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# CALIFORNIA:

## An Emissions Trading Case Study



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# Background

In 2006, California passed its landmark climate policy, the Global Warming Solutions Act (AB 32), which set a greenhouse gas reduction target of 1990 levels by 2020. AB 32 also authorized the creation of California's cap-and-trade program, which since its launch in 2013, has come to cover over 80% of the state's emissions.<sup>1</sup> In 2015, a target of 40% below 1990 levels by 2030 was added, and in 2017 the cap-and-trade program was extended legislatively until at least 2030.

This legislative extension included a few significant changes to the cap-and-trade program, most notably a new price ceiling to be set by the California Air Resources Board (CARB). This will replace the existing Allowance Price Containment Reserve (APCR) that was designed to act as a "soft" price ceiling. Another key change is the decrease in the offsets limit from 8% currently to 4% in 2020, then rising to 6% in 2025. Half of these offsets must also provide "direct environmental benefit to California."<sup>2</sup> To secure passage of the 2017 legislation, a companion measure

addressing local air pollution concerns was also adopted, which represented the most significant step to address air quality at the state level in decades.

CARB has established a firm cap on greenhouse gas emissions and approximately 400 entities have compliance obligations.<sup>3</sup> Since their peak in 2004, emissions have decreased by approximately 10% and the state is ahead of schedule to meet the 2020 target.<sup>4</sup> Compliance has been close to or at 100%.<sup>5</sup> In 2014, California linked its cap-and-trade program with Quebec through the Western Climate Initiative (WCI), and linkage with Ontario took place in January, 2018.

The California cap-and-trade program has successfully withstood three legal challenges. The first, in 2010, claimed that cap and trade was not consistent with the California Environmental Quality Act. CARB did additional alternatives analysis, and the California Court of Appeals ruled in favor of CARB upon consideration.<sup>6</sup> A 2012 lawsuit challenged the use of offsets, and both the trial court and

California Court of Appeal ruled for CARB stating that the agency had acted reasonably to create a set of standardized offset protocols.<sup>7</sup> The most recent challenge was from the California Chamber of Commerce and others claiming the carbon auctions were an illegal tax. The Court upheld the auction mechanism on the grounds that the purchase of allowances versus reducing emissions was voluntary.<sup>8</sup>





# Summary of Key Policy Features

<b>Long-term reduction goal</b>	Reduce emissions to 1990 levels by 2020 (AB 32); 40% below 1990 levels by 2030 (SB 32); 80% below 1990 levels by 2050 (Executive Order S-3-05)
<b>Cap</b>	The 2020 cap is 431 million tCO <sub>2</sub> e. <sup>9</sup> Decreases approximately 12 million tCO <sub>2</sub> e annually, approximately 3.3%. This rate will increase to approximately 13.4 million tCO <sub>2</sub> e or around 5% post-2020 in order to meet the 2030 target. <sup>10</sup>
<b>Compliance Periods</b>	California has had two compliance periods, the first of which ran from 2013 to 2014 and the second was 2015-2017. The third compliance period begins in 2018 and runs until 2020, with three-year compliance periods to follow.
<b>Greenhouse Gases covered</b>	Carbon Dioxide (CO <sub>2</sub> ), Methane (CH <sub>4</sub> ), Nitrous Oxide (N <sub>2</sub> O), Sulphur Hexafluoride (SF <sub>6</sub> ), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Nitrogen Trifluoride (NF <sub>3</sub> ) and other fluorinated GHGs <sup>11</sup>
<b>Sectors Covered</b>	Since 2013, emission sources such as electricity generation (including imports) and large stationary sources (including refineries, oil and gas production facilities, food processing plants, cement production facilities, and glass manufacturing facilities) that emit more than 25,000 tCO <sub>2</sub> e annually have been covered by cap and trade. Beginning in 2015, distributors of transportation fuels, natural gas, and other fuels were also covered. Fuels exclusively for aviation or marine use are not covered. <sup>12</sup>
<b>Number of Entities Covered</b>	Approximately 600 entities have reporting obligations, approximately 400 of those have compliance obligations. <sup>13</sup>
<b>Point of Regulation</b>	Electricity is regulated at the point of generation or, if imported, upon delivery into the state. Large industrial facilities are regulated at the source. Transportation fuels are regulated at “the rack” prior to distribution.
<b>Threshold</b>	>10,000 tCO <sub>2</sub> e for reporting emissions; >25,000 tCO <sub>2</sub> e for compliance obligation
<b>Avg Carbon price</b>	\$11.65 (2014) <sup>14</sup> \$15.06 (Q4 2017) <sup>15</sup>
<b>Allowances Allocation</b>	California distributes allowances differently to each of the three capped sectors: The industrial sector currently receives about 90% of the allowances it needs for free based on output and efficiency such that a producer is not penalized for making more goods and a producer who can make more goods with fewer emissions is rewarded. The utility sector receives free allowances, but must sell those allowances at auction and use the revenue to benefit its ratepayers, primarily through a climate credit on utility bills. The transportation sector does not receive free allowances. All entities that want to purchase allowances can do so through quarterly state-administered auctions or through the private secondary market.
<b>Carbon Leakage Provisions</b>	CARB’s main tool for preventing leakage is through direct allowance allocation based on production levels. This output-based free allocation to the industrial sector incentivizes production and improved energy efficiency such that producers who make more goods with fewer emissions are rewarded with more free allowances. <sup>16</sup>
<b>Use of Revenues</b>	Some revenue is returned directly to utility ratepayers through the California Climate Credit on utility bills. The rest makes up the Greenhouse Gas Reduction Fund (GGRF), which reduces greenhouse gas emissions through climate investments with an emphasis on projects that benefit low-income and disadvantaged communities.
<b>Price/Market Control Measures</b>	Auction Reserve Price – California set a price floor at \$10 per ton in 2012, which increases 5% annually plus inflation. <sup>17</sup> The 2018 price floor is \$14.53. <sup>18</sup> Allowance Price Containment Reserve (APCR) – A percentage of allowances are set aside from under the cap for use if the allowance price hits certain levels. These levels also increase annually at 5% plus inflation, <sup>19</sup> and in 2018 are \$54.26, \$61.06, and \$67.83. <sup>20</sup> In 2021, the APCR will transition to a hard price ceiling, where compliance instruments will be available at a maximum price. That price has yet to be determined by CARB.
<b>Offsets</b>	The use of offsets is limited to 8% of a covered entity’s compliance obligation. <sup>21</sup> This will decrease to 4% in 2020, and increase to 6% in 2025. At least half of offsets post-2020 must provide direct environmental benefit to California. CARB has established rigorous U.S. forestry, urban forestry, livestock, ozone depleting substances, mine methane capture, and rice cultivation protocols.
<b>Linkages</b>	California linked to Quebec under the Western Climate Initiative (WCI) in January, 2014 and Ontario in January, 2018.
<b>Market Regulation and Oversight</b>	The WCI hires an independent market monitor, Monitoring Analytics, and shares responsibility for the administration of the market with linked jurisdictions. CARB works closely with this monitor to track auctions and all holding and trading of compliance instruments. <sup>22</sup> Beginning in 2021, there will also be a new committee of experts who will monitor the environmental and economic performance of the cap-and-trade program.
<b>Complementary Policies</b>	There are many complementary policies addressing greenhouse gas emissions and local air quality including the Low Carbon Fuel Standard (LCFS), Renewable Portfolio Standard (RPS), vehicle and building efficiency standards, and the newly-created Office of Community Air Protection at CARB. The Climate Change Scoping Plan is the blueprint for how all of these policies work together to achieve emission reductions and improved air quality, and this Plan is updated every 5 years. The most recent update was adopted in December, 2017.
<b>Enforcement/Penalties</b>	Annual Compliance Obligation – a covered entity must surrender allowances equivalent to 30% of emissions from the previous year within the current compliance period. <sup>23</sup> Triennial Compliance Obligation – a covered entity must surrender allowances equivalent to 100% of emissions for the compliance period, less allowances already surrendered. <sup>24</sup> Failure to surrender on time results in an immediate surrender obligation equivalent to four times the covered entity’s missing balance. <sup>25</sup>
<b>Banking</b>	California allows for banking of covered facilities’ allowances for use in any future compliance period, subject to individual holding limits.
<b>Monitoring and Reporting</b>	Covered entities must report on their greenhouse gas emissions for the previous year in August of the current year. For entities emitting over 25,000 tCO <sub>2</sub> e the emissions report must be verified by an independent third-party which has been accredited by CARB.

# Carbon Price Evolution

The historic trend of clearing prices in California's cap-and-trade program demonstrate the importance of one key feature of the program: the price floor. Designed to escalate at 5% plus inflation annually, this ensures that the price does not fall too low and continues to drive emission reductions. Most of the 13 joint auctions held between California and Quebec have settled at or just above this price floor. 2017 brought greater market certainty as the California Third District Court of Appeal upheld the design of the cap-and-trade auctions, the California Supreme Court declined to review the case which upheld the lower court's ruling, and the California State Legislature passed a bill to extend the program until at least 2030. Taken together, these factors have created a great deal more assurance in the future of the program, and allowance prices and demand have steadily risen through the final three joint auctions of 2017. The November, 2017 auction cleared at \$15.06, a record \$1.49 above the floor price.

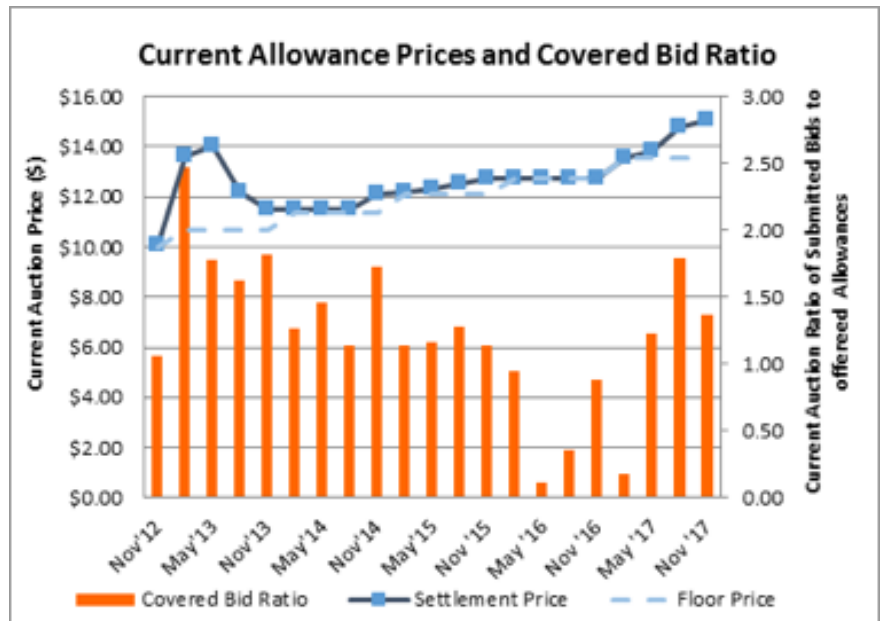


Figure 1: California Carbon Price

Source: California Air Resources Board

# Commentary on Market Functioning

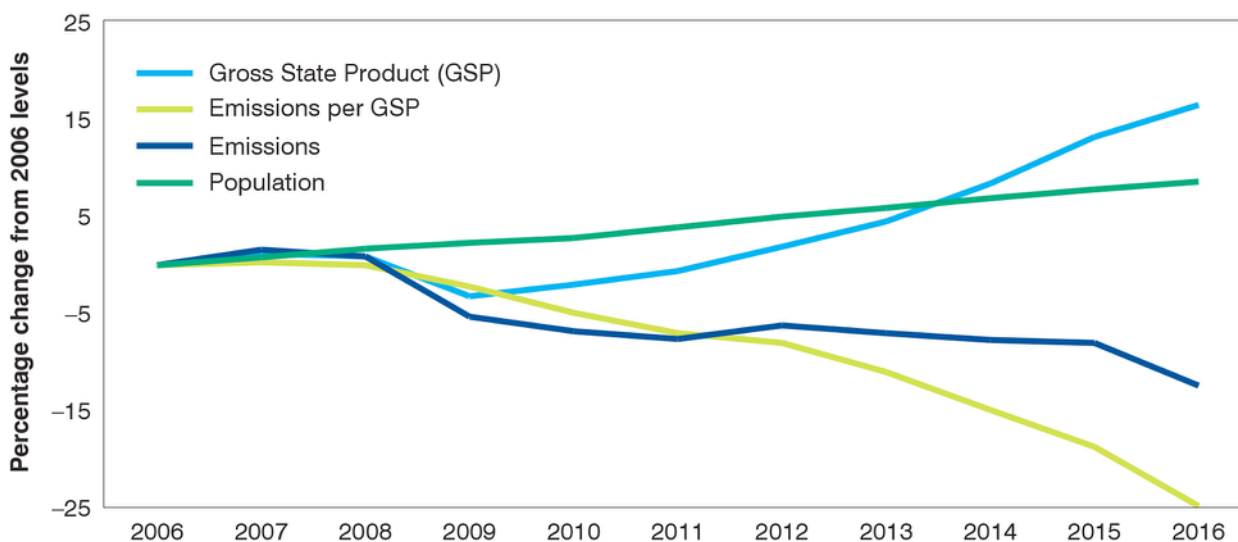
With cap-and-trade as the backbone of California's climate policies, the state's greenhouse gas (GHG) emissions have declined by over 9% since 2006.<sup>26</sup> Per capita emissions have decreased by over 2 tonnes since 2006, and as of 2014 were over 5 tonnes less than national per capita emissions. California is on track to meet, or likely even beat, its target of reducing pollution to 1990 levels by 2020.<sup>27</sup> While it is difficult in California to discern which program is responsible for a ton of emission reductions, what is clear is that cap-and-trade is the insurance policy that guarantees the state will meet its legally-required emission reduction target.

Emission allowances are distributed by CARB in a few different ways: through auction, for free to partially

meet the need of industrial facilities, and for free to utilities which then must consign those allowances back to auction with the revenues benefitting ratepayers. The state-controlled allowance auctions have generated approximately \$6.4 billion in revenue since 2013, which has gone into the Greenhouse Gas Reduction Fund (GGRF).<sup>28</sup> The GGRF invests in clean transportation, urban greening, sustainable communities, high-speed rail, and many other priorities which aim to reduce greenhouse gas emissions and provide additional co-benefits. A minimum of 35% of this revenue must be spent to benefit disadvantaged and low-income communities around the state.

California's climate policies, instead of stifling economic growth as critics suggested, have helped the

state thrive while driving emission reductions. Indeed, the state has demonstrated that the decoupling of emissions and economic growth is possible is providing a model for other jurisdictions to follow. California's Gross State Product (GSP) per capita has increased by \$5,000 since 2006 and continues to beat the national per capita Gross Domestic Product (GDP).<sup>29</sup> Overall GSP has increased more than 16% since 2006, and over that same time the state's job growth has outpaced the nation by 27%.<sup>30</sup> In 2017, California was the sixth-largest economy in the world, and growing.<sup>31</sup> More than 500,000 residents now work in the renewable energy, energy efficiency, and clean vehicle industries, eclipsing the 18,000 employed by fossil fuel generation.<sup>32</sup>



**Figure 2: California Emissions and Economic Growth Since 2006**

Source: California Air Resources Board, California Department of Finance

# What Distinguishes this Policy?

## UNIQUE ASPECTS

### 1. Soft Price Collar

California's program includes unique features based on the early experience of the European Union emissions trading scheme (ETS). Namely, it allows allowance banking to create an incentive to drive emissions down earlier in the program, and includes a price floor which has meant that the Western Climate Initiative (WCI) has one of the highest carbon prices in the world. This price floor also protects against dramatic drops in the allowance price if demand is unexpectedly low.

### 4. Offsets

In including offsets in the California program, CARB has designed protocols with the high levels of environmental integrity based on approved protocols rather than specific projects. This system has been tested and approved by the California courts.

### 2. Price Containment Reserve

CARB also designed a unique Allowance Price Containment Reserve (APCR) to protect against sudden price spikes. A percentage of allowances from under the cap are set aside for use if the allowance price hits three certain levels. California has never had to use the APCR, and looking forward will need to transition this mechanism to the new price ceiling.

### 5. Auction Revenue Use

The environmental justice community is influential in California, and as a result, has been successful in guaranteeing that a minimum of 35% of the cap-and-trade auction proceeds go to disadvantaged and low-income communities. In practice, closer to 50% of revenues are allocated for this purpose.<sup>33</sup>

### 3. Broad Economy-Wide Coverage

The WCI has some of the broadest coverage of any ETS, covering over 80% of emissions from industry, electricity, natural gas, and transportation fuels.

## CURRENT CHALLENGES

### Point 1

Part of the 2030 cap-and-trade program extension included a provision for a hard price ceiling to be determined by CARB. While the existence of a hard price ceiling is not ideal for maintaining the environmental integrity of the program, if California reaches the price ceiling, all revenue raised by the sale of additional instruments must be used to achieve emission reductions on at least a ton-for-ton basis. Now the challenge is to ensure that the price ceiling is set at a sufficiently high level to limit the risk of actually hitting this ceiling. The rate of escalation also has to be determined to ensure that it keeps up with inflation and there is not a point in the future where the price floor and price ceiling are too close together.

### Point 2

Another challenge posed by the 2030 extension is the limitation of offset use, and the related challenge of requiring half of offset projects to be in California. The supply of in-state offsets is limited, and if the program were to reach the price ceiling there may be insufficient supply of credits available to offset emissions at the ceiling on the required ton-for-ton basis minimum. CARB could approve more protocols or otherwise incentivize out-of-cap reductions in advance of reaching the price ceiling to increase the supply of available credits. Specifically, CARB has studied to use of jurisdictional REDD+ credits which would provide the supply of high-integrity offsets California could potentially need. Acceptance of REDD+ credits could come as early as 2019.

### Point 3

CARB will need to consider if it is going to re-evaluate the emissions cap and the post-2020 cap trajectory. There is some debate in California about a potential "oversupply" of allowances post-2020. This is a result of allowances being banked in current and previous compliance periods, which means California has achieved greater emission reductions earlier than expected. Thus, CARB has the opportunity to consider future ambition and decide if the post-2020 cap can be made even more stringent.

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# Acknowledgements

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