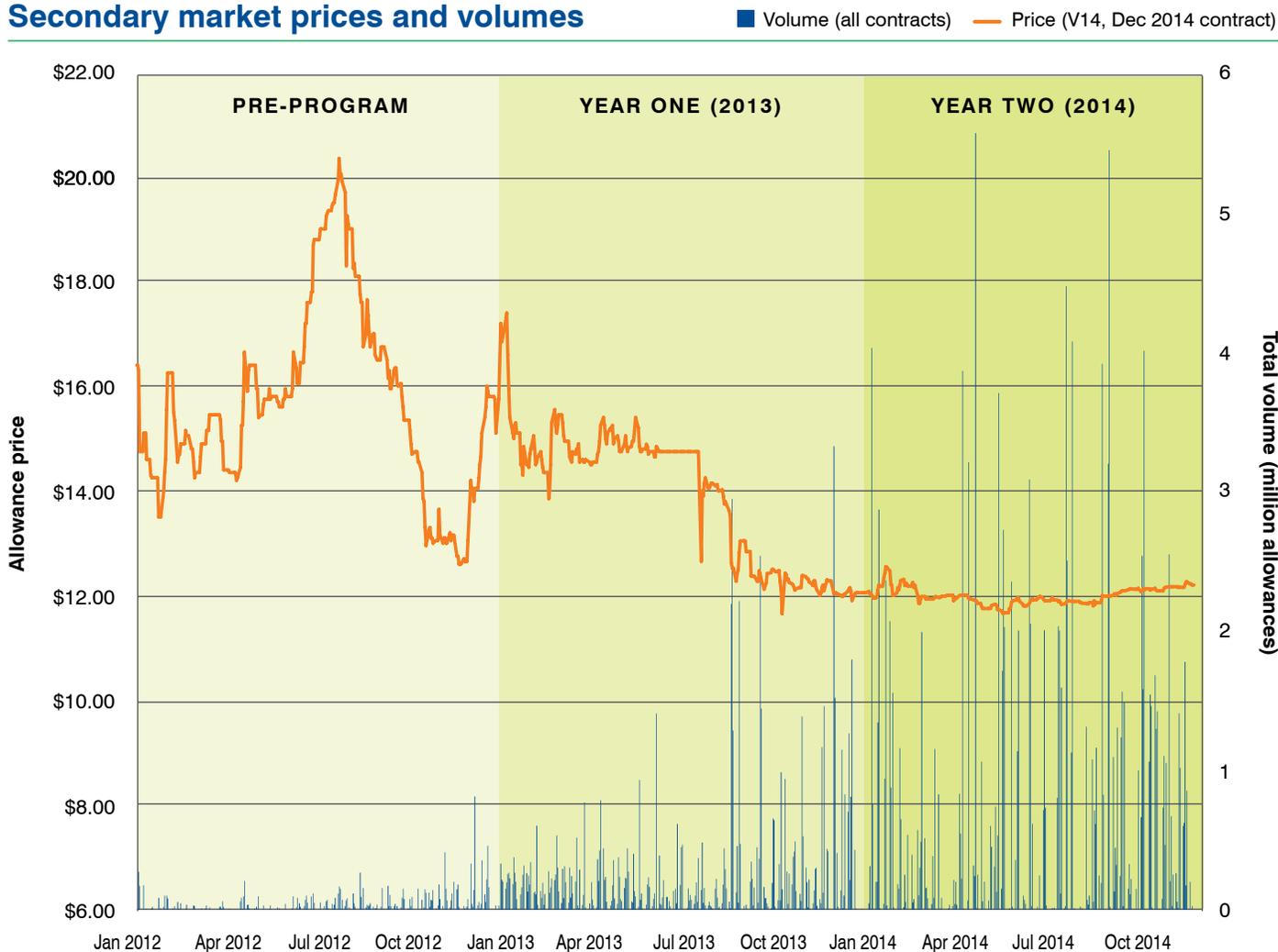
In 2013, contracts for about 25 million future allowances with vintage years 2015 and 2016 (two and three years in the future) were traded on the secondary market. By comparison, in 2014, contracts for more than 77 million 2016 and 2017 vintage allowances (again, two and three years in the future) were traded. Therefore, trading for future vintage allowances more than tripled from 2013 to 2014, demonstrating that more and more participants are making preparations for later years instead of simply purchasing allowances for immediate compliance. This is an indication that companies are gaining confidence in the long-term strength of the program. Figure 2-3 (page 15) depicts the increase in trade volumes (blue bars) coupled with more stable prices (orange line). The data demonstrates that the secondary market has continually matured and strengthened since the cap-and-trade program began in January 2013.

If entities would like to either trade allowances outside of the auctions or buy offset credits, they can do so on the **secondary market**. Trades on the secondary market involve the exchange of 1) current and future vintage allowances, 2) offset credits, or 3) contracts to deliver allowances and offsets in the future (termed “futures contracts”). These trades are cleared across the largest trading exchange in the world, the Intercontinental Exchange (ICE).

A **futures contract** is a formal, contractual agreement for one entity to deliver valid allowances or offsets to another entity in the future at a predetermined price.

Liquidity is a measure of how easy it is to convert an asset to cash or how rapidly the asset can be sold. In this market, greater liquidity signifies a healthier market because it means that companies are able to buy and sell emissions allowances in a timely manner to fulfill compliance obligations.

FIGURE 2-3
Secondary market prices and volumes



Source: Intercontinental Exchange, Inc.

Offset market

The offsets market has expanded over the past year, with CARB growing the potential offsets pool by fully approving one new protocol and taking the first of two steps to approve a second. Most existing protocols have seen a steady increase in the overall number of offsets credits issued as well.

At the beginning of 2014, only offsets within four approved project types could be generated and sold into California's program: U.S. forestry projects, urban forestry projects, destruction of ozone depleting substances (ODS), and livestock projects. CARB added a mine methane capture protocol and is expected to fully approve a rice cultivation offset protocol in early 2015. Since the first CARB-certified offsets were issued and became available for sale into the market in September 2013, the total pool of offsets has grown steadily, with approximately 904,500 offsets being issued per month on average. Approximately 13.6 million offsets have been issued to date, just under half (6.66 million) being ODS offsets, and the rest being U.S. forestry (6.23 million) and livestock offsets (0.68 million) (see Table 2-5 and Figure 2-4, page 16). No certified offsets under the urban forestry protocol have been issued, likely because these projects remain too costly. Due to its recent regulatory approval, no mine methane capture offsets have yet been issued.

TABLE 2-5
Offset credits issued by CARB

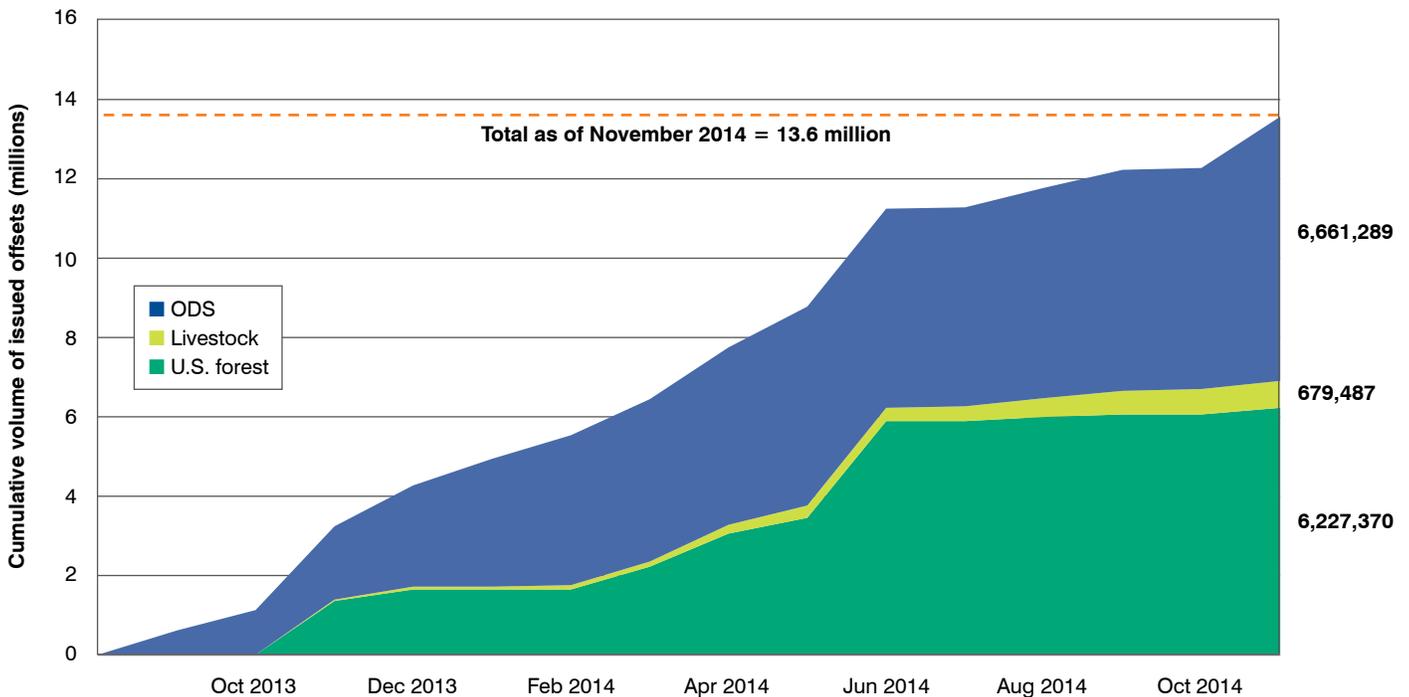
PROJECT TYPE	ODS	LIVESTOCK	U.S. FOREST	URBAN FOREST	MINE METHANE CAPTURE
Compliance	1,645,536	72,831	3,378,928	–	–
Early action	5,015,753	606,656	2,848,422	–	–
Total	6,661,289	679,487	6,227,370	0	0

Source: California Air Resources Board³²

There is a period of up to eight years following offset issuance during which CARB can decide, upon investigation and findings of fact, to invalidate an offset due to calculation issues, double selling, or environmental non-compliance. This invalidation window can be shortened to three years if the offset is verified twice by two different CARB-accredited verification bodies, a process that should give the credits higher market value due to the lower invalidation risk. This double verification occurred for the first time in April 2014, for an ODS project developed by Diversified Pure Chem, an important milestone marking the maturation of the offset market.

In May 2014, CARB initiated an investigation of ODS offset credits generated by the company Clean Harbors on the grounds of potential non-compliance with environmental laws. During the investigation, over four million credits were taken out of the market to prevent them from being traded. After a thorough review, CARB invalidated about 2% of the offsets that were called into question, representing less than 1% of the total offsets market at the time (see “ODS Offset invalidation,” page 25). The investigation and subsequent invalidation process took about five months from start to finish, during which time activity on the offset market decreased

FIGURE 2-4
Cumulative offset credits issued by CARB by month



Source: California Air Resources Board³³

substantially as participants waited to find out the outcome of the investigation and reassess their invalidation exposure. The final determination was made in time for companies to retire offsets for the first compliance period and move into the second compliance period with updated knowledge about the invalidation process and risk. During the course of the investigation, CARB issued almost 3.8 million credits (see Figure 2-4, page 16), increasing the pool of available offsets credits by more than 40%.

Allowance surrender

On November 3, 2014, covered companies were required for the first time to surrender allowances—enough to cover 30% of their 2013 emissions—to demonstrate compliance with the cap-and-trade program. By this day, each covered entity had to transfer the appropriate number of allowances from their holding account to their compliance account. CARB reports that 100% of regulated companies met their requirement, a significant milestone demonstrating that entities are committed to complying with the program and are aware of what is expected of them moving forward.

Quebec auction results

Prior to the successful joint California-Quebec auction in November 2014, Quebec held four of its own quarterly auctions which were considerably smaller than the California-only auctions due to the size of Quebec's program, roughly one-sixth of California's. There was greatest interest in the first Quebec auction, with the highest number of bidders registered and the most total bids made across both the current and advanced auctions (see Table 2-6). Although the percentage of allowances purchased in the first auction was smaller than in subsequent auctions, a greater number of allowances were offered for sale. The number of bids and qualified bidders dropped slightly in the next auction, although the relative number of allowances being auctioned was smaller. The third auction had very similar results, followed by another drop in number of bids in the final auction. This muted interest is attributable to the fact that Quebec entities do not have to surrender any allowances until November 2015, unlike California, where entities had to surrender allowances for the first time in November 2014. This delayed surrender requirement means that Quebec entities could be waiting to engage in the market and may still be evaluating how they will comply.

The results of the last Quebec-only auction in August 2014 show that Quebec entities were poised to benefit from having a larger, better functioning market. In this auction, 66% of the 2014 vintage allowances were purchased, while 95% of the 2017 vintage allowances were

CARB reports that 100% of regulated companies met their [allowance surrender] requirement, a significant milestone demonstrating that entities are committed to complying with the program.

TABLE 2-6
Current auction results
Quebec-only auctions

	DEC 2013	MAR 2014	MAY 2014	AUG 2014
Floor/reserve Price (in Canadian dollars, or CAD)	\$10.75	\$11.39	\$11.39	\$11.39
Settlement price (in CAD)	\$10.75	\$11.39	\$11.39	\$11.39
# allowances offered	2,971,676	1,049,111	1,049,111	1,049,111
% purchased	34%	99%	100%	66%
# of qualified bidders	19	16	15	14

Source: The Ministry of Sustainable Development, Environment and the Fight against Climate Change³⁴

TABLE 2-7
Advance auction results
 Quebec-only auctions

	DEC 2013	MAR 2014	MAY 2014	AUG 2014
Floor/reserve price in Canadian dollars, or CAD)	\$10.75	\$11.39	\$11.39	\$11.39
Settlement price (in CAD)	\$10.75	\$11.39	\$11.39	\$11.39
# allowances offered	6,319,000	1,527,000	1,527,000	1,527,000
% purchased	27%	84%	85%	95%

Source: The Ministry of Sustainable Development, Environment and the Fight against Climate Change³⁵

purchased (see Table 2-7), a seemingly counterintuitive result considering 2014 vintage allowances should be more valuable than 2017 allowances as the latter can be used for an additional three years of compliance. It is possible that entities were not aware of this distinction when bidding, or there may have been so few bidders that one entity's bidding strategy impacted the whole auction. Similarly, the floor price at the August auction was lower than in the first joint California-Quebec auction because of the conversion rate between Canadian and U.S. dollars, indicating there should have been greater demand for the cheaper allowances in the August pool. Overall, the relatively low volume of bidding suggests that Quebec entities were still gaining experience with the market prior to the first joint auction.

Cap-and-trade auction proceed investments

Investments of the revenue generated by the cap-and-trade auctions will help California move towards an energy efficient, low-carbon economy.

As described in the "Auction proceeds" section (page 13) California's cap-and-trade auctions have already raised hundreds of millions of dollars in proceeds. California has held nine quarterly allowance auctions to date, raising a total of \$969.1 million for the Greenhouse Gas Reduction Fund (GGRF). At the direction of California decision makers, proceeds will be reinvested to reduce climate pollution and benefit the economies, health, and environment of California's communities. These investments play an important role in fulfilling the goals and objectives of AB 32, but it is also important to note that because the cost of carbon, and thus the cost for an allowance, is set by the cap, allowances have inherent value whether they are auctioned or not. Decisions about how this value is distributed throughout the economy are essential aspects of the design of any cap-and-trade program.

Allowance value

In a cap-and-trade program, the overall number of allowances is set by the cap and demand is determined by the quantity of emissions generated by companies regulated under the system, since all polluters must turn in an allowance for every ton they produce. As with most products in a market-based system, allowance value reflects the balance between supply and demand. Allowance auctions are one way that CARB distributes this limited supply of allowances. Revenue collected from the auctions is either returned to electricity customers as a climate credit or reinvested in the economy through the GGRE.

California has held nine quarterly allowance auctions to date, raising a total of \$969.1 million for the Greenhouse Gas Reduction Fund.

Cap-and-trade benefits communities and serves as a model for the world

By Senate President Pro Tempore Kevin de León

California is a thriving state and a leading global powerhouse—the eighth largest economy in the world—bigger than the economies of nations like Russia and Italy. We are a state known for our innovation and pioneering efforts in technology, business, entertainment, and sports, as well as in how we address environmental challenges.



When California officially launched the price on carbon pollution two years ago, I knew we were on the brink of something big. Carbon pricing is an important tool to level the playing field between high polluting fossil fuels and clean renewable energy. To ensure success, I have spent much of my time in the legislature ensuring the rules of the road are the tightest in the world.

California has not waited for Washington D.C. to act—the effects of climate change are real and happening now. Fire, drought, flooding, and unhealthy air are realities that impact Californians. Inaction is not an option when the costs of waiting are so high and when action can benefit communities across the state.

By pricing carbon pollution, we are laying the foundation for a green economy with good jobs and cleaner air that is

an example for the world. A key element to the cap-and-trade program is the accompanying investments made possible by no longer allowing carbon polluters to pollute for free. In 2014 alone, we directed over \$850 million towards projects that move us towards a clean, low-carbon economy. As a product of a landmark bill I championed, neighborhoods that are low-income and highly polluted will be directly benefitting from these investments. Thanks to SB 535, a law I authored in 2012, we are showing the world that fighting climate change also means more green-collar jobs such as driving the most cutting-edge clean cars, trucks and buses to make our cities less polluted or providing energy retrofits in low-income apartments to lower household energy bills. In turn, parents won't have to worry as much about children suffering asthma attacks and missing school and work as a result. These benefits from the cap-and-trade program and other clean transportation policies add up to major savings, an estimated \$8.3 billion in pollution-related health costs alone by 2025.

California is seeing big pay-off on our resolve to safeguard California's communities, environment, and economy. Our two year old cap-and-trade program is ratcheting down dangerous carbon pollution while strengthening our economy through deployment of energy efficiency and clean technology. With the world watching California, and coming to our doorstep to partner with us, we as lawmakers have a duty to protect and strengthen the program to guarantee progress well into the future.



Senate President Pro Tempore Kevin de León speaks during Governor Jerry Brown's January 2015 inauguration.

California decided to provide industrial polluters with some free allowances to help them transition into the program and to help them remain economically competitive with similar out-of-state businesses not subject to climate regulation. This free allowance allocation system is a method by which California provides value directly to regulated businesses to protect the economy and foster clean economic growth.

Investments can deliver myriad benefits

All state proceeds collected through the cap-and-trade auctions are placed into the GGRF and must be used to reduce GHGs. However, both AB 32 and legislation passed in 2012 outline other important policy priorities that must be considered when investing GGRF funds, including ensuring benefits to disadvantaged communities, cutting emissions cost-effectively, and maximizing societal benefits to the environment, economy, and public health.³⁶ Pursuing these policy priorities is often referred to as “furthering the purposes of AB 32.” By investing auction proceeds in programs that cut greenhouse gas emissions in the state, California can accelerate pollution reductions while delivering on these larger policy objectives.

California’s decisions about investing proceeds have immense impact on the legal durability of the cap-and-trade program. In the fall of 2012, the California Chamber of Commerce (joined by the Pacific Legal Foundation in early 2013) sued California, arguing that the auctions constitute an illegal tax. The state’s decision to use the proceeds to reduce GHGs and further the regulatory purposes of AB 32 was the foundation of the District Court judge’s ruling that the auctions do not constitute an illegal tax under California law. Alternative uses of the auction proceeds, including dividends for California residents or reductions in distortionary taxes, may not have been viewed as favorably by the Court.

By investing auction proceeds in programs that cut greenhouse gas emissions in the state, California can accelerate pollution reductions while delivering on these larger policy objectives.

Legislative investment decisions in 2014

The budget for fiscal year 2014-2015 passed on June 15, 2014 and appropriated the first \$832 million of cap-and-trade revenue. Accompanying bills (enacted as part of the state budget) provided further direction for future fiscal years. Senate Bills (SBs) 852 and 862 establish long-term funding streams for transit, sustainable communities, affordable housing, and high-speed rail (see Figure 2-5, page 21). Both bills require 25% of this funding to be invested in programs that benefit disadvantaged communities in California, in accordance with the mandate established by SB 535 (de León) in 2012. SB 1204 (Lara) directs CARB to fund development, demonstration, and deployment of zero and near-zero emission trucks, buses, and off-road vehicle and equipment technologies, with a focus on disadvantaged communities. SB 1275 (de León) requires CARB to develop a long-term funding plan to meet the goal of putting one million electric cars, trucks, and buses on California’s streets while ensuring that low-income and disadvantaged communities benefit from this transition. Earlier in 2014, the Legislature amended the 2013–2014 budget to include \$30 million for electric vehicle rebates and \$40 million for water efficiency projects, bringing the total amount of appropriated cap-and-trade funds to \$902 million.

Public process to implement GGRF investments

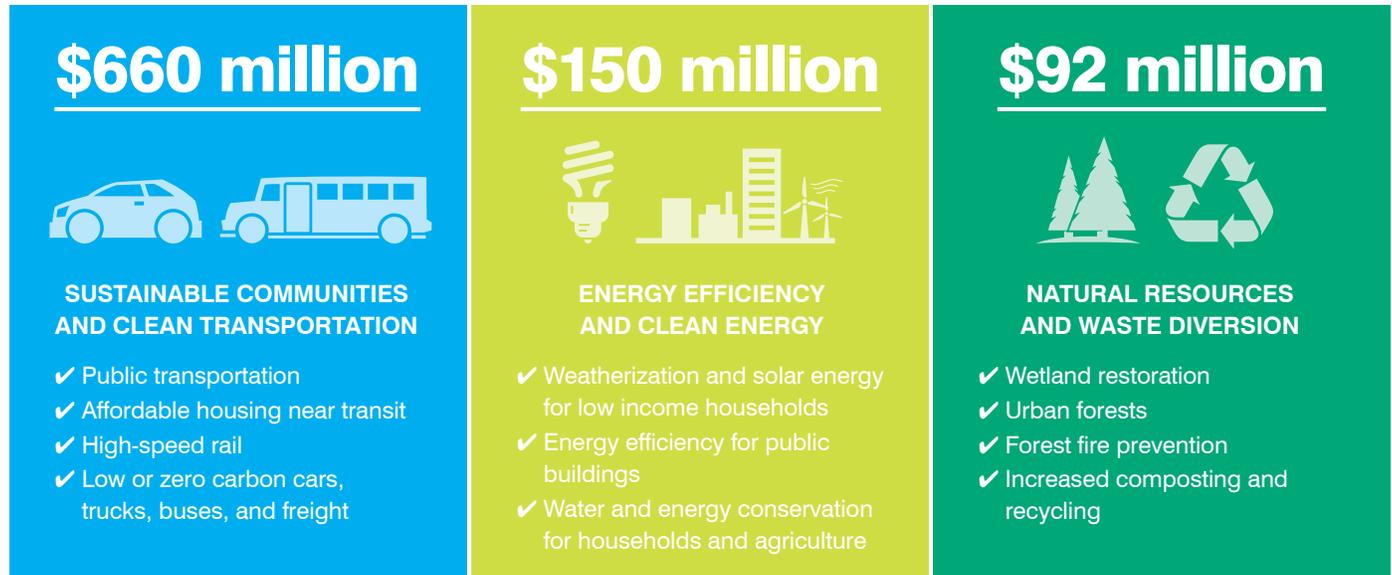
Legislative action is critical, but not the only component of the cap-and-trade proceeds investment process. The diversity of investments outlined by the Legislature means 12 different California agencies will be responsible for directly making investments in communities with CARB providing guidance and oversight throughout the process. There are many other important steps California is taking to get investment dollars into communities:

FIGURE 2-5

Greenhouse gas reduction fund, 2013–2015

How will the \$902 million be used?

This year, more than 30% of cap-and-trade proceeds will benefit California's most impacted communities



Source: California Air Resources Board³⁷

- **CalEnviroScreen Tool:** SB 535 (de León, 2012) requires that at least 25% of investments benefit California's most disadvantaged communities. The Office of Environmental Health Hazard Assessment (OEHHA) developed a first-of-its-kind mapping tool to pinpoint the location of these communities, using 12 environmental factors and seven demographic and socio-economic factors. The tool, called the CalEnviroScreen, creates scores for each of the state's 8,000 census tracts, which are widely used to analyze demographic data.
- **CARB SB 535 Guidance:** In September 2014, the CARB board adopted guidance for agencies administering SB 535 funds.³⁸ The guidance defined what it means to “benefit” a disadvantaged community, directed agencies to conduct public outreach and gather input in target communities, and provided examples of the types of benefits that agencies should maximize while simultaneously reducing GHGs. CARB estimated that 32% of the investments made in 2014–2015 would benefit disadvantaged communities, well above the 25% minimum requirement.
- **Expenditure Record:** Before disbursing funds, each agency must submit their expenditure record to CARB for approval. The expenditure record documents how each agency plans to invest cap-and-trade funds and how that investment will lower greenhouse gases and further the purposes of AB 32. CARB staff and attorneys review the record to ensure compliance with all legislative requirements. All approved expenditure records are then made publicly available.
- **Quantifying Reductions and Benefits:** CARB is also responsible for developing guidelines for agencies to quantify and track the GHG reductions and associated benefits of all investments. Draft guidelines should be released in early 2015, and final guidance will be approved in 2015 after public comment.

- **Three-Year Investment Plans:** CARB is required to develop a cap-and-trade investment plan every three years to help guide the Legislature as it appropriates proceeds annually through the budget. The first investment plan was completed in 2013, with the next due in 2016. The public outreach process for the second investment plan is likely to start in 2015.

Experts identify likely benefits from cap-and-trade investments

Several steps remain before the cap-and-trade investments translate into real, tangible projects in communities. Although it is too early to measure outcomes, a wealth of research exists that provides a window into the likely environmental and economic benefits of these investments:

- **Next 10 and UC Berkeley:** A report released in 2012 looked at California’s options for investing cap-and-trade proceeds and analyzed economic impacts of 18 different expenditure scenarios, many of which are similar to the actual 2014–2015 investments.³⁹ Researchers modeled the impact of a \$100 million investment on gross state product (GSP), state tax revenue, and jobs. Although there was significant variability, all scenarios delivered monetary benefits that far exceeded the investment. For example, investing \$100 million in residential building energy efficiency would increase GSP by \$875 million, generate \$56 million in new state tax revenue, and create 8,751 new job-years.
- **ICF, Inc.:** A report released in 2013⁴⁰ explored the benefits of using allowance value in five different ways: 1) a lump sum dividend to all California residents; 2) investments in energy efficiency; 3) investments in clean transportation; 4) a blended strategy of options one through three; and 5) free allocation of allowance to the fuels sector, which is covered under the program as of January 1, 2015. The results found that all scenarios created benefits greater than would occur if proceeds were diverted into the **General Fund**, an option that had been proposed by state budget officials. The results showed that energy efficiency and clean transportation investments resulted in the most job growth, and that a dividend maximized equity and income growth. Investing in clean transportation would create about 75% more jobs than providing free allowances and providing a

The GGRF is a special fund with a specific purpose whereas the **General Fund** is where tax dollars are collected and then spent via the state budget.

TABLE 2-8
Benefits of cap-and-trade investments

EXPENDITURE	ENVIRONMENTAL/HEALTH FACT	ECONOMIC FACT
Sustainable communities Transit-oriented development that puts low-income people closer to public transportation and other conveniences	“Smart growth” policies mean that we will need 75% less land to accommodate California’s growing population, preserving it for agriculture, watersheds, and forests. ⁴¹	The average Los Angeles resident could save \$11,000 per year by switching from driving to using public transportation. ⁴²
Clean transportation/zero emission cars Californians receive tax credits for purchasing an electric vehicle	An electric car reduces dangerous air pollution by over 90% compared to a conventional car. ⁴³	Electric vehicle drivers save between \$2-3 per gallon compared to gasoline. ⁴⁴ Every \$1 saved on gasoline creates \$16 of economic benefit for the state economy, and lower income Californians benefit most. ⁴⁵
Clean energy Solar photovoltaic (PV) systems on universities or multi-family, low-income housing	Unlike coal and natural gas, solar power produces no GHGs or other harmful pollutants, and uses almost no water to operate.	Almost 50,000 jobs could be created if 10% of solar capacity in Los Angeles County was realized. ⁴⁶
Waste diversion Increasing composting and non-traditional recycling (e.g., fibers)	Diverting 75% of solid waste away from landfills (as required by 2011 legislation) would reduce GHG emissions by an additional 1.7 million tons beyond earlier targets set in 2005. ⁴⁷	Meeting the goal of increasing waste diversion to 75% by 2020 is expected to result in 110,000 new jobs by 2020. ⁴⁸

dividend would increase incomes by 20% more than free allocation. California's current investment strategy that combines GGRF investments and a "climate credit" to electricity consumers is most similar to the blended strategy that can provide both jobs and income benefits to Californians.

- **Analysis Group and RGGI, Inc.:** Nine northeastern states currently participate in the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade program for the electricity sector. RGGI launched in 2009 and auctions 100% of its allowances, raising a total of \$1.9 billion through December 2014.⁴⁹ The RGGI states primarily invest auction proceeds in categories also identified as priorities for California: energy efficiency, clean and renewable energy, research and development for GHG abatement technologies, and direct bill assistance.⁵⁰ A 2011 Analysis Group report showed that RGGI states turned \$912 million in proceeds from the first three years of cap and trade into \$1.6 billion in economic value for state economies and created 16,000 new job-years.⁵¹

Table 2-8 (page 22) shows potential investments from each expenditure category, and identifies key environmental, health, and economic facts associated with each.

California climate credit

In March 2014, the California Public Utilities Commission (CPUC) and CARB announced that each household purchasing electricity from an investor-owned utility (IOU), electric service provider, or community choice aggregation provider in California would receive a credit on their April and October electricity bills as a result of the cap-and-trade program. The so-called California Climate Credit is designed to protect ratepayers from increases in electricity prices due to the cap-and-trade program. The credit amounts to 85% of the revenue collected from CARB's sale of the allowances allocated to the California IOUs—the rest of the funds are used for the benefit of small businesses and manufacturers. The average credit in 2014 was \$70 per household. The credit may increase in the future if electricity consumers significantly decrease their aggregate energy use and/or electricity providers invest substantially in GHG reductions.⁵²

The average credit in 2014 was \$70 per household.

Regulatory and agency updates

CARB strengthened the cap-and-trade program in 2014 through amendments to the regulation and enforcement actions taken against companies that had violated program requirements. California is on track to meet its 2020 GHG emissions cap and to comply with the Environmental Protection Agency's (EPA's) recently-announced Clean Power Plan.

Amendments

CARB maintains an on-going dialogue with regulated entities, academics, market experts, and other stakeholders to assess how the cap-and-trade program is working and what if any changes are needed. Technical amendments to the cap-and-trade regulation often emerge from this process, including a series of changes that were approved by CARB's board in April 2014 and took effect on July 1. The new amendments included, but were not limited to:⁵³

- additional cost containment mechanisms (i.e. limited borrowing from future years to replenish the allowance price containment reserve as needed)
- adoption of a Mine Methane Capture (MMC) offset protocol

Resource shuffling is defined by CARB as “any plan, scheme, or artifice to receive credit based on emissions reductions that have not occurred, involving the delivery of electricity to the California grid.”⁵⁴

- updates on allocation to the natural gas sector specifying that utilities will receive free allowances but must auction a minimum of 25% in 2015 and 50% in 2020. Further compliance rules will be decided by the CPUC
- modifications to existing benchmarks for allowance allocation to certain sectors
- increased transition assistance into the second compliance period for the industrial sector
- specification of retirement order for compliance surrender (i.e. offsets and reserve allowances are retired from compliance accounts first)
- definition of activities that do not constitute **resource shuffling** in the electricity sector
- additional provisions to improve CARB’s ability to monitor the market, including a disclosure requirement for entities voluntarily in the program that may have a relationship with covered or “opt-in” entities

On July 29, 2014, CARB proposed another round of technical amendments, which were approved by CARB’s board at their September 18, 2014 public meeting, during which staff were asked to make additional changes. The new amendments included, but were not limited to:⁵⁵

- clarification of how tomato producers quantify their product data
- adjustment of allowance allocation for two covered entities based on new information
- removal of the exemption for imported carbon dioxide
- updates to the Ozone Depleting Substances, Livestock, and U.S. Forestry offset protocols
- modification of requirements related to corporate association disclosures and offset transfer price reporting

On December 18, the CARB board directed staff to move forward with the work necessary to potentially adopt a sixth offset protocol at a future board meeting in 2015. The protocol involves U.S.-based projects that reduce methane emissions associated with rice cultivation.

California’s new offset protocol for rice cultivation

By Robert Parkhurst, Agriculture Greenhouse Gas Markets Director at Environmental Defense Fund

Rice is one of California’s largest crops and contributes more than \$5 billion a year and 25,000 jobs to the state’s economy. Throughout the growing season, rice farms serve as important wetland habitat, but they can also release large amounts of methane, a potent greenhouse gas. Research has shown that growers can implement practices that cut methane while protecting wildlife habitat and maintaining rice quality and yield. Practices such as dry seeding, early drainage, and alternate wetting and drying all fit this category, but have not been widely used.

The new rice offsets protocol would give rice farmers, many of whom are found in California’s Central Valley, the opportunity to generate offsets if they reduce methane emissions and meet stringent quality requirements. For example, rice producers must provide both historical and current information to certified third party verifiers to ensure the emissions reductions are real and accounted for accurately.

This new financial incentive can help rice growers earn more money while protecting the environment. Since the protocol rewards methane reductions that are avoided, the reductions are permanent and the methane will never be released into the atmosphere.

Throughout 2014, CARB took several enforcement actions against parties in violation of the regulation, demonstrating the high level of vigilance with which they are monitoring the program.

First update to the Climate Change Scoping Plan

Under AB 32, CARB was required to develop a Scoping Plan laying out recommended measures that would reduce California's emissions to 1990 levels by 2020. The Scoping Plan, completed in 2008, contained a suite of regulations, including a cap-and-trade program, that are being implemented and that have put California on track to meet the 2020 mandate.

AB 32 also required CARB to update the Scoping Plan at least every five years. CARB released a draft First Update to the Scoping Plan in the fall of 2013, and the final was adopted by the CARB board in May 2014. This update is a comprehensive planning document that takes a sector-by-sector (transportation, energy, natural and working lands, agriculture, waste management, water, short-lived climate pollutants, and green buildings) approach to evaluating California's progress to date and recommending future actions to reduce GHG emissions. The overarching conclusions include:

- California is on track to meet its 2020 target.
- The state's economy is growing and thriving even as emissions decline.
- California should begin planning for reductions after 2020 and should set a mid-term (2030) target for GHG reductions.
- California needs to be even more comprehensive in its approach to tackling climate change, including incorporating short-lived climate pollutants, natural resources, waste, water, and agriculture even more directly into climate action strategies.

Enforcement actions

CARB is responsible for monitoring the cap-and-trade program and enforcing compliance with the regulation when necessary. Throughout 2014, CARB took several enforcement actions against parties in violation of the regulation, demonstrating the high level of vigilance with which they are monitoring the program.

GHG emissions reporting violations:⁵⁶ Accurate GHG emissions reporting is vital to the health and integrity of the cap-and-trade program. On January 27, 2014, CARB issued close to \$1 million in fines against three companies for late or inaccurate reporting of their 2011 GHG emissions. Chevron U.S.A. Inc. was penalized for reporting incorrect emissions information for one of its refineries, and failing to correct the data for 243 days. Chevron North America Exploration and Production Company was also fined for not reporting emissions from one of its oil fields, an error the company neglected to correct for 219 days. Finally, Southwest Gas Corporation was fined for being 320 days late in submitting the necessary report regarding natural gas supplied to California.

Bidding violations:⁵⁷ On February 20, 2014, CARB fined four companies between \$25,000 and \$75,000 for violations committed during auction bidding. Southern California Edison, Luminus Energy Partners QP, L.P., and CP Energy Marketing (US), Inc. were fined for confidentiality breaches that involved disclosing information to third parties regarding auction participation and bidding, actions strictly prohibited by the regulation to prevent collusion among market participants. The City of Riverside was also fined for submitting a bid at auction that exceeded its financial bid guarantee, an amount stipulated by CARB that ensures each entity can, and will, pay for the allowances it bids on.

ODS offset invalidation:⁵⁸ On May 29, 2014, CARB began an investigation of ODS offset credits issued to a project at a Clean Harbors Incineration Facility. Evidence showed that the facility

may not have been in compliance with its operating permit issued under the federal Resource Conservation and Recovery Act (RCRA) at the time some of these offsets were generated. All of the approximately 4.3 million ODS offsets from this facility were called into question. After an in-depth investigation, CARB determined that the Clean Harbors Incineration Facility was not operating in accordance with its RCRA permit on February 2–3, 2012. CARB released a preliminary determination invalidating the 231,154 offset credits generated on those two days; however, on November 14, 2014, after a 10-day comment period during which a more detailed timeline of events was uncovered, CARB moved to invalidate only 88,955 credits, which were generated before 4 p.m. on February 3. At the time of the invalidation, these credits represented less than 1% of the market, which totaled 12.6 million credits (see “Offset market,” page 15).

United States EPA’s Clean Power Plan

On June 2, 2014, EPA proposed the Clean Power Plan (CPP)—a rule that would use existing legal authority under section 111(d) of the Clean Air Act to establish the first nationwide limits on carbon dioxide (CO₂) pollution from existing power plants. The CPP contains state-specific emission intensity targets based on each state’s unique generating portfolio and potential to deploy four key emission reduction measures—known as “building blocks”—that many states and utilities are already putting in place to reduce carbon pollution from the power sector. Each state has a 2030 emissions intensity target, and average emissions intensity targets for the period from 2020 to 2029. States have tremendous flexibility to adopt a range of policies that are cost-effective and tailored to local conditions and circumstances. Under the President’s Climate Action Plan, EPA has committed to finalizing the CPP by June 2015, and state plans establishing standards consistent with the CPP must be submitted by June 2016. The CO₂ emissions limit on the power sector begins in 2020.

EPA anticipates that the flexible framework proposed in the CPP will reduce CO₂ emissions from the power sector to 30% below 2005 levels by the year 2030—yielding not only vital climate benefits, but also urgently needed reductions in other harmful pollutants from the power sector such as sulfur dioxide, nitrogen oxides, and particulate matter. These emission reductions will yield significant near-term public health benefits: according to EPA, in 2030 the CPP will lead to 6,600 fewer premature deaths, 150,000 fewer asthma attacks in children, and 490,000 fewer missed work and school days. The total benefits of the rule will reach approximately \$55 billion to \$93 billion per year by 2030, or approximately six to eleven dollars in benefits for every dollar spent on compliance.⁵⁹

The four building blocks used to develop the CPP targets include:

1. improving efficiency of existing fossil fuel power plants
2. shifting generation from high-emitting power plants to lower-emitting units
3. expanding use of zero-emitting generating resources, such as renewables and nuclear
4. increased end-use electricity efficiency

In evaluating the building blocks, EPA considered potential emission reductions, cost-effectiveness, energy requirements, and other health and environmental impacts.⁶⁰ States have wide latitude to choose from a broad range of policy measures to achieve their state-wide emissions target, and are not confined to the building block measures. California and other states that have adopted cap-and-trade programs have the flexibility to translate their emissions intensity targets into an equivalent annual limit on total CO₂ emissions from the power sector (what EPA calls a “mass-based” target). This flexibility is a core component of the CPP and allows each state to tailor its plan in a way that is most cost-effective and consistent with its own energy landscape and policy objectives.⁶¹

These emission reductions will yield significant near-term public health benefits: according to EPA, in 2030 the CPP will lead to 6,600 fewer premature deaths, 150,000 fewer asthma attacks in children, and 490,000 fewer missed work and school days.

California is well-positioned to comply with the CPP, thanks to its successful implementation of AB 32 and long history of clean energy policies. California's interim carbon intensity goal (the average for years 2020–2029) under the proposed CPP is 556 lbs CO₂/MWh and its final 2030 goal is 537 lbs CO₂/MWh. In meeting these goals, California will be able to draw on a number of existing policies that will reduce emissions from its generating fleet over the coming years—including not just the cap-and-trade program, but also California's nation-leading energy efficiency programs and strong renewable portfolio standard. Recently, the California Energy Commission, with help from CARB and the CPUC, conducted a preliminary projection of the state's CO₂ emissions rates in 2020, 2024, and 2030. This analysis found that with current environmental programs in place and a relatively clean mix of energy, California is already on track to meet the EPA's proposed targets.⁶² California has not publicly announced what existing policies will be submitted to EPA as part of the state's plan for CPP compliance (due in 2016), but it is clear that the state is already making progress towards the necessary reductions within the power sector.

Legislative update

2014 was a banner year for AB 32 in the California Legislature. Several bills designed to strengthen AB 32 were passed while measures that would have harmed or derailed the program failed to move forward.

The 2014 legislative session delivered a number of significant environmental successes, including a package of bills tackling short-lived climate pollutants, methane emissions, and clean cars, trucks, and buses that Governor Brown presented at the United Nations (UN) Climate Summit in New York City in September. A number of bills related to cap and trade were considered, though only measures related to the distribution of auction proceeds were approved:

- **Auction proceed bills:** The Legislature made several key decisions about cap-and-trade auction proceeds, mostly through the annual budget process (see “Cap-and-trade auction proceed investment,” page 18).
- **Tax-and-dividend proposal:** On February 20, 2014, then-President pro Tempore of the California Senate, Darrell Steinberg, introduced legislation (SB 1156) that would have created a carbon tax for the transportation fuel sector with a dividend to low- and medium-income Californians. The bill would have exempted transportation fuels from complying with California's cap-and-trade program. The stated intent of the legislation was “addressing the inseparable connection between climate change and social inequality.”⁶³ While agreeing with many of the bill's objectives, AB 32 advocates raised serious concerns about weakening the successful cap-and-trade program and allowing fuels producers to avoid the mandatory GHG emissions limit. Two months after introducing SB 1156, Senator Steinberg changed his focus, leading an ultimately successful campaign to create a permanent source of funding for “sustainable and affordable housing and mass transit” from cap-and-trade auction proceeds.⁶⁴
- **Planning for reductions beyond 2020:** Several bills were introduced that supported the idea of setting ambitious GHG reduction targets beyond 2020. SB 1156, the Steinberg tax-and-dividend bill, included a finding about the need for longer-term reduction targets. SB 1125 (Pavley and Lara) would have directed CARB to set a 2030 reduction target for GHGs and short-lived climate pollutants by January 1, 2016. AB 2050 (Quirk) would have directed CARB to conduct specific economic analysis for existing AB 32 programs and set a 2050 target, as well as interim GHG reduction targets. While the authors ultimately did not take these bills up for final votes, interest from the Legislature in post-2020 GHG reduction targets will likely re-emerge in future Legislative sessions.

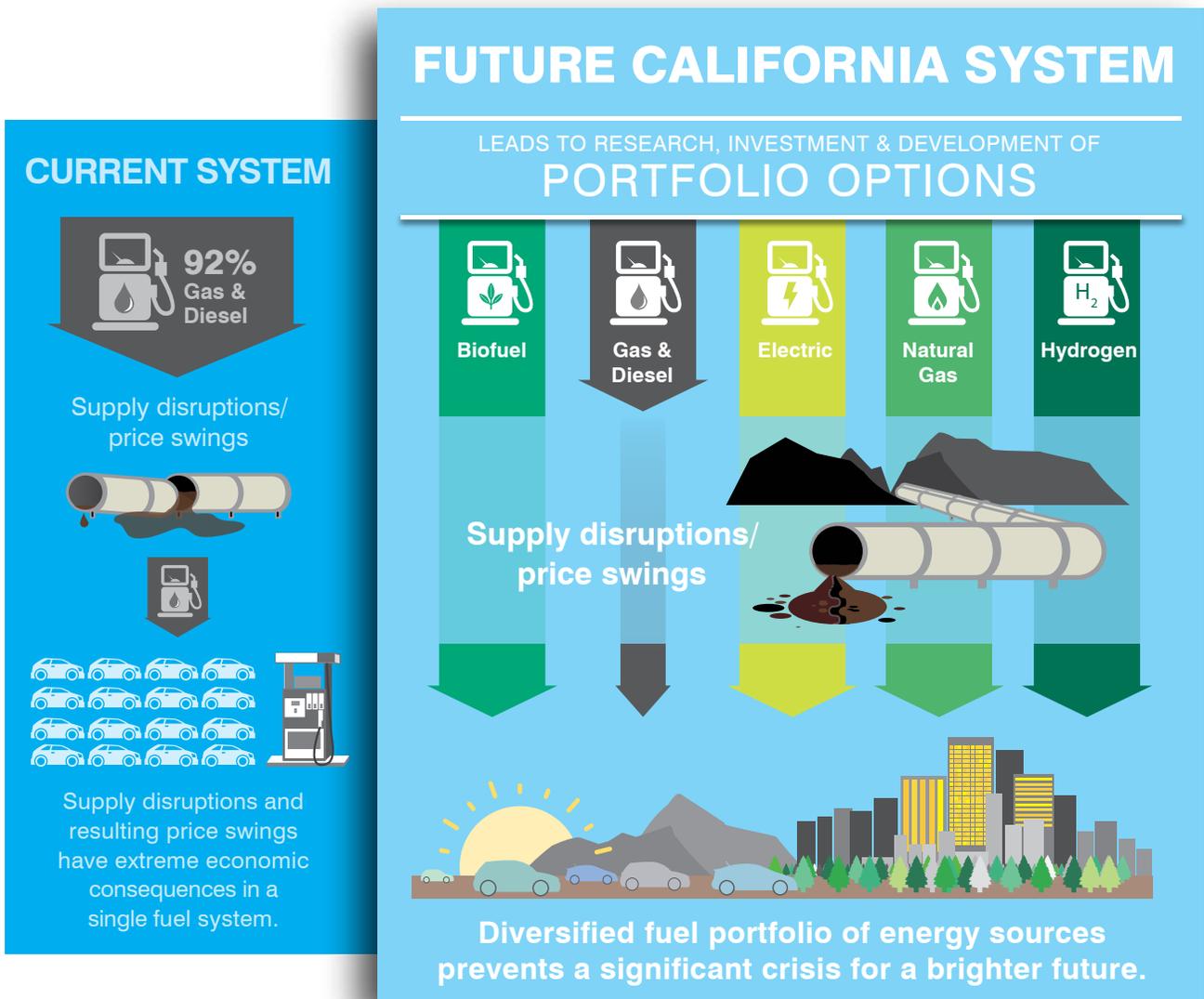
FIGURE 2-6

What is the “portfolio effect”?

The portfolio effect is an investment term that refers to a strategy of investing in many different types of instruments instead of just one (“diversifying an investment portfolio”) to reduce the risk associated with any one investment going bad. Risks that might otherwise greatly affect a portfolio with only one or two investments have much less effect when a portfolio contains several investments. The same concept can be applied to the fuel mix in California. The more alternative fuels (biofuels,

electricity, hydrogen, etc.) available for customers to use across the board, the less California will be dependent on one fuel type and the less the state’s economy will be affected by price swings or shortages of any one fuel. Portfolios reduce volatility overall, meaning better ability to manage pricing changes across the economy. California is moving towards a more diversified portfolio through its suite of climate policies, like cap and trade and the Low Carbon Fuel Standard.

THE PORTFOLIO EFFECT: A tale of two fuel systems



Source: California Energy Commission⁶⁵

“Gut-and-amend” is the practice of amending a bill to remove the current contents in their entirety and replace them with different provisions.⁶⁶

Holding limits are the provisions that limit the number of allowances any one entity can own in order to foreclose opportunities to manipulate the market by hoarding allowances.

- **Removing GHG emissions limits on transportation fuels:** In June and July, two bills unrelated to climate underwent a **“gut-and-amend”** process. AB 69 (Perea) would have delayed inclusion of transportation fuels in the cap-and-trade program for three years, and SB 1079 (Vidak) would have stopped the expansion of cap and trade to fuels altogether. Despite a highly-visible and well-resourced campaign attacking the “fuels in the cap” regulation, the legislative session ended without either bill’s passage. Mr. Perea has since announced that next year he plans to focus on directing more cap-and-trade proceeds towards electric vehicle rebates and charging infrastructure in the Central Valley.⁶⁷

In response to this campaign, 74 economists sent a letter to CARB Chair Mary Nichols outlining the benefits of regulating fuels under the cap. The letter stated that “by establishing a price for carbon reductions within the transportation sector, California will shift toward diversification of its transportation fuel mix through the creation of powerful economic signals to investors.”⁶⁸ Fuel diversification protects the economy from price volatility and reduces California’s vulnerability to supply disruptions in the crude oil market, termed the “portfolio effect” (see Figure 2-6, page 28). The letter also explains that, over time, fuel diversification will decrease demand for, and lower the price of, gasoline and diesel.

- **Other technical adjustments:** AB 985 (Cooley) sought to make significant technical adjustments to cap and trade. First, the bill attempted to ease the allowance **holding limits** that the cap-and-trade regulation places on large polluters. The bill also sought to modify corporate disclosure requirements which are now being addressed through a regulatory amendment process at CARB. AB 985 did not pass.

Legal update

California continues to successfully defend AB 32 against legal challenges, and no major new legal actions were brought against the cap-and-trade program in 2014.

CARB has prevailed in each of the most recent judicial decisions involving AB 32 and the cap-and-trade program. In each case, opponents have appealed these decisions, and most legal activity in 2014 was associated with the appeal processes. The one new lawsuit brought in 2014 relates to the use of cap-and-trade proceeds to partially fund the construction of a California high-speed rail system.

Low Carbon Fuel Standard Constitutional Challenge: In 2010, corn ethanol and oil interests sued CARB over the Low Carbon Fuel Standard (LCFS), arguing that it violated Federal Constitution provisions related to disrupting interstate commerce, preemption, and regulating beyond state borders. The LCFS is a policy designed to reduce the carbon intensity of fuels sold in California 10% by 2020. Though the LCFS is not part of the cap-and-trade program, many experts have expected that similar challenges could have also been brought against the cap-and-trade program. The 9th Circuit Court of Appeals issued a favorable decision for CARB in October 2013, and plaintiffs appealed the ruling. On June 30, 2014, the U.S. Supreme Court declined to hear the case, leaving the 9th Circuit’s favorable decision in place and sending the case back to the trial court, where parties await decision on issues not reached in the first round of litigation.

Auction Challenge: In November 2012, the California Chamber of Commerce sued CARB arguing that the agency did not have authority to hold auctions and that auctioning allowances resulted in an illegal tax. Morning Star Packing Co., a regulated entity, along with other small businesses represented by the Pacific Legal Foundation, filed a similar suit in February 2013 that was considered with the Chamber case. In November 2013, the Sacramento Superior Court

UN Secretary-General Ban Ki-moon described carbon pricing as “one of the most powerful tools available for reducing emissions and generating sustainable development and growth.”

found that CARB does have authority to hold auctions and that tax law does not impose a restriction on auctioning carbon allowances if proceeds are used to reduce GHGs. Both plaintiffs appealed the case and the appellate briefing started in October 2014. Ultimately, the result of this case will provide more clarity on what legal restrictions exist for spending auction proceeds.

Offsets Challenge: In 2012, the Citizens Climate Lobby and Our Children's Earth challenged the use of offsets under California's cap-and-trade program, claiming that CARB had not demonstrated that California offsets protocols represent GHG emissions reductions that would not have occurred in the absence of the offsets credit. In 2013, the state trial court ruled in favor of California, offering unequivocal support for the legality of the offsets program. Our Children's Earth appealed the decision and the case was heard before the California Court of Appeal in December 2014.

High-Speed Rail Challenge: The Transportation Solutions Defense and Education Fund has challenged the inclusion of a high-speed rail (HSR) project in CARB's Scoping Plan and the use of auction proceeds to partially fund it. The challenge points to requirements under AB 32 and the California Environmental Quality Act (CEQA), arguing that HSR will not effectively reduce GHG emissions. Although auction proceeds must be used to reduce GHG emissions, the parameters of what this means are not yet clear. The outcome of cases such as this could affect the record that a state agency must develop in order to fund projects with cap-and-trade auction proceeds.

California: A proving ground for climate action

As other jurisdictions establish carbon pricing regimes, including cap-and-trade programs, they are increasingly looking to learn from California's success and experience. According to the World Bank, nations and regions representing 52% of global GDP have stated their support for putting a price on carbon as a necessary tool to fight climate change and transition to a low-carbon economy.⁶⁹

California is implementing the largest economy-wide cap-and-trade program in the world, building off lessons from previously established programs such as the **European Union Emissions Trading System (EU ETS)** and the **Regional Greenhouse Gas Initiative (RGGI)**. Two years into implementation, experience and expertise from California's program is in high demand by other governments considering how and whether to design their own market-based policies.

Global interest in carbon pricing was on full display at the UN Climate Summit held in New York at the end of September 2014. Governments, businesses, and investors announced their support for carbon pricing as a critical tool for cutting GHG emissions and averting the most dangerous impacts of climate change (see Figure 2-7, page 31). These governments represent 54% of global greenhouse gas emissions, 52% of global GDP, and nearly half of the global population. UN Secretary-General Ban Ki-moon described carbon pricing as “one of the most powerful tools available for reducing emissions and generating sustainable development and growth.”⁷⁰

In his speech at the UN Climate Summit, California Governor Jerry Brown stated, “I believe that from the bottom up we can make real impact, and we need to join together.”⁷¹ Throughout 2014, California has demonstrated its commitment to working with other jurisdictions, creating new alliances and building on previously established partnerships.

Linkage with Quebec: California officially linked its cap-and-trade program with Quebec's as of January 1, 2014, making allowances from both jurisdictions entirely interchangeable

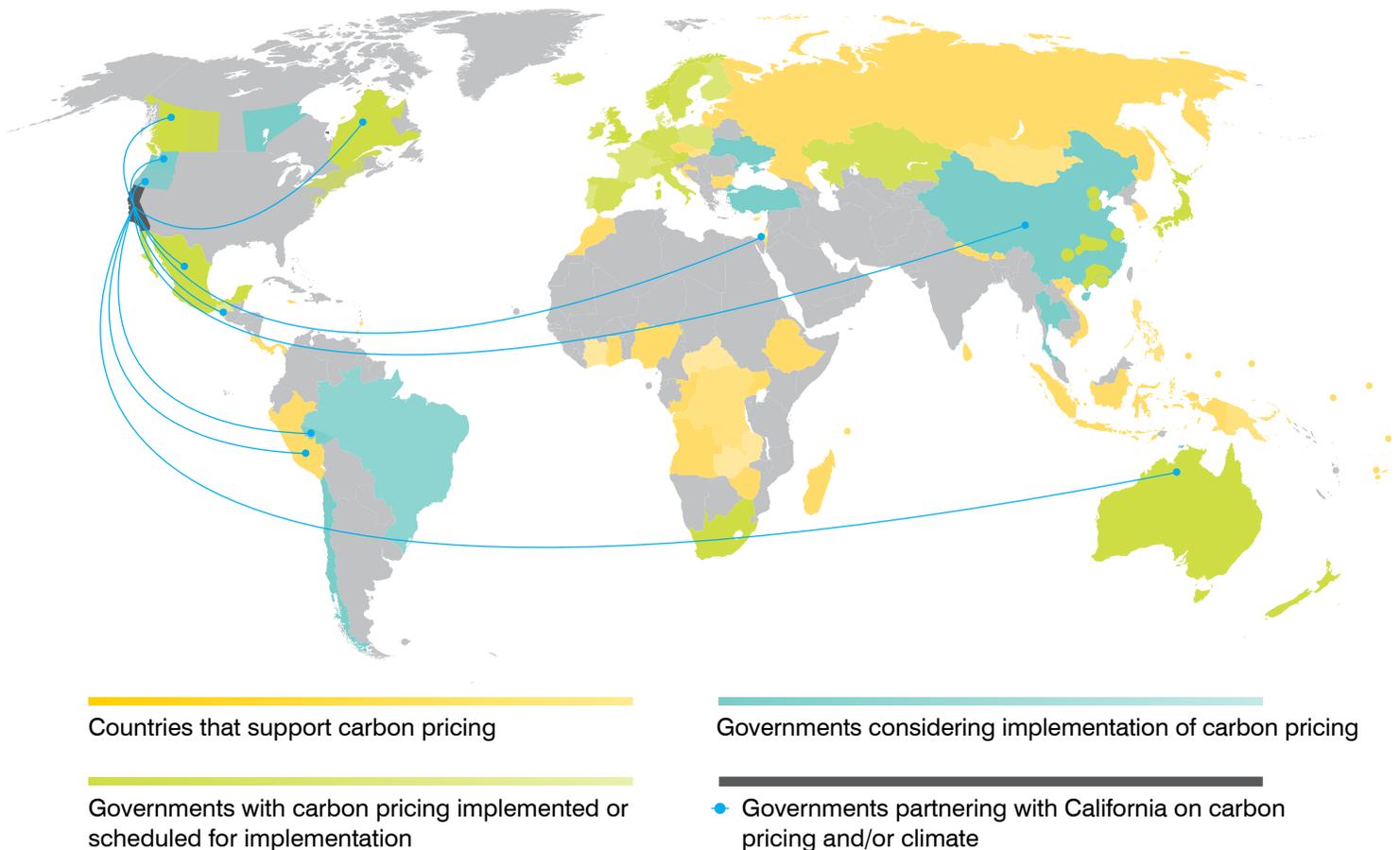
A larger market can be created through the harmonization of separate systems, an outcome that may pave the way for similar linkages around the world.

(for a summary of the first joint auction, the final linkage step, see “Quebec auction results,” page 17).

The culmination of the California-Quebec linkage is an important milestone, demonstrating that a larger market can be created through the harmonization of separate systems, an outcome that may pave the way for similar linkages around the world. Linking can benefit both jurisdictions, as the expanded market creates a larger portfolio of emission reduction opportunities available for regulated companies. With this larger portfolio of options, companies have flexibility to tailor the most cost-effective compliance strategies, reducing overall emission reduction costs and increasing program efficiency. The larger pool of regulated companies in the combined market is also likely to produce more frequent trading activity, reducing the chance of sudden spikes in allowance prices given the continuous stream of buyers and sellers coming to market.

Memorandum of Understanding (MoU) with China:⁷² In September 2013, Governor Brown and Vice Chairman Xie Zhenhua of the National Development and Reform Commission signed an agreement exclusively focused on combatting climate change, an event that foreshadowed the joint announcement made by President Obama and Chinese President Xi Jinping in November 2014. China is the largest GHG emitter in the world and has plans to slow emissions growth and ultimately to peak its carbon emissions on or before 2030. Seven pilot cap-and-trade programs

FIGURE 2-7
Carbon pricing worldwide



Source: The World Bank⁷³

are underway in China, in five of the country's cities (Shenzhen, Beijing, Shanghai, Tianjin, and Chongqing) and two of its provinces (Hubei and Guangdong). These pilots are providing lessons learned and helping build capacity in the run up to 2016 when China is expected to launch a national program that would be the largest in the world. Under the California-China MoU, government officials have exchanged expertise and information about their respective cap-and-trade programs and have sent delegations to the respective jurisdictions to learn directly from stakeholders on the ground.

Memorandum of Understanding with Mexico:⁷⁴ During Governor Brown's trade mission to Mexico in July, California and Mexico signed an MoU committing to enhanced collaboration between the two jurisdictions on climate change, human and environmental health, air quality, wildfires, and clean vehicles. The MoU was signed by Governor Brown, Undersecretary Rodolfo Lacy Tamayo of Mexico's Secretariat of the Environment and Natural Resources (SEMARNAT), and General Director Jorge Rescala Pérez of the National Forestry Commission of the United Mexican States. The two governments will share information and resources about policies and programs of mutual interest, and they identified carbon pricing as an important area for collaboration (Mexico implemented a carbon tax on most fossil fuels in 2014 and is considering cap and trade). See interview with Soffia Alarcón-Díaz, page 45 for more information.

Memorandum of Understanding with Peru:⁷⁵ In February, Governor Brown and Henry Forsyth, the Ambassador of Peru to the United States, came together to sign an agreement to work on issues of mutual concern, including climate change. The MoU calls for the exchange of "experts and joint projects in climate change mitigation and adaptation policies, air quality, forest management, water quality, and water management."

The carbon pricing movement

By Katie Sullivan and Katie Kouchakji, International Emissions Trading Association (IETA)

Carbon pricing is having its moment. Since the disappointing UN climate negotiations in Copenhagen in 2009, we have seen a coalition of the willing evolve across all levels of national, sub-national, and regional governments; the EU ETS, the New Zealand ETS, and the RGGI are no longer the only games in town. China has launched seven pilot cap-and-trade programs as testing grounds for an eventual national program, which would dwarf any other ETS out there—similar stories are playing out in California, Kazakhstan, and the Canadian provinces, while South Korea's ETS launches in 2015. Meanwhile, Mexico has introduced a carbon tax, with an offset program, and similar plans are underway in Chile and South Africa.

In total, the World Bank's State and Trends of Carbon Pricing 2014 report found that about 60 national and sub-national jurisdictions have introduced, or are in the process of designing, carbon pricing programs. To compound this existing activity, 74 governments, 23 sub-national authorities, and more than 1,000 businesses signed the Bank's joint statement on carbon pricing, released ahead of the UN Climate Summit in September 2014.

The hope is that the UN's 2015 Paris climate agreement facilitates the continued development of national and sub-national carbon pricing initiatives, including multilateral programs such as California and Quebec's linked market. **The carbon pricing moment is on track to becoming a movement**, and our companies will be working hard to support the development of markets that can potentially link with one another and the future UN framework.

Capping the aviation sector

By Annie Petsonk, International Counsel at Environmental Defense Fund

Airplanes pollute, spewing carbon dioxide into the atmosphere and worsening climate change. And airlines are growing—fast. Boeing and Airbus forecast that by the time today's first-graders graduate college, 30,000 new large jets will have taken to the skies. Given the rapid growth of this industry's emissions, many are calling for a cap on CO₂ pollution from aviation.

In October 2013, after a decade of inaction, the International Civil Aviation Organization (ICAO)—the intergovernmental agency that sets safety, security, and environmental standards for flights between different countries—decided to develop a cap on the emissions of international flights. The proposal envisions that airlines will be able to use carbon markets to help meet their caps. ICAO set October 2016 as the date for finalizing the program and in the meantime, they are looking at programs like California's to learn about program design.

NGOs, companies, and countries are working with ICAO to define how airlines will measure and report their carbon pollution, and design a program that gives airlines incentives to cut emissions, while giving them access to high-quality carbon credits. The program will need to ensure that if airlines burn biofuels, those fuels are produced in ways that drive emissions down, not up. And it will need to impose tough consequences if airlines fail to meet their targets.

Industry has made clear that it wants a single global market-based system under ICAO rather than a patchwork of different national regulatory programs. Having aviation cap and price carbon through a well-designed market-based measure would provide a powerful example of global cooperation on cutting carbon pollution—and let us all travel the world more responsibly.

Memorandum of Understanding with Israel:⁷⁶ Governor Brown and Israeli Prime Minister Benjamin Netanyahu signed a wide-ranging agreement in March, pledging to develop joint projects to tackle common challenges, including climate change. Both parties agreed to foster the exchange of ideas between their experts and academics on topics such as water conservation and management, alternative energy, and clean technologies.

Pacific Coast Collaborative: California signed an agreement with Washington, Oregon, and British Columbia in October 2013 committing all jurisdictions to pursue common policy approaches, including carbon pricing. Both Governor Kitzhaber of Oregon and Governor Inslee of Washington have announced recently that climate change and carbon pricing policies are priorities for their respective administrations.⁷⁷ Governor Inslee set up a task force that has evaluated both a carbon tax and cap and trade. The task force released its final report on November 17, 2014, laying out the benefits and challenges of each policy, but not recommending one or the other.⁷⁸ The Northwest Economic Research Center recently released a report in compliance with Oregon Senate Bill 306⁷⁹ that explored a “carbon tax and shift.” The report found that this approach can reduce distortionary income taxes, reduce GHG emissions, and have positive impacts on the economy.⁸⁰

Timeline of important milestones: 2014

JAN

- **1/1** Linkage with Quebec's cap-and-trade program begins.
- **1/9** Governor Brown proposes 2014-2015 budget and commits to repaying borrowed cap-and-trade proceeds.
- **1/10** China announces that it will consider establishing a nation-wide trading system for pollution permits.

FEB

- **2/19** California Auction #6
- **2/19** SB 1125 legislation (Pavley and Lara) is introduced and calls for deep cuts in climate pollution beyond 2020.
- **2/20** Senator Darrell Steinberg proposes legislation to take transportation fuels out of the cap-and-trade program and instead impose a carbon tax on sector.
- **2/20** California Chamber of Commerce appeals court decision ruling in favor of the cap-and-trade program.
- **2/26** California signs Memorandum of Understanding with Peru.

MAR

- **3/4** Quebec Auction #2
- **3/5** California signs Memorandum of Understanding with Israel.
- **3/31** CPUC and CARB announce the California Climate Credit, which will be distributed through utility customers' April and October electricity bills.

APR

- **4/14** Senator Steinberg changes his carbon tax proposal (see 2/20, 2014) to a long-term investment strategy for projected cap-and-trade revenues.
- **4/23** The first offsets with a three-year invalidation period are issued by CARB and enter the market.
- **4/25** CARB approves the cap-and-trade regulation amendments and new mine methane offset protocol.

MAY

- **5/16** California Auction #7
- **5/22** CARB approves First Update to the Climate Change Scoping Plan, noting California is on track to meet 2020 goals, and recommending California set a mid-term GHG emissions reduction target.
- **5/27** Quebec Auction #3
- **5/29** CARB announces they will be reviewing compliance offset credits for ODS destruction events at the Clean Harbors Incineration Facility.

JUN

- **6/2** EPA proposes Clean Power Plan to cut greenhouse gas pollution from existing power plants.
- **6/15** California Legislature passes a budget that includes investments of cap-and-trade proceeds to reduce climate pollution, improve health, stimulate the economy, and benefit disadvantaged communities.
- **6/20** Governor Brown signs 2014–2015 state budget.
- **6/30** U.S. Supreme Court declines LCFS case, leaving in place the 9th Circuit decision upholding the program.

● **Market events**

● **Global collaboration events**

● **Legal events**

● **Legislative events**

● **Regulatory and agency events**

JUL

- **7/2** AB 69 (Perea) is the first of three bills introduced that attempts to delay or stop fuels being regulated under the cap-and-trade program.
- **7/28** California signs Memorandum of Understanding with Mexico.
- **7/29** CARB proposes technical amendments to the cap-and-trade regulation.

AUG

- **8/7** California and Quebec hold practice joint auction.
- **8/16** CalEPA releases major update to CalEnviro Screen to direct investments to disadvantaged communities based on socioeconomic and pollution burden data.
- **8/18** California Auction #8
- **8/26** Quebec Auction #4
- **8/31** The California legislative session ends without passage of any bills that would create an obstacle for regulating fuels under the cap-and-trade program starting January 1, 2015.

SEP

- **9/18** CARB adopts guidance for SB 535 investments and technical amendments to the cap-and-trade regulation.
- **9/21** Governor Brown signs package of environmental bills prior to the UN Climate Summit, including SB 1204 and SB 1275 to use cap-and-trade proceeds to incentivize advanced clean cars, trucks, and buses.
- **9/23** Governor Brown speaks at the UN Climate Summit in New York City, highlighting the vital role of sub-national climate programs on the international stage.

OCT

- **10/8** CARB releases a preliminary decision to invalidate about 5% of the Clean Harbors Incineration Facility's ODS offset credits called into question on 5/29.

NOV

- **11/3** First surrender of cap-and-trade allowances.
- **11/14** After taking public comments, CARB releases final decision to invalidate only a portion of the ODS offset credits from Clean Harbors Incineration Facility identified in their preliminary decision made on 10/8.
- **11/18** The CPUC issues Proposed Decision finalizing the 2015 rules for natural gas utility participation in C&T program.
- **11/25** California and Quebec hold first joint auction.

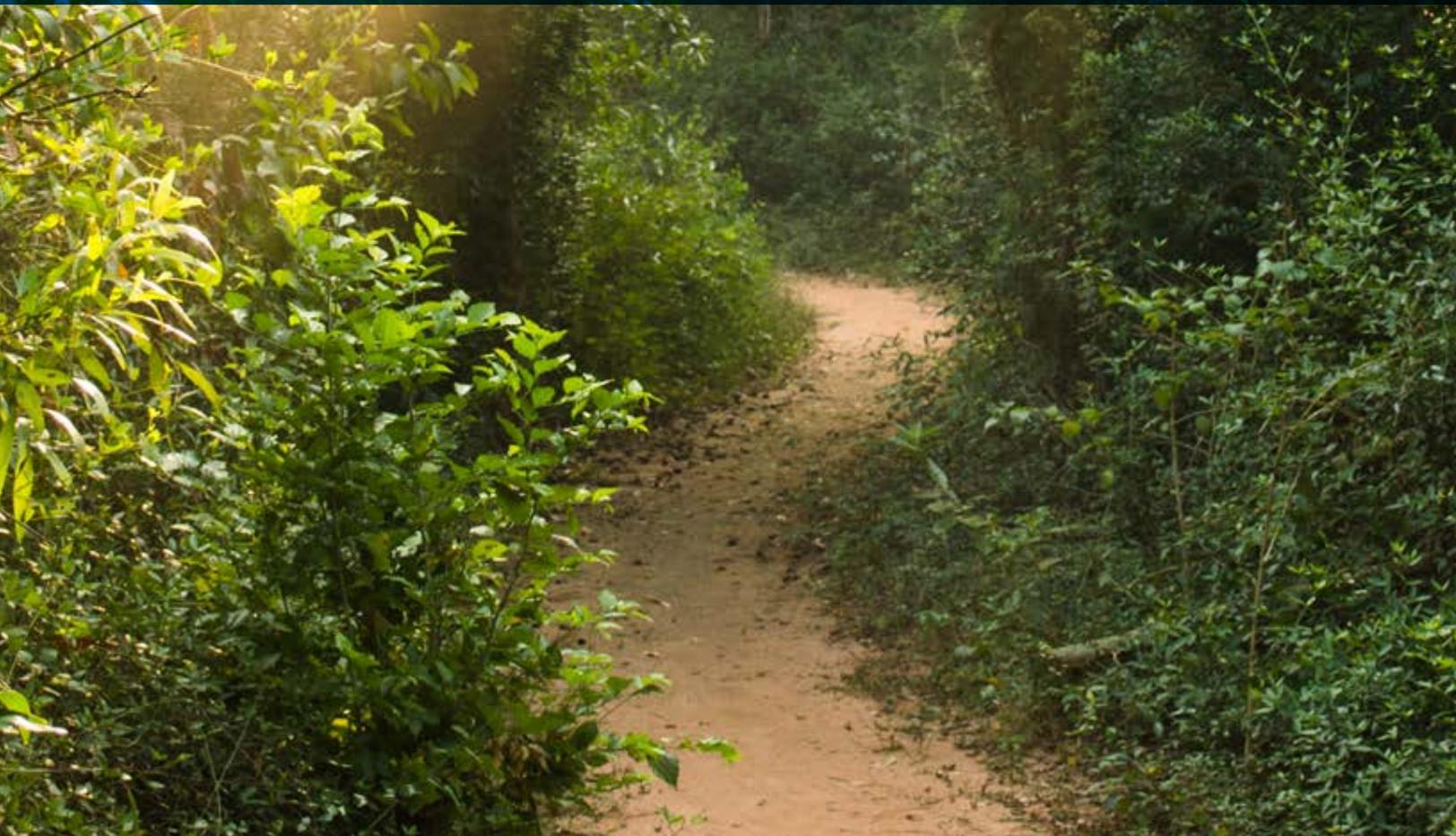
DEC

- **12/09** Oral arguments are heard in offset case appeal.
- **12/18** CARB board directs staff to bring the Rice Cultivation Offset Protocol to the board for final consideration in 2015.
- **12/31** End of Compliance Period 1.



CHAPTER 3

The path forward / 2015 milestones

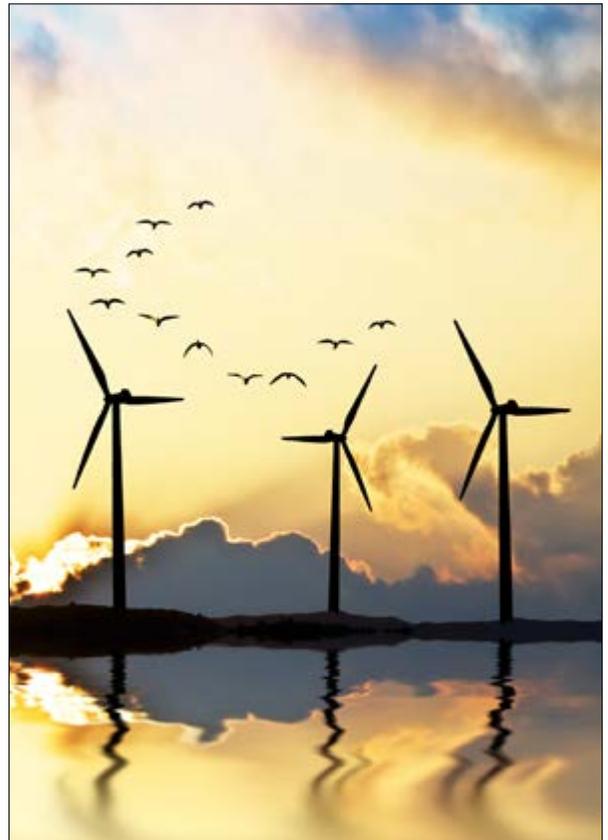


2015 is shaping up to be a year of important milestones that stand to further burnish California's reputation as a climate policy trailblazer with a record of effective policy implementation.

The strong performance of California's cap-and-trade program during Compliance Period One, along with analyses indicating that California is well on its way toward meeting AB 32's 2020 mandate, has built a strong foundation for future action inside and outside of California. From start to finish, 2015 is shaping up to be a year of important milestones that stand to further burnish California's reputation as a climate policy trailblazer with a record of effective policy implementation.

Cap-and-trade expansion: On January 1, 2015, the cap-and-trade program more than doubled in size, as the transportation fuels and natural gas distribution sectors are now regulated under the program. The transportation system is responsible for 38% of the state's total emissions, the most pollution of any sector, and California and Quebec are now the only jurisdiction in the Northern Hemisphere with a cap-and-trade system that covers fuels.

Post-2020 policy development: The Brown administration and the Legislature, along with other key stakeholders, have been ramping up discussions about post-2020 reduction targets and approaches, with the goal of putting California on the path to achieve 80% GHG reductions (below 1990 levels) by 2050. Senator Fran Pavley has already introduced legislation that sets a 2050 cap with potential interim targets in 2030 and 2040. This issue will be deliberated during the 2015 Legislative session, which ends in September. There is broad support for ambitious post-2020 climate action in California, and Governor Brown committed to setting a long-term target during his September 2014 speech to the UN Climate Summit.



GGRF investments: This summer, the Governor and Legislature will hammer out a 2015–2016 state budget that will include another round of GGRF investments that will further cut GHG pollution and benefit communities in the state.

Allowance surrender: In November 2015, businesses in California and Quebec must surrender allowances to cover emissions from Compliance Period One (2013–2014). 30% of 2013 allowances have already been surrendered by entities covered by the California program.

UN COP-21 in Paris: In November and December 2015, national and sub-national leaders from around the world will descend on Paris for the 21st Conference of Parties (COP) to negotiate an agreement on post-2020 climate action. California is expected to have a substantial presence at the conference, and the role of sub-national action and the commitments states and cities around the world are making to take action on climate will be highlighted.

A man in a dark suit is seen from the back, pointing his right hand towards a group of people in a blurred office setting. The background shows a modern office with large windows and other people in business attire.

CHAPTER 4

Expert interviews

EDF interviewed four experts involved with the California cap-and-trade program to glean their unique perspectives on how the state's "grand experiment" is working. These interviews include discussions about major trends in the market, California's international climate partnerships, the economic importance of adding transportation fuels to the program, and the program's effect on regulated companies during the first compliance period.

John T. Bloom, Jr.

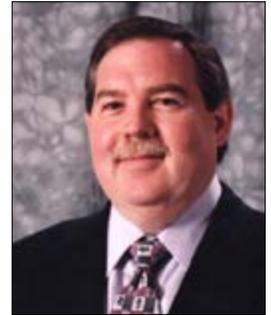
VICE PRESIDENT AND CHIEF ECONOMIST / CEMEX

“In an effort to reduce our GHG emissions, [our company has] invested in new fuel systems to substitute low carbon fuels for fossil fuels.”

—John T. Bloom, Jr.,
Vice President and Chief
Economist, CEMEX

Leakage is defined by CARB as “a reduction in GHG emissions within the state that is offset by an increase in GHG emissions outside the state.”

Professional background: John Bloom is Vice President and Chief Economist for CEMEX’s U.S. operations and is Chairman of the Coalition for Sustainable Cement Manufacturing & Environment that includes all cement companies in California. CEMEX is a global building materials company with operations in over 50 countries and is a founding member of the World Business Council for Sustainable Development’s Cement Sustainability Initiative. Prior to joining CEMEX, Mr. Bloom was Vice President of Planning & Development for Southdown, which CEMEX acquired in 2000. Mr. Bloom has over 25 years of experience in the construction industry and holds a Bachelor’s degree from Colgate University and a Master’s degree in economics from the University of Chicago.



Q: How has California’s carbon market fared in the first compliance period?

A: It has been functioning well. The auctions are going smoothly and the prices are relatively stable and close to the floor. The auction platform was set up successfully and the Compliance Instrument Tracking System Service (CITSS) platform tracks all trading. Covered entities are also getting free allowances based on their leakage risk as they are supposed to under the program rules. So thus far, we don’t see any problems with the carbon market from our perspective.

Q: What do you think are the most important features of a carbon market?

A: I think in terms of the general design of a cap-and-trade program, you want a framework that is environmentally effective, economically efficient, and equitable. Those goals are achieved with the government setting the state-wide emissions cap and letting the market determine the price of carbon. Putting a price on carbon is critical to achieving cost-effective emission reductions, but it is also extremely important to minimize **leakage** to the greatest extent feasible to insure that the program is environmentally effective and equitable. The government allocates free allowances as a function of each sector’s leakage risk using carbon intensity benchmarks which reduces the risk of leakage while maintaining the incentive to reduce emissions. I do believe it is best to use this market-based approach, as it provides the appropriate incentives for all covered entities to look at the carbon price and determine what they can do in the most cost-effective and economical way to optimize their market position. At the end of the day, those who can reduce carbon most cost-effectively do so, and those who can’t end up having to buy allowances. So, a carbon market provides covered entities with more flexibility in meeting their compliance obligations in a cost-effective and equitable way compared to a mandatory approach.

Q: Is California doing all it can do to be cost-effective, equitable, and minimize leakage?

A: I personally believe there should be a more robust carbon offset market to have a program that is as cost-effective as possible. Naturally, CARB wants to make sure the protocols they approve are sound and meet all the necessary criteria, but the market would benefit from more offsets and this is a good way to extend incentives for carbon abatement outside California.

Q: What has the process been for submitting comments to CARB? Has CARB’s regulatory process been transparent?

A: I think it has been a very good and transparent process. CARB had advisory committees on the technical and market sides, as well as a climate action team and sector working groups. We worked very openly with CARB and they committed all the resources necessary

The CARB board has directed staff to consider a pilot **border carbon adjustment** for the cement sector. In February 2014 staff held a technical workshop on the subject.⁸¹ The timeline for developing the pilot is uncertain but staff may take a proposal to the board in 2015.

“I am most optimistic about the contributions our industry can make to the carbon abatement challenge.”

—John T. Bloom, Jr., Vice President and Chief Economist, CEMEX

to get a good understanding of our industry and our unique challenges in a carbon-constrained world. We had many meetings, submitted extensive written comments, and in the end they put the cement sector in the high leakage risk category. We are now in the process of working with CARB to develop an incremental **border carbon adjustment** measure that would effectively make all cement suppliers to California responsible for their full carbon footprint. Since the cement sector is highly exposed to leakage and does not get 100% free allowances, an incremental border carbon adjustment is necessary to minimize leakage to the extent feasible.

Q: Has CEMEX initiated any energy efficiency projects as a result of this program?

A: The cement industry has already invested in the best technology to be highly energy efficient since we have a very energy-intensive production process. In general, the primary carbon abatement pathway that is left is to replace fossil fuels with less carbon intensive alternative fuels like biomass. We as a company, in an effort to reduce our greenhouse gas emissions, have invested in new fuel systems to substitute low carbon fuels for fossil fuels. In addition, through the Self-Generation Incentive Program, we put in two wind farms at our Victorville, CA plant.

Q: What is your expectation for the program after 2020? Should CARB establish longer-term goals?

A: I fully expect longer-term targets to be set and CARB has started the process to look beyond 2020. In view of all the discussions we have had with CARB, I know they are committed to having a program that is going to work for industry and that's not going to have a lot of leakage so that it stands out as a model for others to adopt. When you want to try and get a carbon program adopted in other places throughout the U.S. and the world, the biggest issue you face is showing that you can do it in a way that is cost-effective and doesn't disrupt the competitive landscape. If you can show that this is possible, you will overcome a lot of natural resistance to carbon markets.

Q: Have you found that those outside of California are watching?

A: Other cement companies in the U.S. are well informed about California's climate change program. We have had presentations about AB 32 at industry conferences, so they are definitely aware of it.

Q: What are you most optimistic about?

A: I am most optimistic about the contributions our industry can make to the carbon abatement challenge. We have had many discussions with policymakers on how the cement industry can help the state meet its ambitious 2050 GHG emission targets. This includes thinking about how state transportation agencies can be encouraged to make pavement investment decisions based on full life-cycle analyses, which take into account the cost of carbon. This requires an assessment of pavement durability and an accounting of how pavement-vehicle interaction affects fuel efficiency in order to choose the option that truly has the lowest life-cycle cost. We are also looking into how cement can help achieve zero-net energy buildings. When you look from cradle-to-grave in terms of what our products can do as opposed to the alternatives, we can really contribute to the carbon reduction challenge this state faces. We are looking forward to the opportunities that California's policies are creating.

Lenny Hochschild

MANAGING DIRECTOR / EVOLUTION MARKETS

Professional background: Lenny Hochschild is a Managing Director for Evolution Markets, an advisory and brokerage firm specializing in environmental markets. Mr. Hochschild manages Evolution Markets' Global Carbon Markets Group and assists a broad base of clients in assessing risk, establishing market strategies, and executing transactions in the global carbon market.

Q: What are the major trends you've seen on the secondary market for California carbon allowances and offset credits?

A: The main trend over the past year has been lack of volatility in the market, and this is what most market participants and price forecasters anticipated. The auctions so far have been in line with expectations and the secondary market for carbon allowances is moving forward smoothly. We are slowly seeing more covered entities coming into the market to purchase allowances, causing liquidity to increase throughout the year. Liquidity is measured by the volumes of trades being made each day. Volumes are significantly higher this year than they were last year and high volumes without much price volatility is a sign of an orderly market.



Another trend we've seen is that **bid-offer spreads** have tightened between last year and this year. That is a classic sign that the market is becoming more efficient. There have also been more "cost-of-carry" transactions taking place. A "cost-of-carry" transaction happens when a company purchases allowances but finds the cost to hold those allowances until needed for compliance (cost-of-carry) is too high. This company can enter into a futures contract with a company whose cost-of-carry is lower. The fact that more of these transactions are happening is yet another indication that the market is becoming more efficient and mature.

The last trend we've noticed has been a real slowdown in offset trades since the end of May 2014. Offset activity hasn't stopped, but it has slowed dramatically and this is due to CARB's investigation of the ODS offset credits produced by the Clean Harbors Incineration Facility. It is unclear at this point how this trend will change now that CARB has made a final decision that invalidates a percentage of the offsets generated at the site.

Q: What do these market trends say about the overall program?

A: I think they show that the program overall is strong. The fact that pricing right now is just slightly above the floor price shows that the market believes that California is well on track to achieve its 2020 goals, a testament to the effectiveness of policies such as the Renewable Portfolio Standard and the LCFS that are generating GHG reductions alongside the cap-and-trade program.

Q: Have there been any responses in the secondary market prices to specific events this year?

A: There haven't been many notable events that have moved the market in 2014. Going into the fourth quarter of this year, we did see average daily volumes increase dramatically. That is consistent with what we would have thought given we are 12 weeks away from the start of Compliance Period Two when transportation fuel providers come under the cap.

Q: Did you see any reaction in the market to the announcement of legislation introduced to delay or remove fuels from coming under the cap?

A: I think the market ignored all of that. Most market participants believed that the chances of this legislation passing were very small and it was unlikely to result in a change of the regulation. In retrospect, this was a good assumption to make.

The "bid" is the price that someone is willing to pay for an asset, whereas the "offer" is the price at which someone is willing to sell. The difference between the two prices is the **bid-offer spread**. In a market with high liquidity and high volumes of trades, the spread is usually small because the buyer and seller tend to agree about what the price should be.

“In my view, environmental markets are looking much stronger now than they looked two or three years ago.”

–Lenny Hochschild, Managing Director, Evolution Markets

Q: What is the market expectation for the start of joint auctions with Quebec?

A: Due to the relative size of Quebec’s market, the expectation is that California will be the driver of prices. Given Quebec’s reduction target and current energy landscape, where 98% of the province’s energy comes from carbon-free sources, Quebec entities are expected to be small net buyers of credits from California. The biggest difference between the two programs is that Quebec entities do not have to retire 30% of their previous year’s emissions every year like California entities do. The first time Quebec entities have to retire allowances is November 2015 and because of this, Quebec shouldn’t be a major factor in pricing right now.

Q: What are you most concerned about going forward?

A: There is consistent feedback from a wide range of stakeholders, including a number of covered entities, that CARB can do better with the process of managing the cap-and-trade program. One example was the issue of Disclosure of Corporate Associations. This proposed amendment to the regulation would have required covered entities to list all associated entities, regardless of whether or not the associated entity was itself regulated under the program. This would have resulted in an overly burdensome and unnecessary regulation, with no apparent benefit. After significant stakeholder effort, CARB eventually made what we believe to be the correct decision by limiting the reporting of associated entities to those that themselves are regulated. Getting to this decisions took a lot of unnecessary time and we hope that a more efficient process can be put in place for 2015 and beyond. We hope that they will improve on this as we head into 2015.

Q: What are you most optimistic about going forward?

A: Winston Churchill used to say, “Democracy is the worst form of government, except for all the others.” I think policymakers seem to be coming to the conclusion that cap and trade is the worst form of climate policy, except for all the other ones. In my view, environmental markets are looking much stronger now than they looked two or three years ago.

Professor Christopher Knittel

WILLIAM BARTON ROGERS PROFESSOR OF ENERGY ECONOMICS / MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT)

Professional background: Christopher Knittel is a Research Associate in the National Bureau of Economic Research's (NBER) Environmental and Energy Economics, Industrial Organization, and Productivity Programs. He is also the William Barton Rogers Professor of Energy Economics in the Sloan School of Management at MIT, Director of the Center for Energy and Environmental Policy Research at MIT, and Co-Director of the E2e Project at MIT, UC Berkeley, and the University of Chicago. Professor Knittel is the co-editor of the *Journal of Public Economics* and sits on the editorial board of the *Journal of Energy Markets* and the *Journal of Transportation Economics and Policy*. He received his Ph.D. in economics from UC Berkeley, a MA in economics from UC Davis, and a BA in economics and political science from California State University, Stanislaus. Before joining MIT, Professor Knittel held faculty positions at Boston University and UC Davis.



“The most cost-effective way to reduce GHGs is to establish a price on GHG emissions.”

—Professor Christopher Knittel,
William Barton Rogers
Professor of Energy Economics,
Massachusetts Institute of
Technology (MIT)

Q: What is the most cost-effective method available for reducing greenhouse gas emissions across the California economy?

A: The most cost-effective way to reduce GHGs is to establish a price on GHG emissions through an economy-wide carbon tax or a cap-and-trade system. Fundamentally, GHGs can be viewed just like any other “product”: when you raise the price, the resultant quantity demanded will fall. For pollution, placing a price on emissions causes polluters to strive to emit less.

Historically, the price of emitting GHGs has been too cheap—it has been free—meaning society has been dumping GHGs into the atmosphere for free (without much thought of the societal costs). By raising the cost of emitting GHGs, the market finds the cheapest opportunities to cut GHG pollution on its own; policymakers will not have to guess as to where those cheapest opportunities are.

Determining which policy, a carbon tax or a cap-and-trade system, is best suited to reduce pollution depends on a number of factors and reasonable people can disagree as to which is best. While I prefer a carbon tax because it creates long-term price certainty, taxes can't work in every policy context. However, I note that a cap-and-trade program with a price floor can provide similar benefits to a carbon tax and once a program begins it is important to preserve certainty by not dramatically changing tactics mid-course.

Q: Can comprehensive carbon reductions be achieved without including strategies for transportation fuels?

A: No. The transportation sector is responsible for roughly 30% of U.S. greenhouse gas emissions and 38% of California emissions. Even if all other pollution sources in the economy stop discharging and transportation remains the same, California cannot meet its climate goals. Further, if we ignore the transportation sector, the cost required to achieve any given level of GHG reductions will increase.

Q: What would have happened within the transportation sector in California if this price signal on fuels had been eliminated?

A: If California had eliminated the price signal in the transportation sector by removing fuels from cap and trade, consumers would not have seen the true cost of their actions and the cost associated with meeting any level of GHG reductions would increase.

The empirical literature is clear: when carbon pollution is priced, consumers respond by purchasing more fuel-efficient vehicles and driving those vehicles less, they take more public transportation and combine trips. Evidence also exists that consumers make long-term decisions in response to price changes.

Every GHG-related goal is made better through having the price signal in the transportation sector. If we take this away, society will have to achieve reductions through other, more expensive means. While these other methods might hide their true costs, they will, in fact, be more expensive.

Q: How would allowance prices have been affected if fuels were taken out of the cap-and-trade program?

A: Taking fuels out of the cap-and-trade program would have ultimately increased allowance prices as well as their volatility. Basically, by taking fuels out of the cap, you take away one of the options the market has for reducing GHGs. This can only push to increase allowance prices. Furthermore, by taking away this option you run a great risk of having much more volatile allowance prices.

Q: Should allowances be freely allocated to the transportation sector or auctioned?

A: Giving away allowances to fuel suppliers, as opposed to auctioning them off will have little effect on the aggregate emissions reductions as long as the total pollution cap remains the same. However, by auctioning off allowances, policymakers can raise and direct revenues to uses that cut transportation pollution such as public transport, low carbon infrastructure, and reducing the cost of lower emitting vehicles.

Regardless of whether allowances are given away for free or auctioned, the cap will be met. But there are real-world consequences of each option that matter a great deal. As just one example, there is always the potential for windfall profits from free allocation. In many situations businesses are able to pass the market value of allowances through to consumers, even though they themselves received allowances for free. This is what happened in the EU's wholesale electricity market. Short of fundamental market reform, the easiest step to reduce the potential for such undue profits is to auction allowances, a step the EU has since taken.

Q: What are some of the co-benefits associated with regulating the transportation sector?

A: Some of my recent work suggests that the co-benefits from carbon pricing in transportation are much higher than we ever thought. We have found that the dirtiest cars on the road, measured by their criteria pollutants such as NO_x, VOCs, and CO, respond more to a price on carbon. Therefore, the reduction in pollutants associated with carbon pricing and the co-benefits that come as a result are routinely understated because we previously assumed that all cars respond in the same way. These co-benefits include lower respiratory illnesses, fewer trips to the hospital, and a healthier labor force. In addition, through a price on carbon, people drive fewer miles, yielding co-benefits in terms of reduced congestion and accident risk.

“These co-benefits [of regulating the transportation sector] include lower respiratory illnesses, fewer trips to the hospital, and a healthier labor force.”

–Professor Christopher Knittel,
William Barton Rogers
Professor of Energy Economics,
Massachusetts Institute of
Technology (MIT)

Soffia Alarcón-Díaz

DIRECTOR OF CLIMATE CHANGE MITIGATION POLICY / MEXICO MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES (SEMARNAT)

Professional background: Soffia Alarcón-Díaz currently serves as Director of Climate Change Mitigation Policy at Mexico's Secretariat of Environment and Natural Resources (SEMARNAT), where she is responsible for the design and operation of the National Emissions Registry. She also supports the design and implementation of mitigation policies established in the National Climate Change Strategy, Special Climate Change Program, and the state-level climate change programs. Before joining SEMARNAT, Ms. Alarcón-Díaz worked as a fellow at the World Resources Institute (WRI) where she conducted research for a working paper on the linkages between national and corporate GHG inventories. She holds a master's degree in Public Administration from Columbia University and a bachelor's degree in International Relations from El Colegio de México.



“Mexico is planning to take a comprehensive look at every policy California has designed in the past few years so we can consider developing our own policies.”

—Soffia Alarcón Díaz, Director of Climate Change Mitigation Policy, Mexico SEMARNAT

Q: What are Mexico's climate goals?

A: Mexico has three specific climate targets. The first is to reduce greenhouse gas emissions by 30% by 2020 with respect to a business-as-usual baseline. The second is to reduce emissions by 50% from 2000 levels by the year 2050. The third is to procure 35% of the country's electricity from renewable energy sources by 2024.

Q: What are the most critical areas of work outlined in the California-Mexico MoU? What does Mexico hope to gain from this partnership with California?

A: The first step for us is to gather information about the best practices and lessons learned from California so that we can follow a model that from our standpoint has been successful. To the extent possible, Mexico is mirroring California's climate change-related actions based on the premise that there are similarities between both jurisdictions. Mexico is planning to take a comprehensive look at every policy California has designed in the past few years so we can consider developing our own policies with similar nomenclature, technical inputs, and methodologies. Given the ambitiousness of Mexico's climate targets, the state will need a mix of policies, like what California has, to meet its goals. Right now, we are studying how the third party verification is carried out in California as well as how the reporting tool works. On October 28, 2014, the regulations for the National Emissions Registry were published. Starting in March 2015, all sectors across the economy will be required to report direct and indirect emissions above the 25,000 tons CO₂e threshold. As a result of this process, Mexico is currently seeking best practices for utilizing mandatory reporting requirements like the ones California applies.

Q: Do you think this year was a particularly significant time for Mexico and California to sign an MoU?

A: It was very important for the Mexican government that California, the most advanced jurisdiction in the world in terms of climate policy in my opinion, looked to Mexico. While Mexico is a developing country, it is leading and innovating in terms of tackling climate change. But until now, we've had no partner to learn so closely from. This was an important point in time to sign an MoU because of the energy reform we are going through in Mexico. We are restructuring the entire energy sector, which hasn't been changed for over 70 years. We are looking at best practices in Europe, Canada, and the U.S., but we would prefer to learn from those jurisdictions we share so much with in terms of territory, people, and culture, like California.

Q: What are the prospects that Mexico will develop a cap-and-trade program?

A: Cap and trade within the electricity sector was proposed by the Congress earlier this year. The proposal has since been revised by SEMARNAT and the Secretary of Energy (SENER). There was great interest in its approval and we anticipate it will be contemplated again next year.

Q: What are you most optimistic about and most concerned about going forward?

A: When there is political will to take action, things happen very fast. There is political will in Mexico now to make things happen in developing the renewable sector, transforming the electricity sector, and getting greenhouse gas reductions. But this is also something we need to watch out for. If cap and trade is approved in the near-term along with a lot of other policies, there will be intense time pressure to properly design the regulations. That is why we are taking time beforehand to look at the best practices from California so that infrastructure is in place before these decisions are made. I've learned from other jurisdictions that cap-and-trade implementation can take a few years, but I trust that our California colleagues will be of help during this time.

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Five Ways EPA's Final Clean Power Plan Rule Provides More Flexibility to States

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EPA released the final Clean Power Plan rule¹ on August 3, 2015, setting the first ever national limits on carbon pollution from existing fossil fuel-fired power plants under the authority of Section 111(d) of the Clean Air Act. EPA received over four million public comments on the proposed rule, issued June 2, 2014, and the Agency made significant changes to the final rule in response, revising the approach to setting state goals and changing aspects of the program's implementation. EPA projects that the final rule will achieve a 32 percent reduction in power-sector CO₂ emissions by 2030 from 2005 levels,² a more ambitious result than the 30 percent reduction projected to be achieved by the proposed rule over the same timeframe.³

Many states and stakeholders submitted comments requesting additional compliance flexibility, and in the final rule EPA provided that flexibility in five key ways: making the required interim reductions more gradual; allowing power plants to more easily access emission reduction opportunities in other states through clean energy investments or market-based tools; providing all states more time to develop and implement state plans; creating a Clean Energy Incentive Program to drive early investments in renewable energy and energy efficiency; and employing a rate-to-mass translation methodology to make existing source emission budgets more equivalent to state rate-based goals, which results in less stringent budgets for most states compared to those in the proposed rule.

Background: EPA's Revised Approach to Setting Emission Guidelines

Under Clean Air Act Section 111(d),⁴ EPA sets minimum emission guidelines for categories of existing sources. The guidelines are based on the emission performance of the "best system of emission reduction" as determined by EPA, and states establish equivalent performance standards for the regulated categories of sources through state plans.⁵ EPA's final rule revises the form of the emission guidelines and the definition of the best system of emission reduction that were proposed, responding to stakeholder comments, although EPA has broadly maintained the same approach.

Proposal Approach

In the 2014 proposed rulemaking EPA identified state-by-state goals expressed as a single emission rate in pounds of CO₂ per megawatt hour (lbs/MWh) for a combined category of power plants that included coal, oil, and natural gas steam power plants and combined cycle natural gas plants.⁶ The state goals were based on a best system of emission reduction that reflected pollution reduction potential at the covered power plants through four "building block" strategies that were already being used by states and companies. These were:

1. improved efficiency at coal power plants,
2. shifts in electricity generation from coal power plants to lower-emitting combined cycle natural gas plants,
3. increased renewable energy deployment and preservation of at-risk nuclear generation, and
4. increased deployment of demand-side energy efficiency.⁷

EPA identified levels of implementation that could be reasonably achieved for each of the four building blocks and applied them on a state-by-state basis to arrive at a level of carbon emission improvement that could be achieved collectively by the power plants in a state. This level of improvement was expressed as a state-specific rate-based goal. EPA offered states broad flexibility to meet state goals, including the flexibility to meet goals on a mass emission budget-basis instead of a rate-basis.⁸

Final Rule Revised Approach

In the final rule, EPA made revisions to the form of the emission guideline and to the best system of emission reduction in response to stakeholder comments, although it has broadly maintained the same approach. Chief among these changes is that EPA finalized a more traditional guideline expressed as a single, nationally-consistent standard for each category of sources.⁹ The minimum performance level for all existing coal, oil, and gas steam power plants is 1,305 lbs/MWh in 2030, and the minimum performance level for all existing combined cycle natural gas power plants is 771 lbs/MWh in 2030.¹⁰

The final emission guidelines reflect the level of improvement that can be achieved by each category of units collectively after application of a revised set of building blocks. The best system of emission reduction is now defined as a combination of three—not four—building blocks.¹¹ Neither demand-side energy efficiency, previously building block four,¹² nor nuclear energy, previously a component of building block three,¹³ are used as elements of the final building blocks, though new energy efficiency and nuclear resources may be used for compliance.¹⁴ Another key change is that all of the building blocks are applied on a regional basis, reflecting the emission reduction potential on the three electricity grids in the United States (eastern, western, and Texas).¹⁵ EPA then establishes the least stringent regional rate for each of the two power plant categories as the nationally uniform performance rate for each year of analysis (2022-2030).¹⁶ Other changes to the building blocks include:

- Building Block 1 – Efficiency improvements at coal-fired power plants: EPA determined that a more modest level of improvement was possible—2.1 to 4.3 percent, instead of 6 percent in the proposal—and applied that at a regional, instead of national, level.¹⁷
- Building Block 2 – Shifting coal, oil, or gas steam electricity generation to lower-emitting combined cycle natural gas plants: EPA provides for a more gradual phase-in to more efficient gas plants, evaluated on a regional basis. In the proposal, EPA assumed this shift would be accomplished in the first year of the compliance period, evaluated on a state-by-state basis.¹⁸
- Building Block 3 – Shifting fossil fuel-fired electricity generation to renewable energy generation: EPA revises its approach by evaluating technical and economic potential for deployment of renewable energy resources on a regional basis, as opposed to using a methodology based on the level of state renewable energy goals, and assumes that deploying renewable energy will reduce emissions from fossil fuel-fired power plants.¹⁹

Under this new approach, states continue to have the flexibility to meet the guidelines in different ways. States can now opt to develop a plan that requires all coal, oil, and gas steam plants to meet the national fossil steam performance rate and all combined cycle natural gas plants to meet the combined cycle natural gas performance rate. In addition, states also have the option, as they did under the proposed rule, to develop plans that would meet the required overall level of emission improvement through a state-wide rate for all fossil fuel-fired power plants, or through a mass-based emission

budget.²⁰ EPA also provides the option of using a “state measures” plan approach, under which a state could include a combination of federally-enforceable measures that apply to affected power plants and other measures enforceable at the state level; such a plan would require the inclusion of a federally-enforceable backstop.²¹

Five Ways EPA’s Final Rule Gives States Greater Compliance Flexibility

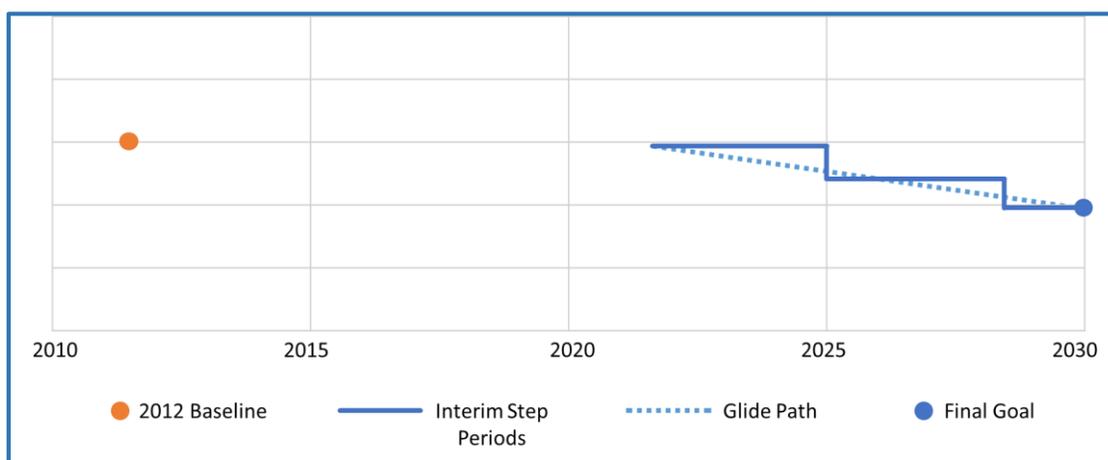
EPA’s final rule includes several changes to the options available for state compliance. Below are five important changes that give states additional flexibility for developing and implementing their plans.

1. Greater Interim Compliance Flexibility

EPA made a significant change in the methodology used to establish emission performance rates by gradually phasing in the implementation of building block 2—the shift in generation from existing fossil steam generation to combined cycle natural gas generation—which results in a more gradual compliance trajectory.²² This change was made in response to public comments expressing concern about the proposed rule’s incorporation of the full building block 2 shift in generation in the first year of the interim compliance period, which had the effect of requiring states to achieve a significant portion of the required CO₂ emission reductions early in the interim period and could have limited the cost-effective emission reduction options available.

EPA also phases in compliance obligations in the interim period by establishing three step periods: 2022 to 2024, 2025 to 2027, and 2028 to 2029.²³ EPA provides more gradual emission level “steps” during these three periods, and also provides states the option to define their own interim step milestones as long as the state demonstrates that the plan will achieve the interim goal on average or cumulatively over eight years.²⁴ Taken together, the phase-in of building block 2, the establishment of interim step periods, and the option to define interim milestones create a more gradual “glide path” toward the state’s final goal. Figure 1 illustrates an example of the interim step periods and more gradual glide path set in EPA’s final rule.²⁵

Figure 1: Interim Compliance Flexibility – Interim Step Periods and Glide Path



Graph reflects EPA depiction of step periods and goals in EPA state fact sheets

2. Further Opportunities for Interstate Compliance

EPA proposed to allow states to comply on a multi-state basis by submitting one joint plan on behalf of all participating states and demonstrating compliance with one weighted average rate-based goal or aggregate mass-based goal.²⁶ Many states and stakeholders requested additional flexibility for interstate trading, including options to develop individual state plans that allow interstate trading.²⁷

In the final rule, EPA recognizes the interconnectedness of the grid and interstate electricity flows in setting emissions performance rates for fossil steam plants and natural gas plants.²⁸ EPA also recognizes the strong interest in taking advantage of cross-state emission reduction opportunities, including through trading.²⁹ The final rule provides multiple opportunities for states to incorporate interstate trading into both rate-based and mass-based state plan types.

As in the proposed rule, states can form multi-state groups and develop a joint plan to meet an aggregated joint emission goal.³⁰ In addition, EPA's final rule provides clear paths for states to design individual mass-based or rate-based "trading-ready" plans that allow the interstate transfer of emissions allowances or emission rate credits without requiring submission of a joint plan, enabling states to give their affected sources access to interstate resources.³¹ In the Federal Plan Proposal, EPA offers a model rule for each of these two approaches, which provides a state with a simple state plan framework to adopt or modify.³² EPA also indicates that it is exploring options for providing support for tracking emissions and allowances or credits.³³

3. More Time for All States to Develop and Implement State Plans if Needed

EPA's proposal would have required each state to submit a plan to EPA within 13 months; a state could submit a detailed initial plan and request a one-year extension for submission of an individual state plan and a two-year extension for submission of a multi-state plan.³⁴ In response to comments indicating that state plan development may require more time, EPA's final rule makes the two-year extension available to all states, and relaxes the requirements for the initial plan submission. By September 6, 2016, a state must either submit a full state plan or, if more time is required, make an initial submittal and request a two-year extension to September 6, 2018.³⁵ States requesting an extension must submit an initial plan that: identifies the state plan approach or approaches under consideration and describes progress made to date; explains why the state requires additional time; and describes opportunities for public engagement, including outreach to vulnerable communities.³⁶

Additionally, the interim performance period now begins in 2022, two years later than the 2020 start date EPA originally proposed.³⁷ This change gives states more time to implement reduction strategies and allows owners of affected sources more time to prepare to meet interim reduction requirements.

4. New Clean Energy Incentive Program to Encourage Early Investments

EPA's final rule includes a Clean Energy Incentive Program (CEIP) to encourage early investments in wind and solar renewable energy projects, as well as energy efficiency projects in low-income communities.³⁸ The CEIP is a voluntary program under which EPA will award matching credits for eligible projects, which both encourages early project development and provides the state additional compliance flexibility in the interim compliance period. Eligible projects include wind or solar projects that commence construction, or demand-side energy efficiency programs in low-income communities that commence operation, after the submission of a final state plan to EPA. A state can allocate allowances from its interim emission budget or issue early action emission rate credits to eligible projects for the MWhs generated or energy

savings achieved by those projects in 2020 and 2021. For every two MWh of qualifying renewable generation, the state can allocate—and EPA will match—one credit; for every one MWh of avoided generation from qualifying energy efficiency projects, the state can allocate—and EPA will match—one credit. EPA will issue these matching allowances or emission rate credits up to an amount equivalent to 300 million short tons of CO₂ emissions. EPA proposes specific frameworks for implementing the CEIP in rate- and mass-based approaches in the Federal Plan Proposal, and requests comment on those aspects of the program.³⁹

5. New Rate-to-Mass Methodology Makes Rate-Based Goals and Mass-Based Budgets More Equivalent

As in the proposed rule, states have the option to develop state plans that meet the guidelines on a mass basis. In the proposed rule, EPA took comment on a methodology for translating from a rate-based state goal to a mass-based budget for existing sources.⁴⁰ In the final rule, EPA defines the emissions budgets that a program covering existing sources would need to meet.⁴¹ In defining these budgets, EPA uses a new rate-to-mass conversion methodology that reflects load-growth potential in equivalent rate-based programs. The approach accounts for the fact that under a rate-based program, existing sources could increase operations—and therefore tons of emissions—if additional offsetting renewable energy was being generated. EPA therefore incorporates into state mass-based targets additional tons of CO₂ that could result from the offsetting use of renewables that were available but not accounted for in the regional building block computations.⁴² This new methodology creates mass-based budgets for existing sources that are more comparable to states' rate-based goals, the result of which is that final mass-based budgets increase for most states compared to the budgets on which EPA took comment in the proposed rule (see Appendix Table 1). This is especially true during the interim compliance period where the rate-to-mass methodology change is accompanied by additional flexibility through the longer opportunity to shift to natural gas (see Appendix Table 2).

One additional important change to the mass-based program requirements is that EPA will require states that are implementing mass-based programs either to address potential increases in emissions from new sources in the state as a result of the program, which would undermine the effectiveness of the program, or to demonstrate that such “leakage” to new sources would not occur.⁴³ EPA notes that one way that states may do this is by voluntarily including new fossil fuel-fired power plants in their mass-based compliance programs,⁴⁴ and EPA provides a new source CO₂ emission “complement” that states can add to their existing source budget to arrive at a maximum equivalent budget for existing and new sources.⁴⁵ States may also provide their own projection for a new source CO₂ emission complement, subject to EPA approval.⁴⁶ States can also address leakage to new sources through an allocation methodology, through another mechanism they create, or by demonstrating that such leakage would not occur, subject to EPA review.⁴⁷

¹ U.S. EPA, Final Rule: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (pre-publication version signed Aug. 3, 2015), <http://www.epa.gov/airquality/cpp/cpp-final-rule.pdf> [hereinafter Final Rule; all page numbers refer to the pre-publication version of the final rule].

² Final Rule at 16.

³ U.S. EPA, Proposed Rule: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34,830 at 34,832 (June 18, 2014) [hereinafter Proposed Rule].

⁴ Clean Air Act (CAA), § 111(d), 42 U.S.C. § 7411(d).

⁵ Final Rule at 238.

⁶ Proposed Rule at 79 Fed. Reg. 34,836.

⁷ Proposed Rule at 79 Fed. Reg. 34,837.

⁸ Proposed Rule at 79 Fed. Reg. 34,837.

⁹ Final Rule at 409.

¹⁰ Final Rule at 28.

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¹² Final Rule at 389-390.

¹³ Final Rule at 385-390.

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¹⁷ Final Rule at 427.

¹⁸ Final Rule at 429.

¹⁹ Final Rule at 437.

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²¹ Final Rule at 897.

²² Final Rule at 703.

²³ Final Rule at 858-59.

²⁴ Final Rule at 858-59.

²⁵ See EPA state fact sheets for charts of individual state goals, EPA, State-Specific Fact Sheets, <http://www2.epa.gov/cleanpowerplanttoolbox/clean-power-plan-state-specific-fact-sheets>.

²⁶ Proposed Rule at 79 Fed. Reg. 34,911.

²⁷ Final Rule at 913.

²⁸ Final Rule at 282-83, 314-17.

²⁹ Final Rule at 363-67.

³⁰ Final Rule at 915.

³¹ Final Rule at 1170, 1207.

³² U.S. EPA, Proposed Rule: Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility Generating Units Constructed on or Before January 8, 2014 (pre-publication version signed Aug. 3, 2015), <http://www.epa.gov/airquality/cpp/cpp-proposed-federal-plan.pdf>.

³³ Final Rule at 918.

³⁴ Proposed Rule at 79 Fed. Reg. 34, 915.

³⁵ Final Rule at 1,001.

³⁶ Final Rule at 1,009.

³⁷ Final Rule at 858.

³⁸ Final Rule at 854-79.

³⁹ U.S. EPA, Proposed Rule: Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility Generating Units Constructed on or Before January 8, 2014 (pre-publication version signed Aug. 3, 2015), <http://www.epa.gov/airquality/cpp/cpp-proposed-federal-plan.pdf>.

⁴⁰ Final Rule at 822-24.

⁴¹ Final Rule at 843-44.

⁴² Final Rule at 831-33.

⁴³ Final Rule at 836-37.

⁴⁴ Final Rule at 1175.

⁴⁵ Final Rule at 1177; see generally U.S. EPA, Final Rule Technical Support Document: New Source Complements to Mass Goals (Aug. 2015), <http://www.epa.gov/airquality/cpp/tsd-cpp-new-source-complements.pdf>.

⁴⁶ Final Rule at 1181.

⁴⁷ Final Rule at 1175.

Appendix: Statewide Mass-Based Goals

EPA set national CO₂ emission performance rates for two subcategories of existing fossil fuel-fired electric generating units: 1,305 lbs/MWh for fossil steam generating units, and 771 lbs/MWh for natural gas combined cycle units. These national rates apply to any state wishing to adopt them directly; EPA provided additional options for states by setting equivalent statewide rate-based goals and mass-based goals. The tables below list mass-based 2030 and interim average goals as originally proposed¹ and as finalized.²

Table 1: Proposed and Final Mass-Based 2030 State Goals – Existing Sources Only (short tons)

	Proposed mass-based 2030 goal	Final mass-based 2030 goal	Percent change proposed to final		Proposed mass-based 2030 goal	Final mass-based 2030 goal	Percent change proposed to final
Alaska				Montana	14,140,674	11,303,107	-20%
Alabama	55,409,500	56,880,474	3%	Nebraska	19,998,059	18,272,739	-9%
Arizona	19,548,346	30,170,750	54%	Nevada	10,151,020	13,523,584	33%
Arkansas	22,151,911	30,322,632	37%	New Hampshire	2,493,329	3,997,579	60%
California	39,468,463	48,410,120	23%	New Jersey	7,431,144	16,599,745	123%
Colorado	27,927,582	29,900,397	7%	New Mexico	11,454,075	12,412,602	8%
Connecticut	4,700,849	6,941,523	48%	New York	19,454,493	31,257,429	61%
Delaware	3,276,117	4,711,825	44%	North Carolina	40,695,357	51,266,234	26%
Florida	75,200,732	105,094,704	40%	North Dakota	29,838,362	20,883,232	-30%
Georgia	34,916,358	46,346,846	33%	Ohio	75,784,796	73,769,806	-3%
Hawaii				Oklahoma	34,052,412	40,488,199	19%
Idaho	516,260	1,492,856	189%	Oregon	3,983,364	8,118,654	104%
Illinois	64,452,817	66,477,157	3%	Pennsylvania	79,666,585	89,822,308	13%
Indiana	80,567,975	76,113,835	-6%	Rhode Island	3,223,669	3,522,225	9%
Iowa	28,382,965	25,018,136	-12%	South Carolina	17,434,545	25,998,968	49%
Kansas	26,545,280	21,990,826	-17%	South Dakota	1,766,178	3,539,481	100%
Kentucky	77,386,087	63,126,121	-18%	Tennessee	25,173,926	28,348,396	13%
Louisiana	29,567,678	35,427,023	20%	Texas	149,844,961	189,588,842	27%
Maine	1,458,257	2,073,942	42%	Utah	22,469,083	23,778,193	6%
Maryland	12,800,695	14,347,628	12%	Vermont			
Massachusetts	8,172,970	12,104,747	48%	Virginia	20,858,503	27,433,111	32%
Michigan	47,843,401	47,544,064	-1%	Washington	3,154,365	10,739,172	240%
Minnesota	15,954,492	22,678,368	42%	West Virginia	58,021,776	51,325,342	-12%
Mississippi	18,132,211	25,304,337	40%	Wisconsin	27,860,643	27,986,988	0%
Missouri	61,500,437	55,462,884	-10%	Wyoming	41,436,214	31,634,412	-24%

¹ U.S. EPA, Proposed Rule Technical Support Document: Translation of the State-Specific Rate-Based CO₂ Goals to Mass-Based Equivalents (Nov. 2014), <http://www2.epa.gov/cleanpowerplan/clean-power-plan-proposed-rule-translation-state-specific-rate-based-co2-goals-mass> (converted to short tons).

² U.S. EPA, Final Rule Technical Support Document: Emission Performance Rate and Goal Computation, Goal Computation Appendix 1-5 (Aug. 3, 2015), <http://www.epa.gov/airquality/cpp/tsd-cpp-emission-performance-rate-goal-computation-appendix-1-5.xlsx>.

Appendix: Statewide Mass-Based Goals

Table 2: Proposed and Final Mass-Based Interim Average State Goals – Existing Sources Only (short tons)

	Proposed mass-based interim goal	Final mass-based interim goal	Percent change proposed to final
Alaska			
Alabama	60,010,471	62,210,288	4%
Arizona	20,457,805	33,061,997	62%
Arkansas	23,571,349	33,683,258	43%
California	40,843,126	51,027,075	25%
Colorado	29,205,247	33,387,883	14%
Connecticut	5,193,773	7,237,865	39%
Delaware	3,556,194	5,062,869	42%
Florida	80,699,187	112,984,729	40%
Georgia	37,313,787	50,926,084	36%
Hawaii			
Idaho	519,802	1,550,142	198%
Illinois	69,299,595	74,800,876	8%
Indiana	84,535,259	85,617,065	1%
Iowa	29,270,327	28,254,411	-3%
Kansas	27,939,262	24,859,333	-11%
Kentucky	80,919,978	71,312,802	-12%
Louisiana	31,755,569	39,310,314	24%
Maine	1,518,341	2,158,184	42%
Maryland	14,534,807	16,209,396	12%
Massachusetts	9,297,985	12,747,677	37%
Michigan	50,560,827	53,057,150	5%
Minnesota	16,651,823	25,433,592	53%
Mississippi	19,176,732	27,338,313	43%
Missouri	64,549,253	62,569,433	-3%

	Proposed mass-based interim goal	Final mass-based interim goal	Percent change proposed to final
Montana	15,024,366	12,791,330	-15%
Nebraska	21,580,374	20,661,516	-4%
Nevada	10,928,871	14,344,092	31%
New Hampshire	2,800,764	4,243,492	52%
New Jersey	9,053,264	17,426,381	92%
New Mexico	12,100,526	13,815,561	14%
New York	22,503,486	33,595,329	49%
North Carolina	44,167,072	56,986,025	29%
North Dakota	30,398,784	23,632,821	-22%
Ohio	82,248,236	82,526,513	0%
Oklahoma	35,420,257	44,610,332	26%
Oregon	4,356,672	8,643,164	98%
Pennsylvania	89,311,008	99,330,827	11%
Rhode Island	3,385,978	3,657,385	8%
South Carolina	18,980,137	28,969,623	53%
South Dakota	1,907,801	3,948,950	107%
Tennessee	27,143,399	31,784,860	17%
Texas	161,714,043	208,090,841	29%
Utah	23,417,876	26,566,380	13%
Vermont			
Virginia	22,763,019	29,580,072	30%
Washington	3,007,612	11,679,707	288%
West Virginia	62,626,974	58,083,089	-7%
Wisconsin	29,669,378	31,258,356	5%
Wyoming	43,705,616	35,780,052	-18%

Working Paper: Supporting State Plan Compatibility and Interstate Compliance with the Clean Power Plan

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Introduction

As states and stakeholders consider options to comply with EPA's Clean Power Plan requirements to reduce emissions in the power sector, there is growing interest in developing individual state plans that give regulated entities the option of working across multiple states to achieve compliance. One way that states could make this option available is to design their plans to be compatible with other states' plans, and then to allow regulated entities to meet their CPP obligation by using compliance instruments issued by other states with similarly approved plans. Such plans would not require formal coordination with other states during the development of the plan, but would share common infrastructure and design elements that would facilitate the use of standardized compliance instruments by regulated entities in different states.¹ States may or may not choose to allow interstate compliance when they first begin implementing the plan, but many have indicated an interest in having the option available.

Facilitating interstate reduction strategies provides multiple benefits to states and regulated entities, including opportunities to: find the lowest-cost means of compliance; lessen competitiveness concerns between jurisdictions; respond to changes in fuel prices, weather, and other uncertainties; improve administrative efficiency; and align better with regional electricity markets. Designing plans to be compatible allows states to "opt in" to interstate compliance in the future without committing to it in the state plan. Even without interstate compliance, many of these benefits can be gained by designing compatible individual state plans that use common elements and infrastructure, and establishing areas of commonality upfront provides states the flexibility to decide to allow interstate compliance in the future.

Through convenings and other conversations with states, stakeholders, facilitators of regional conversations, and other experts, and building upon our own research in this area, we have identified areas in which guidance and tools from EPA could facilitate the compatibility of individual state plans and support a relatively easy path to interstate compliance. The suggestions identified in this working paper are informed by conversations in and around the Georgetown Climate Center's State, Power Company, and NGO Dialogue series, although they should not be understood to reflect the views of any participants in particular.² This working paper also builds on the Center's earlier work with states on opportunities to align and link regional emissions reduction programs.³

* The authors wish to thank Vicki Arroyo for her guidance on this paper and the prior work it builds upon.

¹ For more information on single-state approaches with optional interstate compliance, or "common elements" approaches, see Lissa Lynch et al., Georgetown Climate Center, Clean Power Plan Implementation: Single-State Compliance Approaches with Interstate Elements (May 2015), <http://www.georgetownclimate.org/single-state-clean-power-plan-compliance-approaches-with-interstate-elements>; Franz T. Litz and Jennifer Macedonia, Choosing a Policy Pathway for State 111(d) Plans to Meet State Objectives (April 2015), <http://www.betterenergy.org/publications/choosing-policy-pathway-state-111d-plans-meet-state-objectives>; Jonas Monast et al., Nicholas Institute, Enhancing Compliance Flexibility under the Clean power Plan: A Common Elements Approach to Capturing Low-Cost Emissions Reductions (March 2015), http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_pb_15-01.pdf.

² The fifth and most recent dialogue in this series, held March 10, 2015, focused on exploring opportunities, in either a rate- or mass-based context, for states to develop individual state plans that could provide regulated entities with the option of interstate trading. More information on the convening series is available at: <http://www.georgetownclimate.org/clean-power-plan-implementation-a-state-power-company-and-ngo-dialogue>.

³ Kathryn A. Zyla, Georgetown Climate Center, Linking Regional Cap-and-Trade Programs: Issues and Recommendations (April 2010), <http://www.georgetownclimate.org/linking-regional-cap-and-trade-programs-issues-and-recommendations>.

Specifically, EPA could support the compatibility of individual state plans and facilitate interstate compliance by:

- Making available common infrastructure for tracking both mass-based allowances and rate-based credits.
- Supporting an opt-in mass-based interstate compliance approach by establishing streamlined plan approval criteria.
- Assisting states with potential rate-based interstate approaches by identifying default rules and providing guidance.
- Taking comment in the forthcoming federal plan proposal on an option that works together with compatible individual state plans.

This discussion addresses both mass-based programs and rate-based programs. For a mass-based program this working paper outlines a framework that would provide a streamlined way for states and regulated sources to opt into interstate compliance. This framework is not meant to be limiting; states could develop other approvable frameworks for interstate compliance by accepting each other's allowances. However, this mass-based framework would ensure that the system of state plans that provide for exchange of allowances would maintain the required level of aggregate emissions performance even if new participants entered and exited the market. It is designed to lessen barriers to participation by states and affected units. In contrast, more complex systems to link plans—for example, those that include plans using a state commitment⁴ approach—may require multi-state modeling and specialized reporting requirements to demonstrate that they are projected to achieve (and will maintain) required emissions performance.

In the rate-based context, we have identified ways that EPA could better support interstate compliance; however, a streamlined opt-in rate-based system is significantly more complicated, and questions remain about whether and how such a framework would operate.

EPA is also preparing to release a proposal for a federal plan that would be implemented in states that do not have an approved state plan in place. It is just as beneficial for this federal plan to integrate smoothly with the plans in place in other states as it is for the plans developed by states to work well together. Therefore, this working paper proposes ways that the federal plan could be compatible with individual state plans.

I. Common Infrastructure to Track Mass-Based Allowances and Rate-Based Credits

States interested in allowing regulated entities to use interstate compliance instruments—“allowances” in a mass-based context or “credits” in a rate-based context—will need a way to transfer instruments from entities in one state to entities in another, and to enable an allowance or credit generated in one state to be submitted for compliance in another state. While it is possible for individual states to establish their own tracking systems and ensure that they are securely interoperable (and this should remain an option for states), it could greatly facilitate interstate efforts if a common system were available. Even if states choose not to allow interstate compliance, there are benefits to consistency among states. For example, it would be much more administratively efficient for states to work together than to each create their own infrastructure, and for regulated parties operating in multiple states to be able to use one platform for all of their compliance activities rather than different platforms in each state. In addition, should these states later decide to allow interstate compliance, it will be far easier if they are already using common infrastructure.

⁴ EPA takes comment on a “state commitment approach,” under which emission limits for affected EGUs would not, on their own, assure achievement of the emission performance level, and the state plan “would include an enforceable commitment by the state itself to implement state-enforceable (but not federally enforceable) measures that would achieve a specified portion of the required emission performance level on behalf of affected EGUs.” 79 Fed. Reg. at 34,902.

EPA has significant experience developing tracking systems like this for other pollution programs, and existing products on which this system could be based (e.g., the Emissions and Allowance Tracking System, EATS). EPA could work with states to develop a tracking system (or identify a third-party system) that would be available nationwide to any state that chooses to use it for Clean Power Plan programs.

Tracking Mass-Based Allowances

A tracking system for mass-based programs would provide accounts for entities to hold allowances and provide the means of securely allocating allowances, transferring allowances among entities, and retiring allowances for the purposes of compliance. For example, EPA's EATS tracks emissions, allowances, compliance assessment, and other relevant information, and is the basis for existing tracking systems used by the Regional Greenhouse Gas Initiative (CO₂ Allowance Tracking System, COATS) and the Western Climate Initiative (Compliance Instrument Tracking System Service, CITSS). To the extent possible, tracking infrastructure to support the Clean Power Plan could be interoperable with other existing allowance tracking systems such as these (i.e., there should be a mechanism for securely transferring allowances between accounts in the different systems).

Tracking Rate-Based Credits

A rate-based tracking system would provide accounts for entities to be assigned credits from renewable energy, energy efficiency and other creditable resources. Each credit would identify the power generation or energy savings (in MWh) and/or emission attributes (in tons) associated with it.⁵ The system could be designed to be interoperable with existing Renewable Energy Credit (REC) tracking systems and with third-party energy efficiency tracking systems that are developed and used by states.

II. An Opt-In Mass-Based Interstate Compliance Approach

Under a mass-based compliance system, the owner or operator of an affected EGU would be required to hold allowances equal to the annual CO₂ emissions from the unit. To demonstrate compliance, each affected source would be required to retire a number of allowances equivalent to its emissions over the compliance period. In an interstate version of this approach, a state plan would allow affected EGUs the option of using allowances issued by other states for compliance.

As EPA develops its criteria for what makes any state plan approvable under the Clean Power Plan, the Agency could establish minimum criteria for streamlined approval of plans for opt-in mass-based interstate compliance. In short, an opt-in plan would be approved to allow regulated entities the option of using allowances from other states with similarly approved plans. By meeting minimum plan criteria, such as those suggested below, the system of compatible state plans would be ensured to maintain the required level of aggregate emissions performance.

Being approved to opt into interstate compliance does not mean that a state must allow this option at the outset, nor does it mean that regulated parties are required to participate in an emissions market. A state with this type of plan could limit or constrain the ability of regulated entities to use out-of-state allowances for compliance.⁶

Whether a state allows compliance through out-of-state allowances or limits its program to in-state allowances, the regulated parties would maintain the option not to make use of these mechanisms or to comply only using in-state allowances. This system merely expands the options available to regulated parties.

⁵ See APX, Using Tracking Systems with the Implementation of Section 111(d) State Plans (Oct. 2014), http://www.narecs.com/wp-content/uploads/sites/2/2014/10/APXAnalytics_1_Section111d.pdf.

⁶ Some states may want to accept allowances only from states whose plans meet certain criteria.

Importantly, states would not have to commit to any degree of interstate compliance in their plans. EPA could indicate that opt-in plans would be approved to allow interstate compliance, and states could decide later whether and to what degree to accept out-of-state allowances without requiring a plan revision. The decision to accept out-of-state allowances would be a state decision that would be made pursuant to the regulatory framework in the approved plan. It would be helpful for EPA to clarify that plans approved for opt-in interstate compliance under these criteria would not have to be reapproved if other states (or regulated parties) enter or leave the interstate system. EPA might also clarify that the failure of one participating state to meet its goal (e.g., by not enforcing its state plan or by repealing its regulations) will not jeopardize another participating state's compliance.

Criteria for Opt-In Mass-Based Interstate Compliance Plan Approval

The following criteria could form the basis for an opt-in mass-based compliance plan. Any plans containing these elements could be approved to allow regulated entities the option of using allowances from other states with similarly approved plans. These criteria represent one model designed to facilitate the approval of interstate compliance; however, this framework is not the only possible option for an interstate system, and other plans that include interstate elements would also be approvable by EPA.

- *Common infrastructure:* The plan either uses common tracking infrastructure or another system that has been demonstrated to be securely interoperable with the common system.
- *Common units for allowances:* The plan uses default common units or includes a conversion factor for accepting interstate allowances denoted in different units.

Mass-based interstate compliance could be more efficiently implemented if EPA were to identify default units for allowances, as well as an acceptable way to translate between units. For example, if EPA were to identify metric tons as the default units, short-ton allowances could be accepted as long as a regulated entity retires sufficient short-ton allowances to cover its full emissions in metric tons (or vice versa).

- *Budget integrity:* The plan will not allow emissions to exceed the state's mass-based budget.

The cap should not exceed the state's mass-based goal.⁷ The plan will require affected units to retire allowances to match their emissions, with the total quantity of allowances equal to or below the state's mass-based goal, aggregated over the compliance periods specified by EPA's final rule.⁸ Compliance flexibility mechanisms such as borrowing⁹ or set-asides¹⁰ must be "under the cap," preventing overall emissions from rising above the capped level during the compliance periods.

⁷ As proposed by EPA, states have the option of translating the rate-based goal to a mass-based goal based on either historical data for existing affected fossil fuel-fired sources or on historical and projected data for existing and new fossil fuel-fired sources. If a state chooses the latter approach, it must include both existing and new sources in its mass-based program. U.S. EPA, Translation of the State-Specific Rate-Based CO₂ Goals to Mass-Based Equivalents Technical Support Document (Nov. 2014), <http://www2.epa.gov/sites/production/files/2014-11/documents/20141106tsd-rate-to-mass.pdf>.

⁸ Such a plan would be "self-correcting" according to EPA's formulation, because it "inherently would assure interim performance and full achievement of the state plan's required level of emission performance through requirements that are enforceable against affected EGUs." 79 Fed. Reg. 34907.

⁹ Borrowing is a temporal flexibility mechanism that allows the use of allowances from a future compliance period to meet a compliance obligation in an earlier compliance period. U.S. EPA, Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control 3-19 (June 2003), <http://www.epa.gov/airmarkets/resource/docs/tools.pdf>.

¹⁰ A set-aside is an allowance distribution flexibility mechanism under which the regulator withholds a certain number or percentage of allowances for a specific purpose. Set-aside allowances can but used to support specific technologies or address equity issues, or as a cost-containment reserve to release additional allowances if allowance prices exceed a certain level. *See id.* at 3-18.

Given the complexities of state commitment approaches and multi-sector programs, approval for opt-in interstate compliance could be limited to single-sector mass-based budgets. Designing a plan to meet these criteria would not necessarily foreclose links with multi-sector programs in the future; however, this would likely require a more detailed evaluation and demonstration to EPA that the required power sector reductions were being achieved.

To demonstrate budget integrity, the plan would also include enforcement penalties for holding insufficient allowances that are punitive enough to ensure compliance, as well as provisions for emissions monitoring and reporting.

- *Interstate allowances:* The plan specifies that the state will only accept allowances from states that are also approved by EPA for opt-in interstate compliance. This limitation ensures that the entire system of compatible plans maintains budget integrity; states whose plans do not meet these requirements will not be connected to the others.¹¹
- *New sources:* The plan specifies that the state will only accept allowances from other states that treat new generation units similarly (i.e., whether the state includes or excludes new units in its mass-based budget). This approach would prevent the use of allowances from states with dissimilar treatment of new units, which could help address emissions leakage and result in greater environmental integrity.

Under EPA’s proposal, states have the option of including new generation units in a mass-based program (with a higher state goal reflecting the share of load growth attributable to new sources).¹² A number of states and stakeholders have argued for the inclusion of new units in mass-based programs. This is because the exclusion of new units from a compliance obligation creates an economic incentive to have these units supply as much electricity as possible, resulting in “leakage” of emissions from old to new units. The exchange of allowances between systems that include new units and those that do not could exacerbate this problem by allowing emissions from states that cover new units to leak to states that do not.

The criteria listed above are minimum criteria that would be required to be consistent for individual state programs to be compatible within the opt-in interstate compliance framework. States may wish to voluntarily make additional plan elements consistent, to improve efficiency, standardize the administrative process for parties regulated in multiple states, or minimize market distortions, or to limit the acceptance of allowances to states that are compatible beyond these minimum criteria.

Additionally, states may be interested in other ways of linking mass-based programs beyond the opt-in approach proposed here, including jointly-developed regional plans or linked multi-sector programs. It would be helpful for EPA to provide guidance on the requirements for approval of other types of linked plans or other customized plans that include interstate trading elements that do not meet the criteria listed above.

¹¹ Some states may want to create a plan that provides the option to allow interstate compliance in the future, but particularly at the outset of the program, may not make use of the option to accept out-of-state allowances. Other states may want to agree together to create a network among which interstate allowances will be accepted, or to limit acceptance of allowances to states with plans meeting certain criteria. One approach that may achieve these goals would be for EPA to include a “reciprocity” requirement in the minimum criteria, which would specify that the state will only accept allowances issued by a state that reciprocally accepts its allowances.

¹² U.S. EPA, Translation of the State-Specific Rate-Based CO₂ Goals to Mass-Based Equivalents Technical Support Document (Nov. 2014), <http://www2.epa.gov/sites/production/files/2014-11/documents/20141106tsd-rate-to-mass.pdf>.

III. State Coordination on Rate-Based Programs

In a rate-based crediting approach, states would allow affected units that are operating above the required CO₂ emission rate to purchase credits from operators of renewable energy generation, energy efficiency programs, creditable nuclear generation, or affected sources operating below the required rate. Allowing regulated entities to use out-of-state credits for compliance offers flexibility, but also involves significant complexity. A key question is how to ensure consistent approaches to calculating the compliance value provided for renewable energy generation, energy efficiency measures, and other creditable measures, so that these credits can be exchanged with entities in other states. In addition, the impacts of interstate compliance on overall emissions reductions and power market dynamics may require further consideration in the state plan development and approval process. Given the uncertainty surrounding these potential impacts, it is unclear whether a streamlined opt-in approach such as the one proposed above for a mass-based system could work for a rate-based system; therefore no such system is suggested here. However, there are ways that EPA might make it easier for states to develop compatible rate-based plans.

Rate-Based Crediting Consistency: Default Crediting Methodology

In order for rate-based credits to be exchanged between states, there must be a consistently defined credit to exchange. Therefore, states will need a consistent approach to assigning credit for resources produced (e.g., renewable energy generated or energy avoided through energy efficiency) in one state but used for compliance in another.¹³ The emission value of a credit could be calculated in a number of different ways: based on the target rate of either the buying or selling state, on the regional marginal fossil emissions rate, on a blended or average rate, on the actual emission rate of the generation being displaced or avoided, or on a rate derived from the ratio of the target rates of the buying or selling state.¹⁴ Each of these options has different implications for actual reductions achieved by the programs, and may create different incentives for operation of—and investments in—these creditable resources.

EPA proposes that states interested in multi-state rate-based compliance would submit a joint plan to comply with a single aggregate rate based on a weighted average of their individual state rates.¹⁵ While this would be a straightforward way to address the issue of determining the emission value of interstate credits, it would require a higher degree of coordination than the single-state approaches supporting interstate compliance in which states and stakeholders have expressed interest. A multi-state joint plan with a blended rate would also raise issues if states wanted to join or leave the multi-state program at a later date.

If EPA allows interstate rate-based compliance options that do not require a blended rate, identification of a common methodology for crediting emission reductions would be necessary to ensure that credits are consistently defined. EPA could support compatibility of rate-based state plans by establishing a default approach for calculating the compliance value of interstate rate-based credits if it does not require a blended rate. Some stakeholders have suggested that this default should be aligned with the way state goals are calculated to ensure that the amount of reduction the programs ultimately achieve is in line with the goals set by EPA. Some stakeholders have also suggested that EPA should seek to avoid changing incentives for siting renewable energy and energy efficiency. Although default rules from EPA would provide some level of consistency, EPA could allow states to negotiate the use of other approaches if they are able to demonstrate that such an approach has integrity and does not result in emissions leakage, potential double counting, and perverse incentives for siting low- and zero-carbon resources.

¹³As EPA notes in its proposed rule, another way to approach this crediting question is to ask whether zero-emissions MWh should simply be added to the denominator of the affected unit.

¹⁴ See Steven Michel and John Nielsen, Western Resource Advocates, Carbon Reduction Credit Program: A State Compliance Tool for EPA's Clean Power Plan Proposal (Nov. 12, 2014), <http://www.westernresourceadvocates.org/energy/pdf/CRC%20Program%20-%20WRA%20working%20paper%2011%2012%2014.pdf>.

¹⁵ 79 Fed. Reg. at 34,911.

Rate-Based Crediting Consistency: Guidance on Treatment of Distinct EM&V Methods

Even with a clear crediting methodology, credit for avoided emissions may not be assigned equivalently to similar energy-saving activities in states with different approaches to evaluation, measurement, and verification (EM&V), particularly if the rigor of evaluation programs differs among states. Ensuring that credits are real and equivalent between states does not mean that states must adopt the same approach to EM&V of energy-saving measures. Instead, EPA could allow states to take different approaches to EM&V by providing guidance for discounting the quantity of credits generated based on the EM&V approach. For example, measures that are evaluated through a less rigorous EM&V process would receive a lower level of credit than those evaluated through an approach that provides more certainty about the level of electricity generation avoided.

Other Considerations for Interstate Rate-Based Compliance

The interstate exchange of rate-based credits may raise additional complications depending on how such a system is structured, including potential increases in overall emissions or negative energy market effects. Due to the differences between individual state target rates, identical resources in two states could face very different market signals. A natural gas facility in a state with a target rate above its operating rate could sell credits, effectively receiving a subsidy, while an identical facility in a state with a target rate below its operating rate would need to purchase credits. These different price signals could lead to shifts in siting of generation and overall emissions outcomes. At least in some circumstances, interstate exchange of rate-based credits between states with different target rates could magnify price signals that lead to higher overall emissions or impacts on competitiveness. Since further analysis is needed to understand these effects, no streamlined opt-in pathway is suggested here.

Multi-state compliance with a blended rate target, as proposed by EPA, may help to address these issues by equalizing the target rate that all affected units must meet. However, a blended rate approach would require significant cooperation among participating states, preventing a simple opt-in interstate compliance approach. Even without an opt-in option, EPA could make it easier for interested states that want to collaborate on a rate-based approach to do so by providing guidance on default crediting methodologies (if EPA chooses not require a blended rate) and on the treatment of differing EM&V measures.

IV. A Federal Plan that is Compatible with Individual State Plans

While the suggestions above would enable states to develop individual plans that achieve the benefits of interstate programs, some states may not submit an approvable plan, in which case a federal plan will be implemented. Just as it is beneficial to states, regulated entities, and the electricity system to have individual state plans work well together, it is equally important for the federal plan to work well with other state plans and with existing state programs. For this reason, EPA could take comment in the forthcoming federal plan proposal on whether a federal plan might make use of the same default elements that are recommended for individual state plans, such as using the default crediting protocol for rate-based programs, or the default units for mass-based programs. Likewise, the federal plan could make use of the same common tracking infrastructure made available to states developing their own plans. Finally, if a mass-based version of a federal plan is available, EPA could propose and take comment on a plan that meets the opt-in interstate compliance approval criteria, and contains all of the elements necessary to allow regulated entities the option of using out-of-state allowances from states approved for opt-in interstate compliance. EPA could also take comment on whether to allow states using the federal plan to decide whether to limit the allowances that will be accepted. In addition, as noted above, there are elements of state programs that it would be beneficial, if not necessary, to standardize. If those elements are included in the federal plan, it could also serve as a template for states interested in greater compatibility to follow. While states developing their own plans would be free not to follow this template, this approach leads to a system in which program elements are compatible by default, and deviating from the common approach is an option that states affirmatively choose to take.

Conclusion

Many states and stakeholders are interested in the additional flexibility that comes from allowing affected units to use allowances or credits from another state, in order to reap the benefits of multi-state collaboration without the administrative complexity of developing a joint plan. EPA can assist states by providing infrastructure and guidance to facilitate the development of compatible state plans, and by taking comment on a federal plan that integrates well with individual state plans.

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Please contact Kathryn Zyla (zyla@law.georgetown.edu) with any questions.

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