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California Carbon Market Watch

A COMPREHENSIVE ANALYSIS OF THE GOLDEN STATE'S CAP-AND-TRADE PROGRAM / YEAR ONE 2012–2013

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THE GOLDEN STATE'S CAP-AND-TRADE PROGRAM

YEAR ONE: 2012–2013

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

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Preface

California's Global Warming Solutions Act, also known as AB 32, was signed into law on September 27, 2006. Environmental Defense Fund co-sponsored the bill, which stated that California "may" adopt a market-based regulation to cut greenhouse gas (GHG) emissions. That market-based regulation, a cap-and-trade program, is one of many efforts developed and implemented over the last seven years to reduce the state's GHG emissions to 1990 levels by 2020.

With the debut and implementation of the cap-and-trade program in 2013, California has once again proven to be a leader in environmental policy in the United States. Not only is the state setting an example for the rest of the country in addressing GHG emissions, it's doing so in a flexible, economically efficient fashion, allowing the economy to prosper, while improving public health.

The data and observations presented in this report provide tangible evidence of the program's success in its first year. The allowance auction process has gone well, the secondary market has shown stability, and prices indicate low marginal abatement costs for compliance entities thus far. The smooth transition to a capped economy is an impressive accomplishment, due in large part to a carefully constructed regulation that involved a rigorous stakeholder engagement process and leveraged international lessons learned in building market-based mechanisms.

Today, California is a bright spot not only in the U.S., but internationally as well. California's regional leadership is evident through the Western Climate Initiative and the recently signed Pacific Coast Collaborative Climate Action Plan. Beyond North America, the memorandums of understanding (MoUs) signed with China and Australia show that California's program is already regarded internationally as a leading model.

There is still work to be done to ensure that the program continues on a path of success to 2020 and beyond. Organizations like IETA and EDF will continue to provide input towards achieving this goal. Building deeper collaborations and alliances in the coming years—not only across jurisdictions, but also across businesses and regulators—will be critical to ensure emissions reductions are achieved in a manner that allows our economy to prosper as the scope of the cap broadens in 2015 and the interaction with complementary measures is better understood.

As we know, California cannot solve the problem of climate change alone. The linked California and Quebec carbon market launching in 2014 is an important development, which, if successful, has the potential to encourage other jurisdictions to come forward with programs of their own. Further, upcoming federal action on power plants through Clean Air Act 111(d) standards will put an even greater spotlight on California from states that are looking for cost-effective solutions to reduce emissions and meet U.S. EPA guidelines.

It's been a long and, at times, arduous process from the passage of AB 32 to the eventual implementation of California's landmark cap-and-trade program. However, after its inaugural year, most would agree that the state has developed a program to be proud of—one that is poised for future success and emulation across other economies, both inside and outside U.S. borders.

Dirk Forrister, President and Chief Executive Officer
International Emissions Trading Association (IETA)

Executive summary

January 1, 2014 marked one year since the start of California's landmark cap-and-trade program, a market-based system to reduce greenhouse gas (GHG) pollution. The program will be the second-largest carbon market in the world, after the European Union's, and will cover 85% of all carbon pollution in the state by 2015. It is the most discussed program in a suite of strategies being deployed to achieve the goal of California's Global Warming Solutions Act—also known as Assembly Bill 32 (AB 32)—a 2006 law requiring the state to reduce GHG emissions to 1990 levels by 2020. California is the eighth-largest economy in the world and the first state in the nation to employ an economy-wide cap-and-trade program. While no state or country can stop climate change alone, California's environmental policies have a history of success and replication. The importance of California's program is thus magnified by the example it sets, and the world is watching to see whether the state's carbon market will succeed.

One year into the program, the outlook is positive. California's cap-and-trade system weathered legal challenges and demonstrated a successful launch and viability during its initial year. In the first five auctions, all of the offered emission allowances usable for compliance in 2013 were sold. Similarly, the secondary market for carbon allowances has shown stability, and carbon prices close to the floor indicate the long-term possibility of low marginal abatement costs for regulated entities. Contrary to some predictions of harsh economic damage, capping carbon pollution in California has occurred amidst sustained and promising economic recovery and growth, including a stronger housing market and lower unemployment rate.

This report provides an overview and analysis of California's carbon market after one year in operation. Included are a background on the cap-and-trade program, an account of the carbon market's progress to date, and an analysis of what the market's performance means for California's environmental and economic goals. This analysis includes in-depth summaries and trends observed from the quarterly auctions and secondary market activity, along with evaluations of market performance by industry experts and academics. Updates regarding litigation, proposed regulatory amendments, and international agreements are also discussed.

Five key conclusions from the program's first year and five key considerations for the program's future are highlighted on pages vii and viii.

Tim Connor

First year conclusions

1. **The successful state-run auctions are evidence of a well-constructed, strong, and adaptive policy.** California had the good fortune of learning from predecessor cap-and-trade programs like the European Union Emissions Trading System (EU-ETS) and the Regional Greenhouse Gas Initiative (RGGI). The five successful quarterly auctions conducted thus far are evidence of a strong design for California's program. Each auction has shown a solid demand for current year allowances, with numerous compliance entities participating and allowance prices remaining stable and reasonable. The California Air Resources Board (CARB) has developed a robust administrative framework. To date, there have been no signs of market manipulation, the auction platform and logistics have been straightforward, and key market communications have been timely and well managed.

2. **The secondary market for California carbon allowances is robust and healthy. Although the offset market was quiet, late 2013 issuance of CARB offset credits suggests greater offset market activity lies ahead.** Since the first auction commenced, allowance prices have stabilized on the secondary market and the volume of traded allowances has increased. This reflects increased confidence, familiarity, and participation in the market. Furthermore, since CARB offset credits have been issued and the first surrender date for compliance instruments by regulated entities approaches in November, it is likely that increased interest in the market will result in more offset transactions.

3. **Wise investment of the auction proceeds will be an integral part of achieving the state's AB 32 pollution reduction goals.** State auction proceeds—$533 million to date—will boost clean energy in California, improve air quality, and create jobs. California law requires that auction proceeds be invested in further reducing GHG emissions. Although the goal of the cap-and-trade program is not to raise money, this first year of auctions has shown that a meaningful amount of money can be generated from the sale of allowances. While Governor Brown has taken a one-time loan of $500 million from the state's auction proceeds, he has committed to return these funds and invest future funds to cut carbon pollution. Furthermore, as required under law passed in 2011, at least 25% of the proceeds must be invested in a manner that benefits disadvantaged communities in California that are most impacted by climate change and poor environmental quality.

4. **The average price for allowances suggests that achieving the cap may be less costly than some expected.** Some critics of the program, including regulated businesses, have expressed fear of high compliance costs from AB 32. The reality of current allowance prices—just over $11—is in stark contrast to those fears, and shows that the cost of emissions reductions will be much lower in this first compliance period than previously expected. Even if prices hover above the floor, the cap ensures reductions will be met and that companies will incorporate the cost of carbon into their strategic planning.

5. **Market experts interviewed for this report expressed overwhelming positive views regarding the first-year performance of California's cap-and-trade program.** In addition to noting the auction mechanism is well designed, experts felt the complete sale of current allowances and improved liquidity in the secondary market are encouraging signs of a well-functioning market. All of those interviewed were confident that the market is here to stay and highlighted the importance of post-2020 goals.

Future considerations

While the data presented in this report indicate the first year of cap and trade in California has been a success, there are upcoming program milestones and other important factors that may impact the market.

1. **The end of the first compliance period:** California will know more about the program's success in November 2014 when regulated entities will first have to surrender allowances. At that time, the state and general public will have additional information about how the program is functioning, what emissions reductions have been achieved, and how entities are meeting their compliance obligations.

2. **Linkage with Quebec:** California and Quebec formally linked their cap-and-trade programs beginning on January 1, 2014. The Quebec linkage expands the market and provides regulated entities greater flexibility in meeting their compliance obligations cost-effectively. More importantly, it paves the way for other linkages which could create greater environmental and economic benefits.

3. **Proposed cap-and-trade regulation amendments:** Continued market oversight has resulted in a list of proposed cap-and-trade regulation amendments scheduled for consideration in spring 2014. One such amendment includes maintaining the integrity of price containment mechanisms, including credible offsets. Offsets, banking, and other cost containment mechanisms will continue to be important features of the cap-and-trade program.

4. **Fuels coming under the cap in 2015:** The cap more than doubles in size to include distributors of transportation fuels and natural gas on January 1, 2015, the start of the second compliance period. Under the current regulation, suppliers of transportation fuels will not receive any free allowances, meaning they will be required to purchase allowances to cover their emissions. This will significantly impact the supply and demand outlook for carbon allowances.

5. **Post-2020 goals:** Cap and trade, in combination with complementary measures like the Renewable Portfolio Standard and Low Carbon Fuel Standard, are keeping California on track to meet 2020 reduction targets. However, California must set post-2020 goals in order to provide regulated entities with certainty moving forward. With legal challenges mostly overcome and regulated entities showing stronger demand for future vintage allowances, California is seeing more confidence in the longevity of the market. Conversations about setting a 2030 carbon pollution reduction target have begun and it is crucial for policymakers to think about post-2020 program design elements to ensure more ambitious reductions can be met at reasonable costs.

California cap-and-trade policy: an overview

Legislative history of Assembly Bill 32 (AB 32)

On September 27, 2006, California enacted the Global Warming Solutions Act (AB 32), which aims to reduce California's greenhouse gas (GHG) emissions to 1990 levels by 2020. This represents a roughly 16% reduction from the business-as-usual scenario, from 507 to 427[1] million metric tons of CO_2 equivalent ($MMTCO_2e$)[2] (see Figure 1).

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.

To accomplish California's emissions reduction mandate, AB 32 authorized the California Air Resources Board (CARB) to establish a market-based **cap-and-trade** regulation alongside complementary emissions reduction measures, which are laid out in CARB's Scoping Plan.[3] To ensure the program's success, expert advisory groups such as the Emissions Market Assessment Committee[4] and the Economic and Allocation Advisory Committee[5] were formed to aid in the regulation's development. Additionally, lessons learned from the European Union Emissions Trading System (EU-ETS) and the emissions trading program of nine states in the northeastern United States, the Regional Greenhouse Gas Initiative (RGGI), were taken into careful consideration during this time.[6] With extensive stakeholder input, research, and analysis, the enforceable cap-and-trade program officially began on January 1, 2013.

Cap-and-trade model

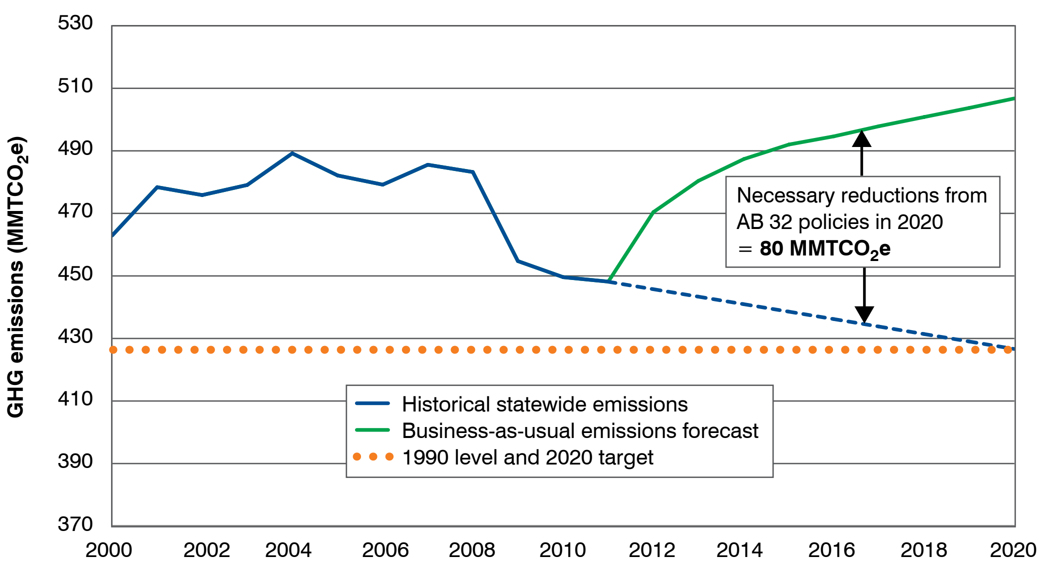
Cap and trade is not a new environmental solution. It was successfully used to control sulfur dioxide (acid rain) pollution from power plants in the U.S.[7] This program, established by the 1990 Clean Air Act Amendments, harnessed the power of the marketplace to reduce acid rain pollution significantly, spurring *The Economist* to call it "the greatest green success story of the past decade."[8]

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

The "cap" refers to the absolute limit on pollutant emissions that is set for all sectors covered by the regulation. The number of **allowances** available for use within the program corresponds to this cap. By limiting the total number of allowances to a specified amount, the government

FIGURE 1

AB 32 emissions reduction target compared to the business-as-usual scenario



Source: Historical 2000 to 2011 GHG Emissions Data[9] and Emissions Forecast[10] from California Air Resources Board can ensure the aggregate emissions do not exceed the cap's set level. If a market participant holds extra allowances that it does not need for its compliance obligation, it can sell them to other participants who need those allowances. This is the "trade."

California's cap-and-trade program

Under California's cap-and-trade program for carbon pollution, a stringent cap with a specific number of emission allowances is set forth in Table 6-1 of §95841 of the regulation (Annual Allowance Budgets for Calendar Years 2013–2020). Pursuant to the regulation, allowances are distributed to regulated businesses by the state, either given for free or sold at auction. At the end of each compliance period, companies must surrender allowances back to the government sufficient to cover their compliance obligation, which is based on their emissions. Companies failing to meet compliance requirements must pay penalties, as is the case in other regulatory programs.[11] Every year, the total number of available allowances (either given for free or auctioned) decreases, driving emissions down over time. This is known as a "declining cap."

By setting a statewide cap instead of company or sector-specific levels, the program gives each regulated entity the freedom to decide how it will comply. Companies can purchase additional allowances beyond those they receive for free, or invest in emissions reduction projects that leave them with extra allowances that can be sold to other businesses. The cap-and-trade program also allows regulated entities to use verified reductions from uncapped sectors (**offsets**) to meet up to 8% of their compliance obligations in any one year.[12] This variety of compliance options provides flexibility to regulated entities, which lowers the overall cost of the program.[13]

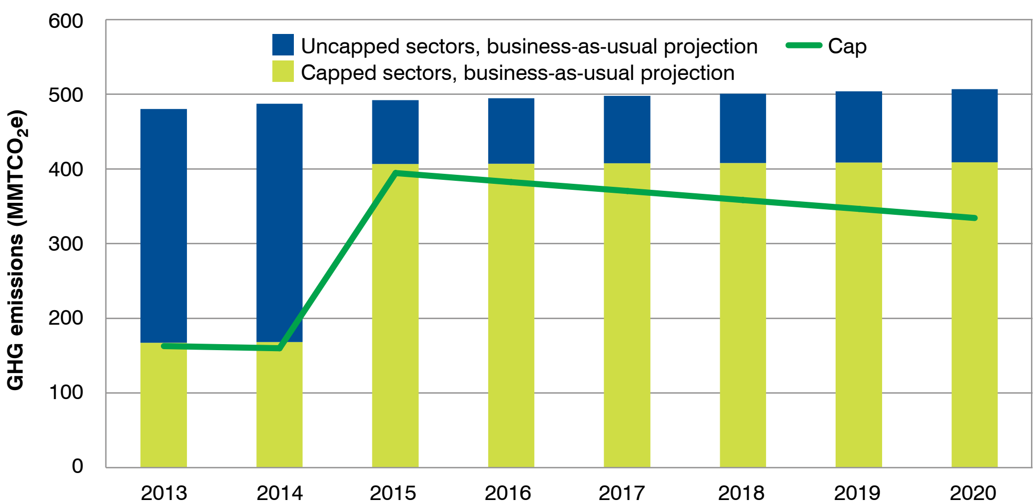
An **offset** credit represents one metric ton of GHG emissions that is reduced or removed by an activity not covered by the cap-and-trade program in order to compensate for, or "offset," an emission made by a regulated facility. Offset credits must meet strict regulatory reporting and oversight criteria and must fall under a protocol that has been approved by CARB.

The central elements of the program include:

- **The cap:** California's cap declines every year. From the first to the second year, the cap tightens by about three million metric tons of emissions, or 1.9%. In 2015, suppliers of transportation fuels, natural gas, and other fuels come under the regulation, expanding the covered pollution by about 1½ times. Thereafter, the cap decreases by approximately 12 million metric tons of emissions every year, or an average annual decrease of 3.3% (see Figure 2).[14] The cap declines

FIGURE 2

The declining cap and the business-as-usual emissions projections through 2020



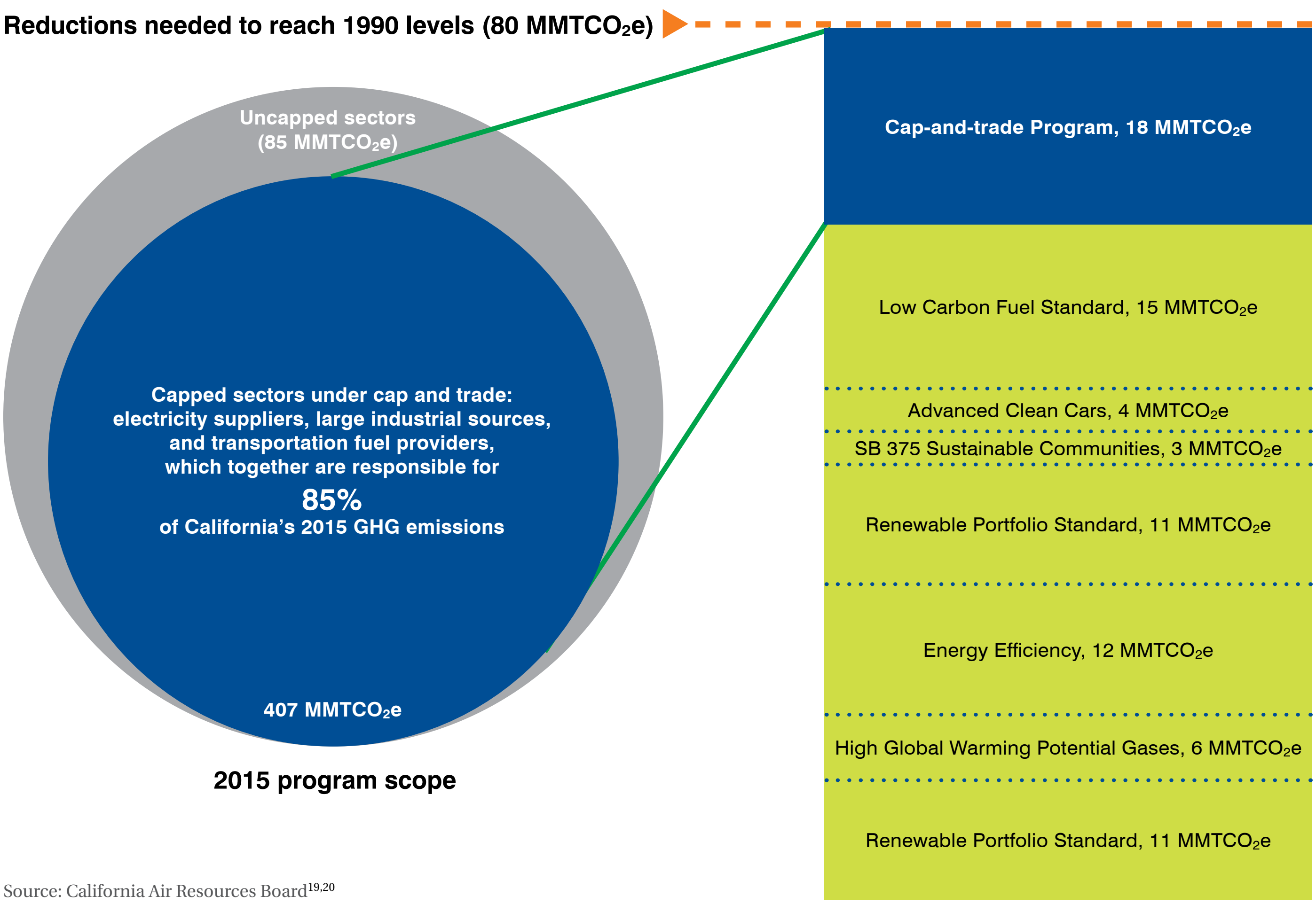
Source: California Air Resources Board[15] more moderately in the program's first compliance period to ensure a smooth transition to a capped economy.

- **GHG emissions reporting and verification:** Emissions reporting requirements have been in place since 2008, when CARB adopted a mandatory reporting rule requiring all major GHG sources to submit emissions reports every year. That rule was later harmonized with the U.S. EPA Greenhouse Gas Reporting Rule. The data from the reporting rule has allowed CARB to develop a cap-and-trade program based on actual measured emissions, as opposed to estimates, and allows the agency to continue monitoring California's progress towards its reduction goals.[16]

- **Emissions coverage:** California's emissions sources are varied in scope, with the leading contributors in 2020 projected to be the transportation sector (36%), the power sector (20%), and heavy industry (18%).[17] Starting in 2013, major GHG-emitting sources, such as electricity generation (including imports) and large stationary sources (e.g., refineries, oil and gas production facilities, food processing plants, cement production facilities, and glass manufacturing facilities) that emit more than 25,000 metric tons of CO_2 equivalent per year are regulated by the program. In 2015, the program expands to include distributors of transportation fuels, natural gas, and other fuels.[18] At that time, this comprehensive program will cover approximately 85% of the state's total emissions (see Figure 3).

FIGURE 3

Scope of the cap-and-trade program and its complementary policies under AB 32



Source: California Air Resources Board[19,20]

- **Compliance periods:** A compliance period is the time frame during which aggregate compliance obligations are calculated. At the end of each year, and within a specified time after the end of each compliance period, each regulated facility must turn in the appropriate number of credits to cover their emissions over that time. California's program has three compliance periods:[21]

  First compliance period: 2013 through 2014
  Second compliance period: 2015 through 2017
  Third compliance period: 2018 through 2020

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."[24]

- **Allowance allocation:** To protect electricity ratepayers from price spikes in their electricity bills, CARB gives allowances for free to electrical distribution utilities. According to a decision by the California Public Utilities Commission, major regulated utilities must consign their allowances to auction and use the proceeds from the sale of their allowances to benefit ratepayers. To ensure that California businesses remain competitive, transition smoothly into the program, and to prevent emissions **leakage**, CARB also initially provides industrial entities with most of their allowances for free.[22] For most sectors, the percentage given for free then decreases as the program progresses according to leakage risk classification.[23] In the first compliance period, the average industrial entity receives about 90% of the allowances for free. Recent proposed amendments may extend this level of transition assistance into the second compliance period for specified regulated sectors.

- **Auctions:** Allowances that are 1) not given away for free according to the regulation, or 2) consigned by regulated utilities, are sold at state auctions administered and overseen by CARB.[25] The auctions use a single-round, sealed-bid, uniform-price format. Participants submit confidential bids for a specific amount of allowances at a specific price, also called a bid schedule. The highest bidder in the auction is sold their requested quantity of allowances first, then the second highest bidder, and so on until there are no more allowances. All winning bidders receive the quantity of allowances they bid for at a uniform settlement price, which is determined as the value of the lowest winning bid, also known as the auction clearing price. Regardless of their original bids, all winning bidders pay the same price.[26]

  Auctions are held quarterly—every February, May, August, and November—and bids are submitted through an online platform. Two types of allowances are auctioned—current year vintage and future year vintage allowances. Current year allowances are eligible for use starting in the year they are auctioned, while future year allowances can be banked for later use but may not be used for compliance until their vintage year (typically three years after the year in which they were auctioned).[27] For example, in the four auctions held in 2013, the current year allowances offered for sale were 2013 vintage and the future year allowances offered were 2016 vintage. Auctioning of future vintage allowances enables compliance entities to plan or bank for future compliance.[28]

- **Price stability:** The floor or minimum price per allowance is set in the regulation at $10 in 2012, and increases by 5% plus the rate of inflation as measured by the Consumer Price Index (CPI) for all urban consumers each year thereafter.[29] To ensure that prices do not spike drastically, a percentage of allowances from 2013–2020 are set aside at the beginning of the program in an Allowance Price Containment Reserve (APCR). If needed these allowances are offered for sale through a reserve auction at three pre-set price tiers: $40, $45, and $50, which also increase by 5% annually plus the rate of inflation. Once all of the allowances in the first price tier are sold, allowances will then be sold at the second tier price and so forth. These reserve auctions are scheduled to take place six weeks after each quarterly auction if requested by participants,[30] but no reserve auctions have been held to date, as market prices have remained significantly below the lowest price tier of $40.

Cap and trade acts as a "safety net" for California, ensuring that all necessary reductions occur to meet the 2020 target, even if the estimated reductions from other measures fall short.

- **Offsets:** Compliance entities can use offsets to cover up to 8% of their compliance obligations.[31] The provision of credible offsets provides an important cost containment mechanism by increasing the supply of low-price compliance options.[32] Offsets also encourage and provide economic value for emissions reductions in sectors not covered by the cap. Protocols currently approved by CARB include:[33]
    - U.S. forest projects
    - Urban forest projects
    - Livestock projects
    - Ozone depleting substances (ODS) projects

While the cap-and-trade program is sometimes referred to as the cornerstone of California's climate change program, it is only one of a varied suite of policies implemented to help the state reach its GHG reduction goals. Cap and trade acts as a "safety net" for California, ensuring that all necessary reductions occur to meet the 2020 target, even if the estimated reductions from other measures fall short.[34] Therefore, the amount of reductions attributed to the cap-and-trade program will depend on the performance of the other policies. According to CARB's July 2013 update to the legislature, cap and trade will provide approximately 22.5% of the reductions needed to reach 1990 emission levels (see Figure 3, page 4).[35]

State of the carbon market

Quarterly auctions

The successful state-run auctions are evidence of a well-constructed, strong, and adaptive policy.

The last day of market data collection for this report was November 30, 2013.

Auctions are an important part of the cap-and-trade program because they provide an opportunity for price discovery. The settlement price of each auction acts as a periodic measure of how the market values the underlying asset, the emissions allowance. Auctions also ensure an efficient and fair distribution of allowances and prevent windfall profits for certain participants at the expense of others.[36] So far, California has held five auctions through which compliance and non-compliance entities have purchased more than 117 million allowances.[37] CARB has estimated it will auction approximately 118 million allowances in 2014.[38]

- **Settlement price:** In the auction of 2013 vintage allowances (current auction), the settlement price per allowance climbed from just above the floor at $10.09 in the first auction to $14.00 in May 2013, and then settled at $11.48 in the last auction of 2013 (see Table 1, page 9). The volume-weighted average settlement price over all five auctions was $12.00, which is 12% over the floor price. A $3.91 range in auction settlement price with no significant spikes indicates a smooth transition to a capped economy. In addition, recent settlement prices closer to the floor price reflect a lower-than-expected cost of compliance for regulated entities in this first compliance period, giving entities sufficient time to adapt to the cap and make any needed emissions reductions before the floor price rises in later compliance years.

  In the advance auction of future vintage allowances for use starting in three years' time, the settlement price remained at the floor price for the first three auctions, after which the price per allowance increased to $11.10 in the last two auctions (see Table 2, page 9). This price increase indicates growing demand for future credits during the second half of the year.

- **Volume:** In all five auctions, every 2013 vintage allowance available for sale was purchased (see Table 1, page 9). Full subscription in the current vintage auctions indicates a competitive market and a healthy interest from market participants. The first five auctions also demonstrated a strong level of competition shown by a cumulative ratio of 1.66 bids placed compared to the number of allowances available for sale. This means that approximately 53.9 million more bids were made than could be filled. In the advanced auctions, both 2015 and 2016 vintage allowances were auctioned. 14% of 2015 vintage allowances and 81% of 2016 vintage allowances available were purchased (see Table 2, page 9). The last two auctions saw the complete sale of future allowances, reflecting growing confidence in the future and longevity of the market.

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:** Across all five auctions, there have been 142 unique **qualified bidders** (see Table 3, page 9). The increasing number of regulated companies registered to participate in at least one of the quarterly auctions is an indication that a growing proportion of market participants are planning their compliance strategies and adjusting to participation in the carbon market. In-depth analysis shows that 40 companies have registered for four out of the five auctions, while 33 have registered for all five. This indicates there is a core group of companies consistently requesting access to the auction process. The companies that registered for all five auctions were primarily power suppliers and major oil and gas interests.

  Of the unique qualified bidders, 75% were compliance entities, while the rest were companies with no compliance obligations and involved in the market most likely for financial or speculative purposes. The breakdown of registered bidders by type as shown in Figure 4, page 10, shows substantial participation from electricity generators and importers of electricity, who represented approximately 56% of California's capped emissions in 2013.[39] Overall, the participant pool is diverse, with representation from all regulated sectors.

TABLE 1

Current auction of 2013 vintage allowances

	Nov 2012	Feb 2013	May 2013	Aug 2013	Nov 2013
Floor price	$10.00	$10.71	$10.71	$10.71	$10.71
Settlement price	$10.09	$13.62	$14.00	$12.22	$11.48
Current allowances offered	23,126,110	12,924,822	14,522,048	13,865,422	16,614,526
Current allowances purchased	23,126,110	12,924,822	14,522,048	13,865,422	16,614,526
% of current allowances purchased	100.0%	100.0%	100.0%	100.0%	100.0%
# of bids: # sold (ratio)	1.06	2.47	1.78	1.62	1.82

Source: California Air Resources Board Auction Information[40]

TABLE 2

Advance auction of future vintage allowances

(2015 and 2016 vintage)

	Nov 2012*	Feb 2013	May 2013	Aug 2013	Nov 2013
Floor price	$10.00	$10.71	$10.71	$10.71	$10.71
Settlement price	$10.00	$10.71	$10.71	$11.10	$11.10
Future allowances offered	39,450,000	9,560,000	9,560,000	9,560,000	9,560,000
Future allowances purchased	5,576,000	4,440,000	7,515,000	9,560,000	9,560,000
% of future allowances purchased	14.1%	46.4%	78.6%	100.0%	100.0%
# of bids: # sold (ratio)	0.14	0.46	0.79	1.69	1.64

*2015 vintage allowances were sold at the November 2012 advanced auction while 2016 vintage allowances were sold at all of the advanced auctions in 2013.

Source: California Air Resources Board Auction Information[41]

TABLE 3

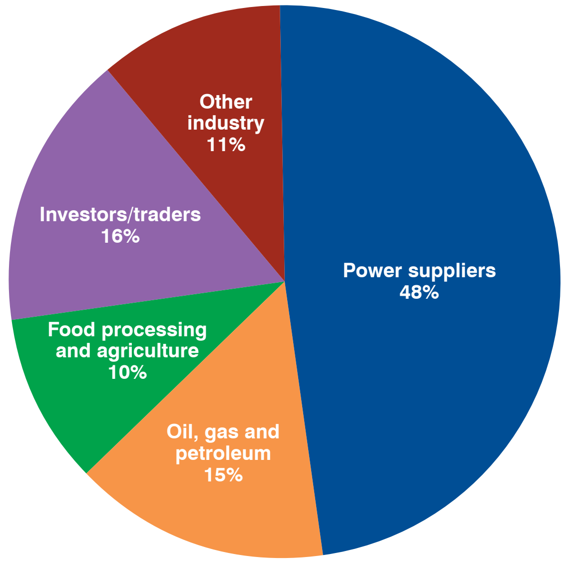
Qualified bidder breakdown

	Nov 2012	Feb 2013	May 2013	Aug 2013	Nov 2013
% compliance entities	87.7%	79.1%	74.1%	78.5%	75.0%
# of registered bidders	73	91	81	79	76
# of new bidders	73	40	14	9	6

Source: California Air Resources Board Auction Information[42]

FIGURE 4

Breakdown of qualified bidders across all auctions by type



Source: California Air Resources Board Auction Information[43]

Auction proceeds

Wise investment of cap-and-trade auction proceeds can be an integral part of achieving AB 32 emission reduction goals.

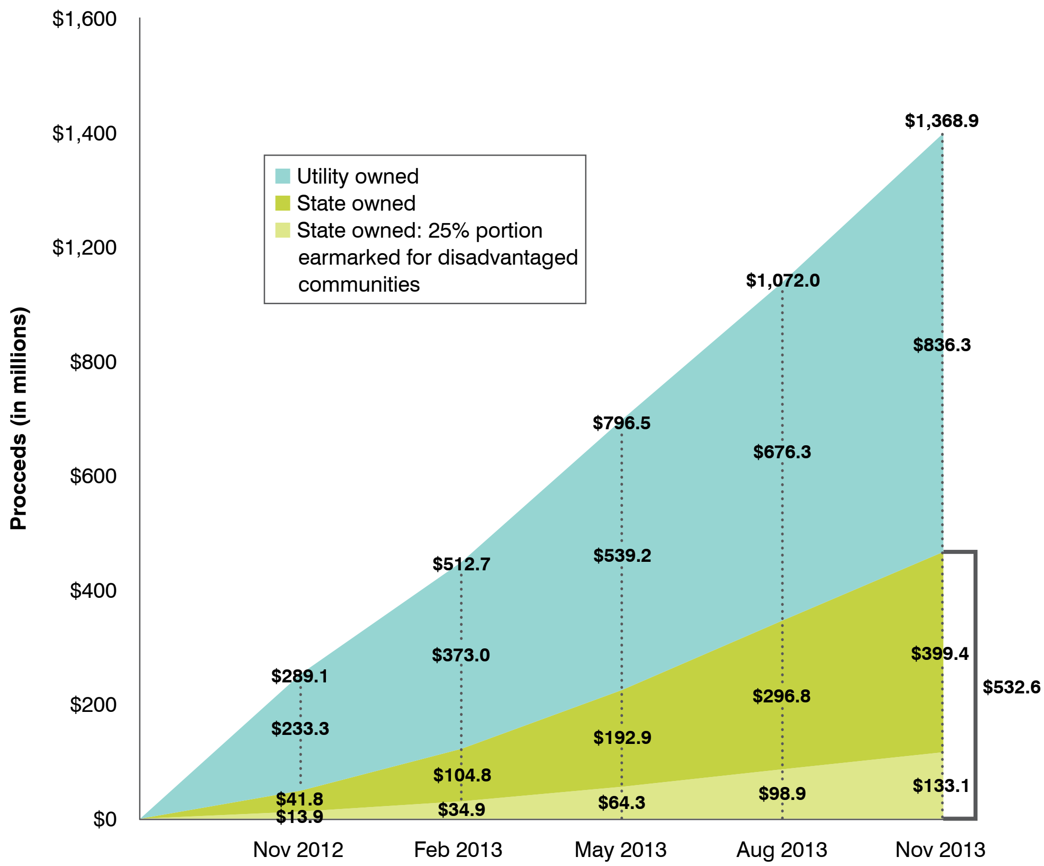
The first five auctions have raised a total of $1.37 billion – $532 million from the sale of state allowances and $836 million from the sale of utility allowances (see Figure 5, page 11). By law, all proceeds from the auction of non-utility allowances are deposited into the state's Greenhouse Gas Reduction Fund and are required to be invested in GHG reductions through activities like renewable energy, energy efficiency, advanced vehicles, water and natural resource conservation, and waste reduction.[44] Pursuant to Senate Bill 535 (De León), at least 25% of the auction proceeds must be spent on programs that benefit disadvantaged communities, which disproportionately suffer from air pollution, and a minimum of 10% must directly fund projects in those communities.[45] The California Environmental Protection Agency has identified disadvantaged communities' zip codes based on geographic, socioeconomic, public health, and environmental hazard criteria.[46] Pursuant to Assembly Bill 1532 (Pérez), the Department of Finance, in collaboration with CARB, has developed a three-year investment plan for the state-controlled auction proceeds.[47] Although Governor Brown has taken a one-time loan of $500 million from the state's auction proceeds to put towards the General Fund, he has committed to returning these funds.

The $836 million in proceeds from utility allowances come from both investor-owned utilities (**IOUs**) and from publicly-owned utilities (**POUs**). As required by the California Public Utilities Commission (CPUC), the IOUs must consign their allowances at auction and the proceeds of these sales must go back to their customers. The CPUC has also ruled that 85% ($659.7 million to date) of IOU utility allowance proceeds must go back to households, 10% ($77.6 million to date) to small business and 5% ($38.8 million to date) to leakage exposed businesses.[48] POUs are not mandated, but may also decide to consign some of their allowances to auction.

The main difference between an investor-owned utility (**IOU**) and a publicly-owned utility (**POU**) is how they are owned. An IOU gets funding from a variety of shareholders who invest money by buying stock. In California, there are three IOUs: Pacific Gas and Electric Company, Southern California Edison and San Diego Gas & Electric. A POU, however, cannot be listed on the stock exchange, and receives money from a group of customer owners. Examples of POUs include Sacramento Municipal Utility District and Los Angeles Department of Water and Power.

FIGURE 5

Total quarterly auction proceeds from the first five auctions



Source: California Air Resources Board Auction Information[49]

Secondary market

The secondary market for California carbon allowances is robust and healthy, reflecting increased confidence, familiarity, and participation in the California carbon market.

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.

With the advent of California's first cap-and-trade auction in November 2012, a secondary market for the sale of GHG allowances and allowance derivatives has developed. This secondary market consists of trades in 1) current and future vintage allowances, 2) current and future GHG offsets, and 3) contracts to deliver valid allowances and offsets in the future (termed "futures contracts"), and is similar to secondary markets developed alongside other environmental and commodities markets. This market is seen as an indicator of overall carbon market health and is helpful in understanding price and liquidity trends.

As shown by the clearing prices across the largest trading exchange, the IntercontinentalExchange (ICE), allowance prices on the secondary market have stabilized while trade volumes have increased (see Figure 6, page 12). Greater trade volumes indicate increasing **liquidity** in the secondary market. During the first half of 2013, the average daily volume of trades made across all futures contracts on ICE was about 372,900. In the second half of 2013, up to the end of November, this daily average increased to about 408,000 (an increase of about 9%). The average daily volume for the year overall was 389,100 allowances. While this is a moderate volume day-to-day, it represents a small fraction of the number of

The **benchmark contract** is the term for the contract that is the most heavily traded on the secondary market, and as such, has the most liquidity and price transparency. Accordingly, benchmark contract prices are commonly used as a point of reference. In 2013, the benchmark contract was set by for the trade of the sale of current allowances (2013 vintage) with a delivery date of December 2013. The benchmark contract for future allowances was for trade of 2016 vintage allowances with a delivery date of December 2015.

allowances sold in each auction (2.3% of the volume sold in the latest auction). Thus, more significant allowance acquisition is possible through the quarterly auctions than the secondary market. Trade volumes on the secondary market are expected to increase further as entities approach the date when they must surrender a portion of their allowances.

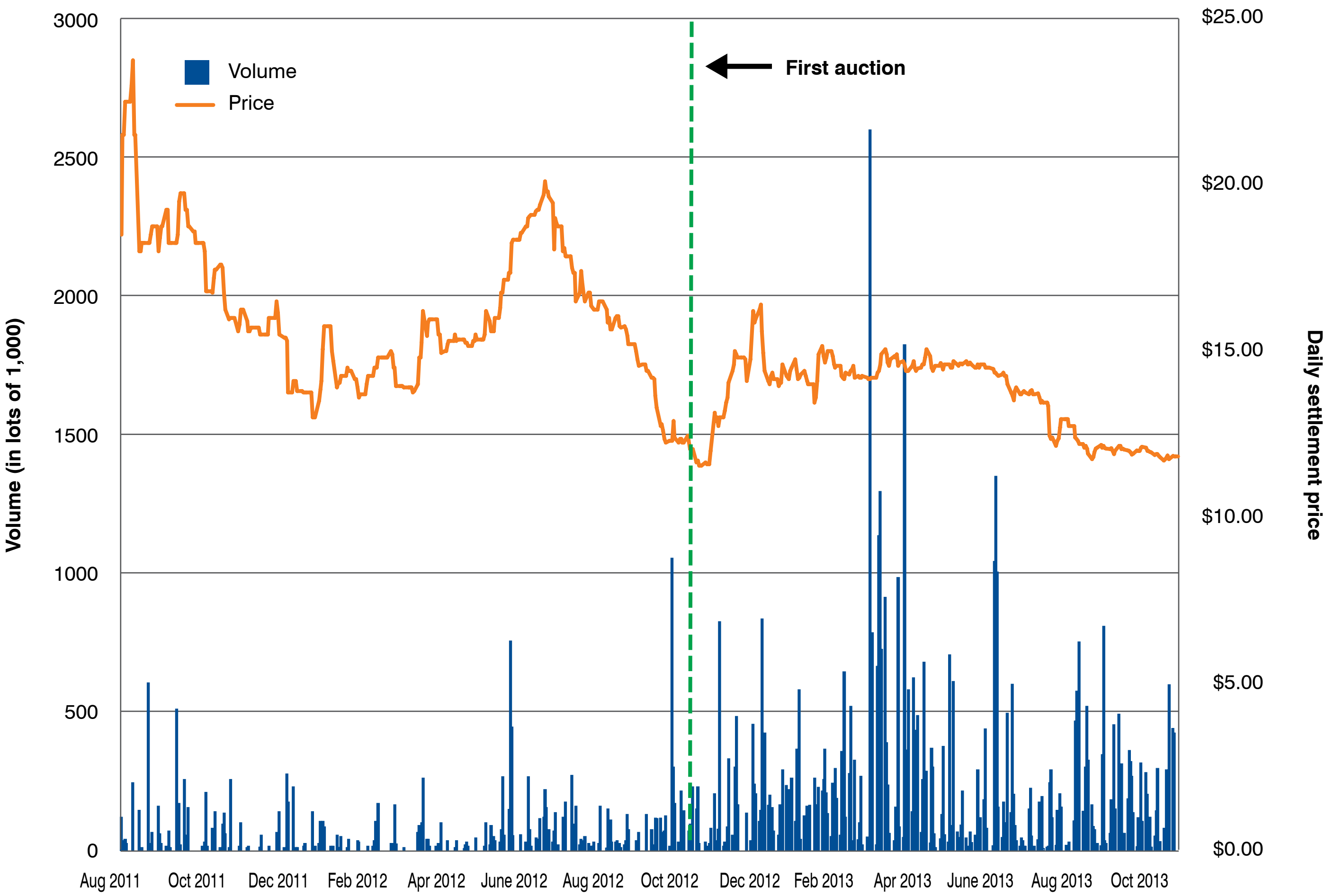
Along with volume, a good measure of liquidity in any market is the bid-ask spread. The "bid" is the price that someone is willing to pay for an asset, whereas the "ask" is the price at which someone is willing to sell. The difference between the two prices is the bid-ask spread. In a market with high 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. As shown by secondary market tracking data reported by Point Carbon, the bid-ask spread has tightened since the start of the quarterly auctions, as is shown in Figure 7, page 13. The average end-of-week bid-ask spread before the first auction was $0.96, while the spread after the first auction through November 2013 was about $0.22. This reflects increased confidence, familiarity, and participation in the California carbon market.

The relationship between allowance prices at auction and allowance prices on the secondary market is shown in Figure 8, page 13. For comparison, the price of the **benchmark contract** for the 2013 vintage year as cleared over ICE is shown alongside the settlement prices in the

FIGURE 6

Allowance price and traded volume on the secondary market

(Vintage 2013, December 2013 contract)

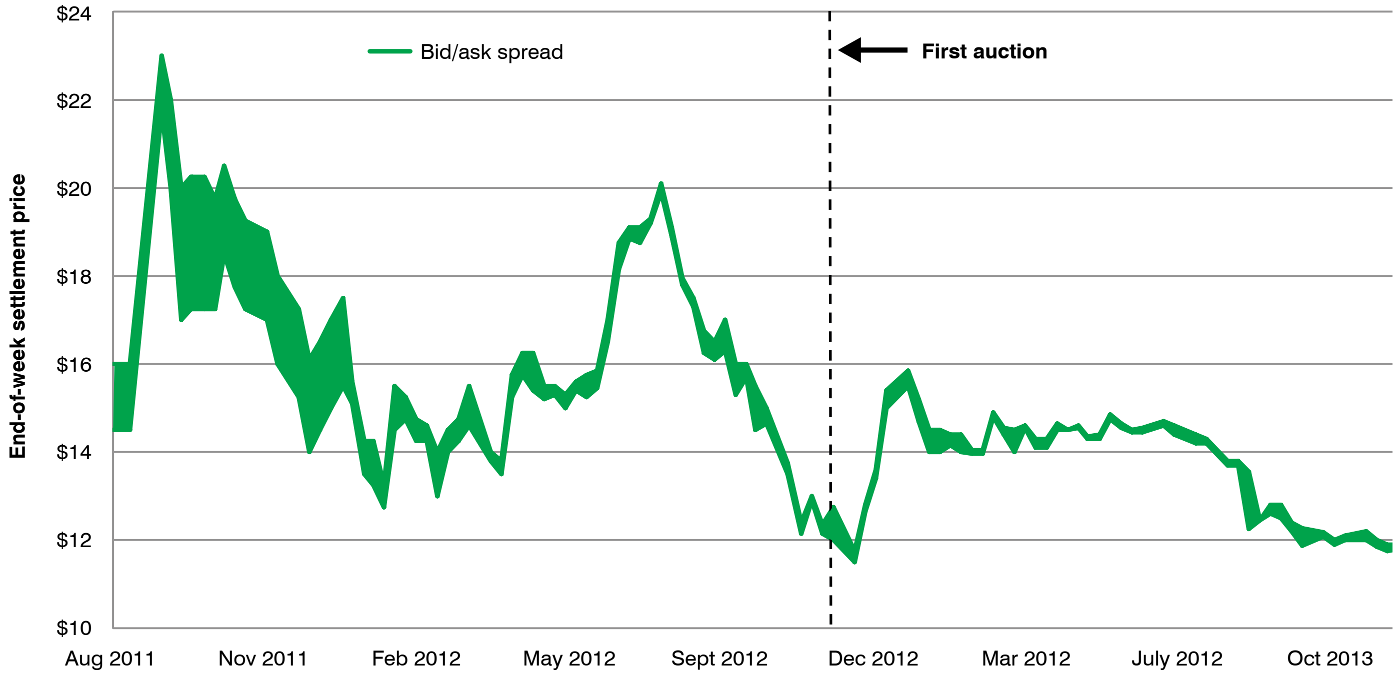


Source: IntercontinentalExchange, Inc.

FIGURE 7

End-of-week bid/ask spread for Vintage 2013

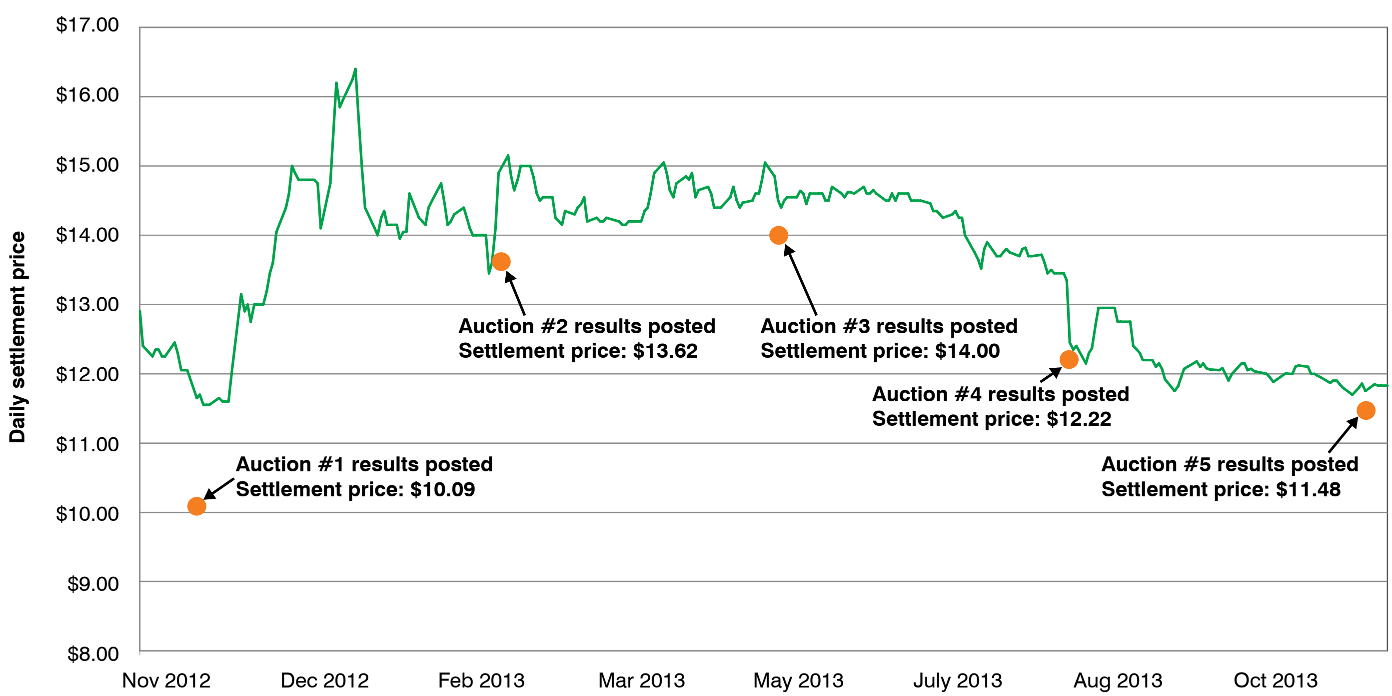
December 2013 contract



Source: Point Carbon

FIGURE 8

Vintage 2013, December 2013 contract price on secondary market



Source: Daily secondary settlement prices from Intercontinental Exchange, Inc. and auction settlement prices from California Air Resource Board quarterly auctions for that same vintage year. From this comparison it is evident that, except for the first auction, the prices on the secondary market very closely align with the settlement prices of the quarterly auctions. In the last three auctions, the settlement price has served as a price gauge, pulling the secondary market one way or another to better align with auction results. The small price fluctuation seen at the beginning of the program followed by greater price stability at the end of the year was expected, as market participants gained a better understanding of their positions in the market and established their compliance strategies.

The trading of future vintage allowances on the secondary market offers useful insight into long-term price indicators and market health. In May 2013, there was a steep decline in price

Why do allowance prices fluctuate over time and why do opinions differ over what they will be?

Just like with other goods, the price of allowances is controlled by supply and demand. If there are a large number of goods (high supply) relative to how many people want that good (low demand), then prices are lower. If there are relatively few allowances compared to how many people want them, prices will be high. The carbon allowance market is nuanced and expert economists often disagree about expected allowance prices. The following is a high-level overview of several factors that can and will influence allowance prices.

The cap: The cap corresponds to the number of allowances available for purchase. The scarcity or abundance of tradable emissions allowances in relation to the demand for those allowances affects the overall market price.

The cost of reducing emissions: If it is cheaper to reduce emissions on-site—by installing a new energy efficient boiler, for example—than to buy allowances, businesses will reduce emissions on-site. The more low-cost opportunities to reduce on-site emissions, the lower the allowance prices. As the cap declines, some businesses will have to reduce emissions on-site.

Offsets: Regulated entities may meet up to 8% of their compliance obligation with certified offsets.[50] By providing out-of-cap reductions to be used for compliance, offsets increase the potential overall supply of low-cost credits to regulated entities. However, if protocols currently approved by CARB cannot supply sufficient credits to meet the full offset demand, as some predict,[51] prices of allowances will be higher than they would be with higher offset availability.

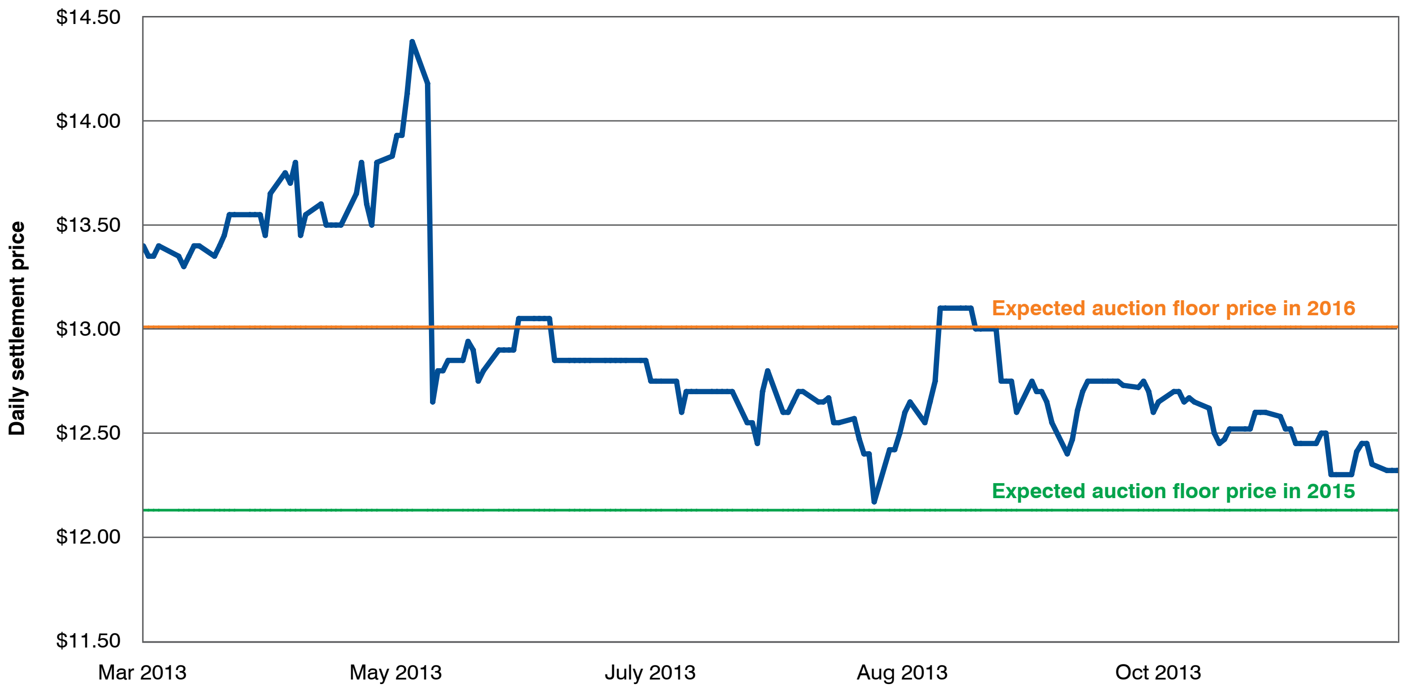
Future expectations: Since entities can "bank" allowances and save them for later use, many are expected to buy allowances in the near term if they expect future prices to be higher. In turn, this will temporarily reduce supply and may result in a commensurate increase in prices. Additionally, if there is an expectation that the cap-and-trade program will continue with a declining cap past 2020, there may exist an increased incentive to bank allowances and cause an upward shift in allowance prices.[52]

Other policies to reduce GHG emissions: California has over 70 regulations targeted to help the state meet the AB 32 reduction target, including the Low Carbon Fuel Standard, the Renewable Portfolio Standard, energy efficiency policies, and clean car standards. CARB estimates that policies other than cap and trade will achieve about 78% of needed emissions reductions.[53] However, if these policies do not achieve their expected reductions, cap and trade will assure overall reductions are still realized. More emissions reductions achieved through these complementary policies will create less demand for carbon allowances and lower prices, and vice versa.

Size of California's economy: California's economic growth does not have to be paired with corresponding growth in statewide GHG pollution. Conversely, as the state's economy continues to decarbonize, steady economic growth can occur simultaneously. However, the decoupling of economic and emissions growth is not yet fully achieved in California, so a sudden drop in economic activity could mean a drop in allowance prices.

FIGURE 9

Vintage 2016, December 2015 contract price on secondary market



Source: Settlement prices from Point Carbon, expected floor prices based on projections of CPI rate of inflation made by the Congressional Budget Office[54]

for the benchmark contract for trade of Vintage 2016 allowances in response to the results of the third auction (see Figure 9). Excluding the data points prior to the drop in prices, the average trading price of this contract for Vintage 2016 allowances has been approximately $12.68. This is $0.55 above the expected floor price for 2015 and $0.33 under the floor price for 2016. The fact that this contract is trading at this relatively high price point three years before it can be used for compliance is an indication of market participants' confidence that the market will be in place in 2016 and likely to be actively trading through 2020.

Offsets market

Although the offsets market has been quiet thus far, recent developments suggest greater activity ahead.

If an offset credit is invalidated because it failed to create a meaningful emissions reduction, it must be replaced by a credible emissions reduction. In the cap-and-trade regulation, CARB has placed the responsibility of replacing that offset on the firm which purchased it, otherwise known as **buyer liability**. Alternatively, **seller liability** refers to when the offset developer is held accountable for the replacement of the invalidated credit.

Over the past year, the market for offset credits usable for compliance by regulated entities has been slow to develop. This slower-than-expected growth is likely due to a series of factors, including:

- the limited number of certified offsets protocols,
- the high degree of prudence exercised by CARB in the verification and issuance process,
- the potential cost burden of **buyer liability** and the risk of credit invalidation as perceived by would-be purchasers,
- proposed legislation that could restrict the use of certain types of offsets,[55]
- the fact that compliance entities do not need to retire any credits until November 2014, and
- a belief in the long-term persistence of low carbon prices in the program as a whole.

The California Emissions Trading Master Agreement

By Rick Saines (Principal, Baker & McKenzie LLP)

On October 2, 2013 the International Emissions Trading Association (IETA) published a free template contract for secondary market trading of California carbon products. Known as the California Emissions Trading Master Agreement (CETMA), the template was developed over a six-month period by a drafting committee comprised of energy and carbon traders, lawyers, and executives at some of California's largest covered entities—including investor-owned utilities, fuel refiners and suppliers, and independent power producers—along with financial intermediaries, brokers, offset project developers, and others.

The result of this process is a document that clarifies and standardizes ambiguous regulatory concepts, provides certainty to counterparties while maintaining needed flexibility, and enhances overall market liquidity by lowering transaction costs for market participants. For instance, the CETMA contractually shifts the risk of offset invalidation from buyer to seller, flipping liability from regulatory default. The rationale behind this approach is fairly simple: by allocating offset invalidation risk to the seller, the CETMA turns what had been a novel and poorly understood regulatory risk into a relatively simple matter of counterparty credit risk, which is something all market participants are accustomed to analyzing. An expected result of the CETMA is a more liquid secondary market for offsets. Likewise, secondary market trading of allowances is expected to pick up as buyers and sellers continue to gain comfort with, and harmonize, key contract terms. The CETMA thus marks an important milestone in the development of a strong, stable, and transparent carbon market in California.

On September 24, 2013, the offsets market received a boost when CARB announced the issuance of the first batch of certified compliance offsets, converting 611,622 early action credits into ARB Offset Credits, or ARBOCs. As of the end of November 2013, CARB has issued a total of 3,239,096 ARBOCs (see Table 4). Now that ARBOCs have been issued and the surrender date for compliance instruments by regulated entities approaches, it is likely that increased interest in the market will result in more transactions. Similarly, the introduction of a standard offsets trading contract, called the California Emissions Trading Master Agreement (see "The California Emissions Trading Master Agreement," above), and the development of insurance mechanisms to protect against credit invalidation risk, are both working to speed up the development of the offsets market. Finally, the potential approval of two new offset protocols by CARB—for mine methane capture and rice cultivation—is expected to grow the market even further throughout 2014.

TABLE 4

Number of ARB Offset Credits issued

(as of the end of November 2013)

	U.S. forest	Urban forest	Livestock	ODS	Total issued
September 2013	0	0	0	611,622	611,622
October 2013	0	0	0	514,701	514,701
November 2013	1,360,806	0	31,348	719,619	2,112,773
Total	**1,360,806**	**0**	**31,348**	**1,845,942**	**3,239,096**

Source: California Air Resources Board Offsets Issuance[56]

Carbon price forecasts

Despite forecasts of low prices, California's carbon market will keep the state on the fast track to reducing emissions.

Over the last three years, several analyses have been released—by industry analysts, academic institutions, non-profit organizations, news organizations, and business groups—that purport to forecast prices and availability of credits in the AB 32 cap-and-trade program. Over time, these forecasts have ranged from low to high, with results dependent on input assumptions and calculation methodologies.

One example of the impact that carbon price forecasts can have on the market was seen in September 2013, when Point Carbon (PC), an industry and markets analysis firm, released a forecast predicting the carbon market would be oversupplied with allowances through 2019. According to PC, AB 32 credit prices would likely remain near the floor price through 2020.[57] This projection was 66% lower than PC's previous estimate that forecasted $75 per allowance in 2020.[58] The cap-and-trade market prices reacted in a bearish manner to this projection, resulting in declining real-time allowance prices for a few weeks before leveling out at the end of September (see Figure 8, page 13). One reason given by PC for the drastic revision was that "emission reduction policies such as California's aggressive Renewable Portfolio Standard, and slow economic recovery have dramatically reduced emissions in the state."[59] While some stakeholders were caught off-guard by this forecast, several market experts have indicated that this was to be expected. For example, analysts from Alpha Inception note, "The truth is that the market is in oversupply by design and not by happenstance, which should not have been a surprise to well-informed participants. This was a wise and economically astute decision by CARB to ensure the program's smooth launch."

In addition to impacting AB 32 allowance prices, the PC estimate also revealed that California is on its way to meeting the statewide 2020 reduction target at lower costs than previously projected. While PC's estimate may be seen as positive news from an environmental perspective, it is important to note it is based on market models that are limited by starting assumptions and forecasting uncertainties. For example, price projections in the PC model are based on the assumption that the program would end in 2020, even though stakeholders from all segments of the carbon market (see "Interviews with California carbon market experts," page 24), as well as the staff at CARB,[60] have voiced the necessity of setting post-2020 caps. Additionally, in a study conducted by Climate Connect Ltd, 71% of respondents said they believe post-2020 targets from CARB are either somewhat important or very important to their current outlook for near-term allowance prices.[61]

Linkage

Linkage is an important avenue for California to build its carbon market and maximize the impacts of its cap-and-trade program. Linkage with Quebec is the first step.

Pursuant to the cap-and-trade regulation, linkage means the "approval of compliance instruments from an external greenhouse gas emissions trading system to meet compliance obligations . . . and the reciprocal approval of compliance instrument issued by California to meet compliance obligations in an external [program]."[62] According to state law adopted pursuant to Senate Bill 1018 in 2012 (Committee on Budget and Fiscal Review), to approve linkage with an external program, CARB must notify the Governor that the agency intends to take such action and the Governor must make specified findings.[63,64]

The first and only jurisdiction to link with California's cap-and-trade system to date is the Canadian province of Quebec. Quebec's program, nearly identical in design to California's, came into effect on January 1, 2013 with approximately 80 facilities from the industrial and power generation sectors covered during the first compliance period.[65] Linkage between Quebec and California under the Western Climate Initiative (WCI) began as of January 1, 2014, and joint auctions are planned for later this year.[66]

According to the Quebec cap-and-trade law, the province's target is to cut GHG pollution to 20% below 1990 levels by 2020.[67] This mandate is deemed by observers as very rigorous considering that as of 2010, 97% of Quebec's electricity came from renewable sources, the vast majority from hydropower.[68] With minimal reduction opportunities in the electricity and manufacturing sectors, most of Quebec's pollution cuts are expected to come from the transportation sector, primarily cars and trucks.[69]

Like California, Quebec will allow for compliance entities to use offsets to meet up to 8% of their compliance obligation, although only three offset protocols have been approved by the jurisdiction so far: a manure storage facilities protocol, landfill sites protocol, and ozone depleting substances protocol. Given the small number of approved protocols, as well as the limitation that projects under two of the protocols can only come from within the borders of Quebec and projects under the third only from within the borders of Canada,[70] the province is not expected to generate a significant amount of offsets in the first compliance period.

Due to both the limited reduction potential and limited offset pool, it is projected that Quebec will be a net buyer of allowances from the California cap-and-trade program, though only in modest quantities.[71] In addition, with a population of 8 million and a 2020 regulated emissions cap of 54.7 $MMTCO_2e$,[72] compared to California's population of 38 million and a 2020 regulated emissions cap of 334.2 $MMTCO_2e$, Quebec represents a much smaller market than California. Accordingly, California will likely remain the primary driver of prices amongst the linked jurisdictions. Until recently, little activity had been seen in Quebec's carbon market, but at the beginning of November, reports indicated that some Quebec companies have begun to hedge in the California market.[73]

Relevant litigation with developments in 2013

California's cap-and-trade program has launched successfully despite ongoing lawsuits.

A number of prior and ongoing court challenges have added uncertainty to California's carbon market, but despite these legal proceedings, the market has functioned remarkably well in its first year. Below are updates on the outstanding cases related to California's cap-and-trade program:

- **Offsets challenge:** In 2012, Citizens Climate Lobby and Our Children's Earth Foundation challenged the use of offsets and charged that CARB's adoption of four offsets protocols under California's cap-and-trade program violates AB 32.[74] In January 2013, a state trial court released a decision in favor of California, offering unequivocal support for the legality of the offsets portion of the program. Our Children's Earth Foundation appealed the decision in California's First Appellate District; briefing was ongoing as of date of publication and a hearing date has yet to be scheduled.[75]

- **Auction challenge:** The day before the first auction in November 2012, the California Chamber of Commerce sued CARB, arguing that the agency did not have authority under AB 32 to hold auctions and that auctioning allowances resulted in an illegal tax.[76] In February 2013, Morning Star Packing Co., a regulated entity, and other small businesses represented by the Pacific Legal Foundation, filed a similar suit that was considered with the Chamber case.[77] In November, the Sacramento Superior Court found that CARB does have authority under AB 32 to hold auctions and that California tax law does not impose a restriction on auctioning allowances. An appeal in the case is expected.

- **Low Carbon Fuel Standard (LCFS) challenges:** In 2010 and 2011, ethanol and oil interests sued CARB in both state[78] and federal[79] court over the state's LCFS. Although the LCFS is a separate regulation from cap and trade under AB 32, the LCFS is expected to reduce the carbon intensity of fuels sold in California by 10% by 2020, and therefore have a significant impact on statewide emissions. Furthermore, the LCFS lawsuits involve general issues of state authority and regulatory process – both of which relate to the state's cap-and-trade regulation. Currently, both state and federal LCFS cases are ongoing, though as of December 2013 significant rulings have been made in both courts allowing the LCFS to continue toward implementation. Additionally, in July 2013, the state Court of Appeal in Fresno found that errors had occurred in the process of adopting the state LCFS and ordered CARB to correct such errors, which is underway. As a result, additional administrative procedures have been implemented during adoption of cap-and-trade amendments to ensure compliance with regulatory process requirements.

Reported greenhouse gas emissions

Despite a slight increase in 2012 emissions, California is still on track to meet 2020 goals.

As required by AB 32, CARB developed a mandatory reporting regulation in 2008 to ensure the timely reporting of annual GHG pollution data by major emitters across the state.[80] A closer look at the numbers in Table 5 shows a slight increase of statewide GHG emissions between 2011 and 2012, mostly attributed to the closure of the San Onofre Nuclear Generation Station (SONGS) in Southern California and a smaller amount of hydropower available in 2012 due to a relatively dry winter. Both of these factors meant that in 2012, less of California's power came from emissions-free sources.

As the economy continues to recover, innovation in clean technologies driven by cap and trade and its complementary policies will mitigate the factors that led to the increase in 2012 emissions. Given the current policy framework, California should readily achieve AB 32's 2020 reduction goal, according to a 2013 Lawrence Berkeley National Laboratory study commissioned by CARB.[81]

TABLE 5

Mandatory GHG emissions reporting from 2008 to 2012

(in $MMTCO_2e$)

Source category	2008	2009	2010	2011	2012
Facilities total	131,670,341	121,577,137	116,569,398	110,047,913	123,229,788
Electricity imports and fuel suppliers total	NA	NA	NA	319,239,535	314,612,368
Grand totals	131,670,341	121,577,137	116,569,398	429,287,448	437,842,156

Source: California Air Resources Board[82]

Proposed regulation amendments

Continued administrative oversight, economic analysis, and public input have resulted in a list of proposed cap-and-trade regulation amendments scheduled for consideration in spring 2014.

CARB released a set of proposed regulatory amendments to the cap-and-trade regulation for public comment in September 2013, following nearly 18 months of public meetings and deliberations. The proposed revisions cover several areas of the regulation, including, but not limited to:[83]

- adjustments to some industrial sector benchmarking methods,
- free allocation of emissions credits to specified sectors like universities and colleges,
- free allocation of emissions credits for legacy power contracts,
- extension of free allocation of emissions credits to businesses for transition assistance,
- exclusion of specified power generation facilities from the program,
- clarifications on resource shuffling provisions and prohibitions,
- adjustments to the Allowance Price Containment Reserve mechanism,
- distribution of allowances to the natural gas sector,
- adoption of an offset protocol for the reduction of mine methane emissions, and
- information sharing and reporting by regulated entities.

After public comment, a revised rule draft was presented to CARB officials in October 2013. At that time, CARB staff disclosed a second set of potential regulatory amendments for development and consideration in the near future, including:

- modification of refinery coverage in the regulation, including provisions on product benchmarks, electricity and steam, hydrogen plants and calciners,
- allocation to public wholesale water agencies,
- reporting requirements to support market oversight,
- information disclosure related to auction participation, and
- market rules which may inhibit secondary market trading and liquidity.

According to CARB staff and market experts, the proposed regulatory changes are expected to have multiple effects on the cap-and-trade regulation. Expected results include increasing the ability of regulated entities to meet short and medium-term compliance obligations, protecting the program from credit price increases, protecting consumers from price increases associated with internalized program costs, and increasing the clarity of regulatory prohibitions.[84] Thus, these changes are likely to protect the longevity of the program and ensure implementation through 2020.

International collaborations and memorandums of understanding (MoUs)

California's program is considered a model for other sub-national and national programs, as demonstrated by the various MoUs signed over the program's history.

Although it is not the first cap-and-trade program or price on GHG pollution, California's program is arguably the most ambitious due to its sheer size and breadth. As such, it has been seen as a model for programs elsewhere in the U.S. and around the world. This has been increasingly evident over the past year from the various foreign governments that have requested California's guidance to establish their own market-based reduction mechanisms. These MoUs do not establish legally binding contracts between the regions, but identify areas of collaboration and facilitate the sharing of information regarding efforts to address climate change. Over the course of the program's development, California has collaborated with:

- **The Western Climate Initiative (WCI):** Formed in February 2007, the WCI is a collaboration of independent jurisdictions (U.S. states and Canadian provinces) that work together to develop emissions trading programs on the regional and subnational level. California's regulation is consistent with provisions laid out in WCI program design documents and linkage with Quebec was facilitated by the initiative.[85]

- **Acre, Brazil and Chiapas, Mexico:** In 2010, Governor Schwarzenegger and representatives of Acre, Brazil and Chiapas, Mexico signed a MoU that led to the establishment of a working group to provide guidance to California on fighting tropical deforestation and carbon pollution around the world through innovative policies that Reduce Emissions from Deforestation and Degradation (REDD).[86] The working group examined design elements, including legal and institutional aspects and social and environmental safeguards, to develop a jurisdictional scale REDD credit trading system that could be used for compliance within California's carbon market. Final recommendations were released in July 2013.[87]

- **China:** In April 2013, Governor Brown signed a MoU with the National Development and Reform Commission of China. The MoU states that both jurisdictions agree to cooperate in "activities to implement carbon emission trading systems and other market-based mechanisms."[88] This MoU is the formal recognition of an extensive partnership that had been ongoing for more than a year between California and China. China is currently establishing and implementing pilot cap-and-trade programs in seven of its provinces and cities covering 250 million people.[89]

- **Australia:** In July 2013, Mary Nichols, the chair of CARB, signed a MoU with the Australian government's Clean Energy Regulator to guide collaboration between the agencies in addressing the global issue of climate change. Under the agreement, the agencies pledge to share information to develop complementary and effective market-based programs to reduce GHG pollution, and support and build on the capacity of the international carbon market.[90] The signing came before a turnover in the Australian government which resulted in a modification of Australia's carbon policies.[91]

- **Pacific Coast Collaborative:** In October 2013, Governor Jerry Brown came together with the leaders of Oregon, Washington state, and the Canadian province of British Columbia to sign an agreement to align their respective climate and clean energy policies. This includes working together to "account for the costs of carbon pollution in each jurisdiction" and, where possible, link carbon-pricing systems.[92]

TIMELINE OF IMPORTANT MILESTONES

This timeline shows notable events leading up to the first auction in California's cap-and-trade program, starting in 2012 and continuing into the market's first year. Also included are upcoming milestones to look for going into the second compliance period.

LITIGATION | INTERNATIONAL COLLABORATION | AUCTION | ACTION PROCEEDS

2012

JANUARY 1
Cap-and-trade regulation officially takes effect, with compliance requirements starting in January 2013.
See page 18

MARCH 28
The Citizens Climate Lobby and Our Children's Earth Foundation file a combined lawsuit to block the use of offsets for compliance (see January 25, 2013 for resolution).
See page 18

JUNE 19
The California Court of Appeal rules in favor of CARB in the 2009 case brought forward by a group of environmental justice organizations.*

SEPTEMBER 30
Governor Brown signs two legislative bills stating that auction proceeds must be used to reduce GHG emissions (AB 1532) and that at least 25% of the state's proceeds must be invested in a manner which benefits disadvantaged communities (SB 535).
See page 10

NOVEMBER 13
The California Chamber of Commerce files a lawsuit challenging CARB's authority to auction allowances (see November 14, 2013 for resolution).
See page 18

NOVEMBER 14
First quarterly auction
See page 9

DECEMBER 20
The California Public Utilities Commission approves a plan for using proceeds from sale of electricity-sector allowances for the benefit of ratepayers.
See page 10

2013

JANUARY 1
Enforceable compliance obligation begins.
See page 5

JANUARY 25
The San Francisco Superior Court upholds CARB's offsets program (see March 28, 2012 for suit filing). The court's decision is thereafter appealed to the California Court of Appeal and the case is ongoing.
See page 18

FEBRUARY 19
Second quarterly auction
See page 9

APRIL 16
The Pacific Legal Foundation, representing Morning Star Packing Company, files a lawsuit claiming the cap-and-trade program imposes an illegal tax (see November 14, 2013 for resolution).
See page 18

APRIL 18
Governor Brown releases findings necessary to allow California's cap-and-trade program to link with Quebec's.
See page 17

MAY 16
Third quarterly auction
See page 9

JUNE 27
California's budget is finalized, which includes a plan to borrow $500 million of 2012 and 2013 proceeds for the state's budget deficit.
See page 10

JULY 15
CARB publishes proposed amendments to the cap-and-trade regulation and solicits public comment on the proposed changes. Consideration of amendments is scheduled for spring 2014.
See page 19

JULY 30
CARB Chair, Mary Nichols, and the Chair of the Australian Clean Energy Regulator, Chloe Munro, sign a MoU on sharing information about market-based reduction mechanisms.
See page 21

AUGUST 16
Fourth quarterly auction
See page 9

SEPTEMBER 24
CARB issues the first offsets that can be used by compliance entities to meet their obligations.
See page 15

OCTOBER 28
The leaders of California, Washington state, Oregon, and British Columbia sign the "Pacific Coast Action Plan on Climate and Energy" to align their respective climate policies.
See page 21

NOVEMBER 4
Facility-level emissions data for 2012 published by CARB.
See page 19

NOVEMBER 14
The Sacramento Superior Court upholds the cap-and-trade program (see November 13, 2012 and April 16, 2013 for suit filings).
See page 18

NOVEMBER 19
Fifth quarterly auction
See page 9

2014

JANUARY 1
Linkage with Quebec begins.
See page 17

MARCH
Proposed cap-and-trade regulation amendments scheduled to be considered around this time.
See page 19

NOVEMBER 1
Market participants must submit allowances to cover 30% of their 2013 emissions.

2015

JANUARY 1
Beginning of second compliance period. Transportation, natural gas and other fuels come under the cap.
See pages 4–5

NOVEMBER 1
Market participants must submit allowances to cover the rest of their emissions for the first compliance period (called a "true-up").

* Association of Irritated Residents, et al. v. California Air Resources Board, et al., No. CPF-09-509562 (Super. Ct. S.F. City and County, 2009).

Expert interviews: California's carbon market

First Solar, Inc.

EDF interviewed five California carbon experts to glean their unique perspective on the progress of the program, including major trends in the state-run auctions, activity on the secondary market, and evaluation of how the program's regulatory design has worked in this first year. The experts interviewed include a regulated entity representative, a broker active in the carbon market, an industry consultant, a carbon market investor, and an academic expert of market-based policies.

Lenny Hochschild

BROKER / EVOLUTION MARKETS

Professional background: Lenny Hochschild is a Managing Director for Evolution Markets, an advisory and brokerage firm for 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 major trends have you seen on the trading floor throughout the year and what do these say about the overall health of the market?
A: There has been a slow and steady increase in participation by end users in the market. Given that the first retirements aren't needed until next November, there is no immediate rush to purchase allowances, but it is reassuring to see additional compliance entities coming into the marketplace. Another trend is the relatively consistent liquidity as compared to last year, with significant increases in average daily volumes traded.

Q: What accounts for the increasing participation you've seen?
A: It is two things. First, it is people understanding better what their compliance positions are. Second, it is the feeling now that this program is here to stay. Half of the conversations last year [2012] were about lawsuits, regulatory decisions, and if CARB is going to be technically ready. The majority of the conversations this year [2013] are around supply and demand, price structures, bids and offers, and where value can be achieved.

Q: What do the high volumes trading in the secondary market indicate?
A: High volumes mean a relatively healthy market. The reason why it is important that volumes are trading is because when you have market participants who want to transact, liquidity is really what they need. Therefore, a better measure of a healthy market is liquidity as opposed to price.

Q: What is the status of the offsets market and what role will offsets play in the future?
A: The biggest positive development in offsets has been the issuance of ARBOCs in September. I believe that this is going to continue to build confidence in the offset marketplace. There is already a fairly well-established offsets market that allows buyers and sellers to procure several different structures and types of offset contracts. So far, pricing in the offsets market has been stable. While the market doesn't appear to be in high demand for offsets in the

"There is the feeling now that this program is here to stay."

–Lenny Hochschild, Broker, Evolution Markets immediate future, the demand will continue to grow as the program continues to move forward and as end users realize that maximizing their percentage of offsets will save them money.

Q: Is it important that CARB set post-2020 goals and if so, when?
A: I think it is important, and the market does too. Market participants and investors want certainty, and policymakers need to provide certainty so that people can plan. Companies are making decisions now about the types of technology or automobile fleets they are going to procure and there needs to be certainty in a post-2020 market as soon as possible.

Q: What were your expectations going into this year and were these expectations met?
A: One year ago I was cautiously optimistic that the program would have a fairly liquid secondary market and that there wouldn't be a court ruling or technical glitch to throw a wrench in the works. It has been a quietly successful year. My expectations were not massive amounts of liquidity, but I was expecting a slow ramp-up period with no technical, regulatory, or legal glitches and so far that is what has happened.

Emilie Mazzacurati

INDUSTRY CONSULTANT / FOUR TWENTY SEVEN

Professional background: Emilie Mazzacurati is the Managing Director of Four Twenty Seven, a climate research and advisory firm. She has ten years of experience working on climate policy and has published extensively on California cap and trade. Previously, she was the Head of Research for North America at Thomson Reuters Point Carbon. Emilie holds a Masters from the Institut d'Etudes Politiques de Paris and a Masters of Public Policy from the Goldman School of Public Policy at UC Berkeley.

Q: From your perspective, what do the past year's auction results indicate?
A: The auction results have been one of the most positive takeaways from this year in the sense that the auctions have gone well, they have been well subscribed, they have cleared at very reasonable prices, and they have indicated a healthy interest in the market with a large number of participants. There has also been moderate turnover of participants, with new companies registered at every auction.

Q: What would you consider to be a good price on carbon?
A: From a public policy standpoint, the lower the price, the better. Of course, you don't want it to go lower than the floor price, but generally, a low price means lower costs for compliance entities and for ratepayers. It also means a little less money in the state's coffers, but that is not what this program is about. This program is about reducing emissions.

Q: How have AB 32's complementary measures, such as the Low Carbon Fuel Standard (LCFS), affected the market?
A: I think the complementary measures are working well, and that is why prices are where they are. CARB is putting a lot of work into planning the next round of policies. The high level of commitment from the governor and involvement of smart scientists from around the state mean California is well positioned to reach its 2050 target. Regulatory policies and economic incentives will be key to this success, along with cap and trade – the so-called "belt-and-suspenders" strategy.

"The auction results have been one of the most positive takeaways from this year."

–Emilie Mazzacurati, Industry Consultant, Four Twenty Seven

Q: Is it important that CARB set post-2020 goals and if so, when?
A: Yes, I believe post-2020 goals should and will be set fairly soon. I think it is very important for the market to know that the program will continue and to know what the target will be. As we get closer to 2020, if there is no price signal beyond 2020, then prices will definitely fall.

Q: What were your expectations going into this year and were these expectations met?
A: Going into this year, there were a lot of issues still up in the air legally and from a regulatory standpoint that have since essentially been resolved or have moved forward enough that they are no longer a concern. The market has started, the sky hasn't collapsed, and the auction platform is working smoothly, so I would say that we are in a much better place than a year ago.

Q: Do you think the market is here to stay?
A: Yes, I think it is and I think CARB has made that pretty clear.

Morgan Hagerty

INVESTOR / CE2 CAPITAL PARTNERS

Professional background: Morgan Hagerty is a Director at CE2 Capital Partners. Prior to CE2, she worked for Morgan Stanley's Commodities group in New York, EDF Trading in London, and the Trust for Public Land in San Francisco. Ms. Hagerty has a BS from Boston College, and an MBA and MEM from Duke University.

Q: What is the status of the offsets market and what role will offsets play in the future?
A: It has taken CARB longer than some people may have liked to approve offset credits, but we understand that it took as long as it did because CARB was making sure they got it right and as a result, the offsets program should be less exposed to further litigation risk. Plus, covered entities don't need to demonstrate compliance until November of 2014, so it is more important to be thorough and accurate. I expect the issuance process to be faster in the future now that the details of CARB's review are clear to participants. As for the future of the offsets market, there is going to be a point where offsets can actually be an exchange-traded commodity and that will come when you have a **CCO8** or **CCO3** that is past its invalidation period. At that point, it doesn't matter what type of offset it is, where it's from, who created it, who verified it; it cannot be invalidated. Starting three years from now, the market will have a true offset commodity, which could be traded on a forward basis, potentially as early as next year.

CCO stands for California Carbon Offset. The '3 in **CCO3** and '8 in **CCO8** refer to the length of invalidation risk associated with an offset. Offsets that are verified once have a risk of eight years in which they may be invalidated by CARB. That term can be reduced to three years by having a second verification done by a second approved verifier.[93]

Q: Is it important that CARB set post-2020 goals and if so, when?
A: Yes, we would like post-2020 caps to be set as soon as possible. It just won't make sense at some point to continue to invest in offset projects unless there is certainty that the program will continue.

> "The most important thing in a cap-and-trade program…is that behavior changes, and behavior is changing. [California companies] are taking into account a carbon price internally when planning… To me, that's success."
>
> –Morgan Hagerty, Investor, CE2 Capital Partners

Q: What were your expectations going into this year and were these expectations met?
A: After the August 2012 auction was cancelled, I was concerned that the first auction in November 2012 might be delayed or possibly even cancelled. So, it was a relief to see that the program started as planned. Looking back, I am very happy that we are where we are.

Q: From your perspective, how has the market been going so far?
A: Thus far it has been successful. To me, the most important thing in a cap-and-trade program or any other carbon pricing environment is that behavior changes, and behavior is changing. Companies are treating power differently; they're planning long-term industrial facilities differently. They are taking into account a carbon price internally when planning, which they didn't have a year ago. To me, that's success.

Q: Do you think the market is here to stay?
A: Yes, although it might look a little different than it does today.

Karsten Barde

REGULATED ENTITY REPRESENTATIVE / PACIFIC GAS AND ELECTRIC COMPANY (PG&E)

Professional background: As a Principal Transactor in Pacific Gas and Electric Company's Energy Procurement division, Karsten is responsible for procurement activities on behalf of PG&E's electric customers, including GHG cap-and-trade compliance instruments. Previously, Karsten worked in Technology & Information Strategy for PG&E's Electric Operations division. He holds an MBA from the Tuck School of Business at Dartmouth.

Q: How has your experience been with auction logistics, platform, and CITSS account?
A: It has been pretty straightforward. I don't think we've seen any major problems with auction logistics so far.

Q: What is the status of the offsets market and what role will offsets play in the future?
A: Unfortunately, there hasn't been a lot happening in the offsets market yet. CARB has just issued its first credits, and that's great because the physical availability should support greater trading. However, I think the big constraint on trading has been the principle of buyer liability. There is no standard agreement for seller liability yet, and market participants are still figuring out how to price that risk. The market also needs more transparent pricing and volume information.

Q: Is it important that CARB set post-2020 goals and if so, when?
A: If CARB extends the cap-and-trade program, it would provide more certainty to the market. Auction results seem to suggest that participants think the market will continue to 2020 and

"Long-term regulatory certainty would help everyone better plan for the future."

–Karsten Barde, Regulated entity representative, Pacific Gas and Electric Company (PG&E)

therefore it is worth banking, but I don't think there's certainty yet beyond 2020. Long-term regulatory certainty would help everyone better plan for the future.

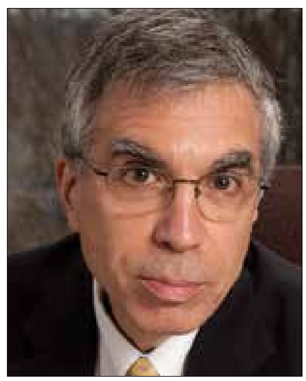
Q: What were your expectations going into this year and were these expectations met?
A: A year ago at this time, PG&E was wrapping up efforts to prepare for cap-and-trade, finalizing internal systems and preparing to implement our plans. At that point there was still a lot of market anxiety and a lot of interest. Looking back now, things have been pretty smooth. Overall, I think market participants are comfortable that the program is working and the market is working. Liquidity is the one area where I'd say I don't yet see what I hope to see and expect to see in the secondary market for allowances.

Q: Do you think the market is here to stay?
A: Yes, although it probably depends on the long-term price impacts, as well as whether other jurisdictions join the program or whether California consumers are asked to go at it alone.

Robert Stavins

ACADEMIC EXPERT / HARVARD UNIVERSITY

Professional background: Robert N. Stavins is the Albert Pratt Professor of Business and Government in the John F. Kennedy School of Government at Harvard University and the Director of the Harvard Environmental Economics Program. Professor Stavins' research focuses on diverse areas of environmental economics and policy, including examinations of market-based policy instruments, of which cap and trade is one. He has studied California's program closely since its inception and has established himself as an authority through numerous publications on the topic.



Q: From your perspective, what do the past year's auction results indicate?
A: In my view, the performance of the auctions indicates that the auction mechanisms themselves were well designed. The prices for the allowances were close to the floor price and this means that the **marginal—or incremental—cost of control** is relatively low. That's good news, not bad news. One reason for this relatively low allowance price is the reduced demand because of the recent recession. That's good news about the cap-and-trade mechanism because it tells us that it's counter cyclical and that cap and trade doesn't continue to punish the economy when it's not necessary, as a carbon tax would. But, to some degree, the low-end allowance prices are due to the reality of the complementary policies that also have an effect on regulated businesses. I don't think this is a problem of the cap-and-trade mechanism itself, but it is the reality of placing so-called complementary policies under the umbrella of the cap-and-trade mechanism.

Marginal/incremental cost of control is the increase or decrease in total cost for the production of one additional unit of output. In this case, it is a measurement of the additional cost of carbon allowances to the output of regulated facilities.

Q: Has implementation of AB32 impacted expectations about the future of cap and trade at the federal and/or international level?
A: Internationally, people are very aware of the cap-and-trade program. I spend a lot of time in Europe and certainly everyone there is watching it closely. The EU is very hopeful because they

> "The auction mechanisms themselves were well designed. Cap and trade doesn't continue to punish the economy when it's not necessary, as a carbon tax would."
>
> –Robert Stavins, Academic expert, Harvard University

The American Clean Energy and Security Act of 2009, otherwise known as the **Waxman-Markey bill**, was an attempt to establish a federal cap-and-trade program. The bill was approved by the House of Representatives, but was not considered in the Senate.[94]

were let down by the fact the **Waxman-Markey bill** didn't move forward in the Senate. So they're very hopeful about what happens in California. If the California system is *perceived* to be a failure (it almost doesn't matter if it is actually a failure or not), then that could be the nail in the coffin for additional jurisdictions not only to take on cap-and-trade mechanisms, but more importantly to take on climate policies in general. That is why I think it is important that this program be well designed. And I think it basically is well-designed, other than having all these other complementary policies. Many of those other policies, such as the Low Carbon Fuel Standard, Renewable Electricity programs, and energy efficiency programs, won't achieve anything additional environmentally since they are acting on sources that are within the cap-and-trade program.

Q: Do you feel that the cost containment provisions included in the program will be sufficient to keep prices low in the future?
A: This question hinges on whether there will be a sufficient supply of credible offsets to meet the demand from the market. And that's a legitimate concern because the state has not been moving as fast as one might have thought in terms of coming up with the definitions of different types of offsets. There is fundamentally a tradeoff between having an adequate number of offsets in the system, and the level of scrutiny placed on additionality.

Q: What are your expectations for the linkage with Quebec? Should California be looking to link with other programs in the future?
A: The impacts of linkage will be felt in Quebec, not California. Linkage is not going to affect the California market, but will affect the Quebec market due to the relative size of the two. That said, I think it is important that California links with credible policies in other jurisdictions. They don't have to be cap-and-trade mechanisms. They can be carbon taxes for instance. This system of bilateral bottom-up linkage is, at this point in time, the implicit future of international cooperation. Everyone is coming to accept that we're not going to see a top-down Kyoto Protocol-like mechanism. Rather, it's going to be partly some kind of bottom-up system, what is referred to as a "hybrid system." Linkage is going to be a very important part of it.

Q: Do you think the market is here to stay?
A: Yes, I think it will be here through the year 2020, which is the current limit in the regulation.

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