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California's cap-and-trade program step by step

HOW CALIFORNIA BUILT THE CORNERSTONE OF ITS CLIMATE POLICY










California has some of the most ambitious climate targets on the planet. The sixth-largest economy in the world, California also boasts impressive job and economic growth. It's no wonder the state has become a key example of successful climate policy.

At the heart of California's approach is cap and trade, an emissions trading system (ETS) that places a firm limit on carbon pollution while providing businesses flexibility to make the lowest-cost reductions first. Many other governments are using a similar strategy: emissions trading programs such as cap and trade are in place in over 50 locations covering over one billion people, and more than 90 countries expressed interest in using markets to meet their Paris commitments.

Based on years of experience in studying and designing environmental trading systems, EDF co-authored a handbook for the World Bank in 2016 that identified the 10 steps essential to effective ETS policy design.

In the following pages, we draw from this 10-step formula and from EDF's decade of experience helping California develop its cap-and-trade program, and provide a clear illustration of how one of the world's most expansive cap-and-trade programs began and matured.

Designing, implementing and operating an ETS in 10 steps

-  **Step 1:** Decide the scope
-  **Step 2:** Set the cap
-  **Step 3:** Distribute allowances
-  **Step 4:** Consider the use of offsets
-  **Step 5:** Decide on temporal flexibility
-  **Step 6:** Address price predictability and cost containment
-  **Step 7:** Ensure compliance and oversight
-  **Step 8:** Engage stakeholders, communicate and build capacities
-  **Step 9:** Consider linking
-  **Step 10:** Implement, evaluate and improve

California's ETS policy design choices

The World Bank's *Emissions Trading in Practice: A Handbook on Design and Implementation*,* which EDF co-authored, identifies 10 steps for designing and implementing an effective cap-and-trade program. Here we describe California's path through these steps, and then provide a timeline of major California cap-and-trade milestones since the state passed its landmark climate law in 2006.

STEP 1: Decide the scope



California decided that a cap with a broad scope would be the most effective way to ensure that the state could meet its targets. At its launch in 2013, California's program covered all six greenhouse gases (GHG emissions) within the industrial and electricity sectors. In 2015, the cap coverage expanded to transportation fuels and natural gas, bringing about 85% of state emissions under the cap. Emissions from imported electricity and fuel are included in the cap, though the cap does not cover emissions from sectors that are currently challenging to measure or regulate on a large scale, such as agriculture and fugitive emissions.

STEP 2: Set the cap



The California Legislature in 2006 set the first climate target of 1990 emissions levels by 2020 based on international recommendations from the Intergovernmental Panel on Climate Change. In order to translate this into a cap, the California Air Resources Board (CARB), the agency that administers the program, determined what the state's emissions were in 1990 and collected data on emissions for over two years. That allowed CARB to set the cap based on real emissions data rather than on projected emissions, improving accuracy. In 2016, California passed legislation setting a new target of reducing greenhouse gas (GHG) emissions by 40% below 1990 levels by 2030.

STEP 3: Distribute allowances



California distributes allowances – the permits that allow a facility to emit one ton of GHG emissions and that they must surrender for compliance—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.

STEP 4: Consider the use of offsets



An offset credit is a reduction of GHG emissions achieved through an activity not covered by the cap to “offset” emissions by a facility under the cap. In California, offset credits must be real, additional, permanent, verifiable, quantifiable, enforceable and produced based on a CARB-approved protocol. California currently allows entities to meet 8% of their compliance obligation from offsets but that number will decline in 2021. CARB has approved six offset protocols from domestic sources, and has a placeholder for international sectoral offset protocols such as Reducing Emissions from Deforestation and forest Degradation (REDD+).

*Available at <https://openknowledge.worldbank.org/handle/10986/23874>

California cap-and-trade milestones

SEPTEMBER 2006 AB 32, establishing 2020 target, signed	DECEMBER 2008 Scoping Plan of climate policies approved	JANUARY 2009 Mandatory reporting of GHG emissions began	FEBRUARY 2009 First cap-and-trade stakeholder workshop held	DECEMBER 2011 Original cap-and-trade regulation approved	NOVEMBER 2012 First California auction held
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STEP 5: Decide on temporal flexibility



California allows unlimited “banking” of allowances for use at a later time. This gives entities an incentive to reduce emissions early on, as they can save these allowances for use in future years when prices are likely to be higher, and can result in earlier emissions reductions and a boon for prices and market stability. “Borrowing” allowances from future years is only allowed in extreme circumstances where prices go unexpectedly high, a situation that has never materialized in California. California entities are only required to surrender allowances equal to their full emissions every three years at the end of a “compliance period,” providing some additional flexibility to procure allowances at best available prices.

STEP 6: Address price predictability and cost containment



California and its partners have one of the highest carbon prices in the world largely due to its price floor. This price floor, which started at \$10 per ton in 2012 and rises by five percent plus inflation annually, has kept prices relatively stable even when market disruptions caused temporary drops in demand for allowances. California currently has a soft price ceiling in the form of a reserve of allowances set aside from under the cap. In 2021, this will transition to a hard price ceiling where compliance instruments will be available at a maximum price and revenue from sales at this ceiling will be used to ensure reductions on at least a ton-for-ton basis.

STEP 7: Ensure compliance and oversight



California’s Mandatory Reporting of Greenhouse Gas Emissions regulation requires entities that emit over 10,000 mmt of GHG emissions to report their emissions, and entities that emit over 25,000 mmt—which are regulated by cap and trade—to verify their emissions with an independent third party.

STEP 8: Engage stakeholders, communicate and build capacities



Cap-and-trade regulators (CARB) completed extensive stakeholder and expert outreach in advance of adopting the cap-and-trade regulation, and continue outreach for all regulatory updates and major adjustments to the program. A number of expert panels of economists, environmental justice advisors, and scientists have also provided advice. CARB has worked toward improving stakeholder outreach to environmental justice communities, and legislative mandates have added two environmental justice members to the voting board.

STEP 9: Consider linking



California began working with a number of U.S. states and Canadian provinces in 2009 through the Western Climate Initiative to determine best cap-and-trade practices, with an eye toward linking the various programs in the future. Those relationships have matured into two linkages with Quebec and Ontario; as a result of the earlier collaboration, all three programs have ambitious caps with similar stringency and closely-aligned policy design. California has also made international, non-binding agreements with many countries including Mexico and China to share best practices for climate policies, which could lead to even closer relationships in the future.

STEP 10: Implement, evaluate and improve



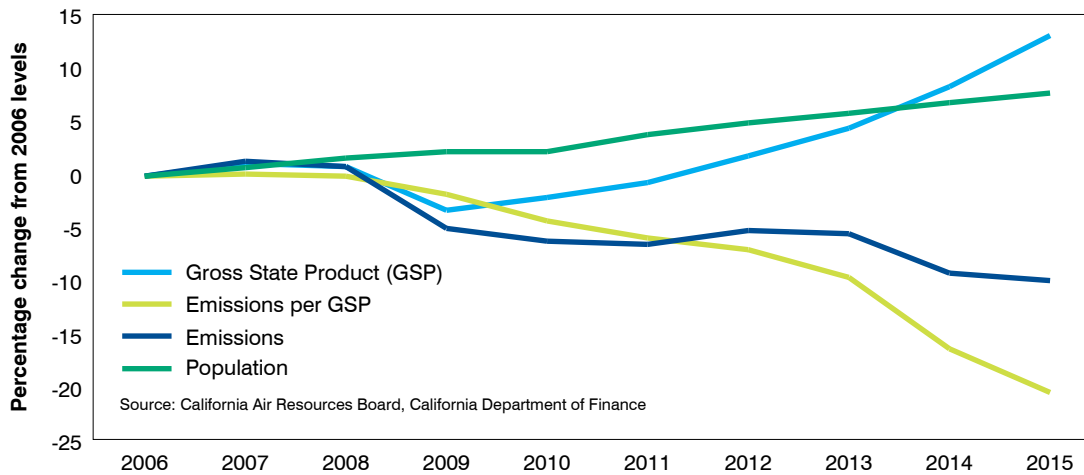
Now that cap and trade has been implemented in California (see timeline, below), CARB works on regularly evaluating and updating the program. California has initiated regulatory updates as needed roughly every two years since the original regulation was approved. This process allows California to maintain regulatory certainty while providing a dynamic program that adapts to current needs. To improve how the state addresses air quality, the California Legislature in 2017 included in its extension of cap and trade a program to further reduce local air pollution.



<p>JANUARY 2013 Large industry and electric generators capped</p>	<p>JANUARY 2014 Linkage with Quebec established</p>	<p>JANUARY 2015 Transportation fuels and natural gas capped</p>	<p>SEPTEMBER 2016 SB 32, establishing 2030 target, signed</p>	<p>JULY 2017 Cap-and-trade program extended to 2030</p>	<p>JANUARY 2018 Linkage with Ontario established</p>
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California's emissions are decreasing and the economy is thriving. With strong climate policies in place, California's GHG emissions have declined by over 9% since 2006. The carbon intensity of California's economy has also decreased, meaning while the state is reducing emissions, it is also taking less carbon to continue growing the economy. **Californians are benefitting.** California's cap-and-trade program is directly benefitting residents through climate investments from auction revenues, new clean energy jobs, and local air quality initiatives.

California emissions and economic growth since 2006







REST OF UNITED STATES 4.8%	TOTAL JOB GROWTH 6.2%
CALIFORNIA 6.2%	CLEAN JOB GROWTH 23.3%

Job growth. From January 2013 to December 2015, California added 1,046,730 jobs, which represents 6.2% growth, outpacing 4.8% job growth in the rest of the U.S. in the same period. Source: Bureau of Labor Statistics

Clean job growth within California. From January 2013 to December 2015, California added 96,048 clean energy jobs, which represents 23.3% growth, outpacing the state's total job growth of 6.2% in the same period. Source: AEE Institute, Bureau of Labor Statistics

Greenhouse Gas Reduction Fund (GGRF) investments through 2017

At least 35% of these cumulative investments directly benefit disadvantaged communities across California.

<p>\$4 billion</p>  <p>SUSTAINABLE COMMUNITIES AND CLEAN TRANSPORTATION</p> <ul style="list-style-type: none"> ✓ High-speed rail ✓ Public and alternative transportation ✓ Affordable housing near transit ✓ Low- or zero-carbon cars, trucks, buses, and freight 	<p>\$503 million</p>  <p>ENERGY EFFICIENCY AND CLEAN ENERGY</p> <ul style="list-style-type: none"> ✓ Weatherization and solar energy for low-income households ✓ Water and energy efficiency for agriculture ✓ Wood smoke reduction 	<p>\$765 million</p>  <p>NATURAL RESOURCES AND WASTE DIVERSION</p> <ul style="list-style-type: none"> ✓ Wetland restoration ✓ Urban forests ✓ Forest fire prevention ✓ Increased composting and recycling 	<p>\$284 million</p>  <p>COMMUNITY AIR PROTECTION <i>coming in 2018</i></p> <ul style="list-style-type: none"> ✓ Community-level air pollution monitoring ✓ Neighborhood emission reduction plans ✓ Accelerated technology upgrades at facilities
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Source: California Air Resources Board, California State Legislature

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