

A photograph of the Golden Gate Bridge in San Francisco, California, taken during sunset or sunrise. The bridge's iconic orange-red towers and suspension cables are silhouetted against a sky with soft, warm clouds. The water of the bay is visible in the foreground, and the distant hills are shrouded in a light mist.

Cost Containment Role of Offsets in California - DRAFT

March 18, 2025



Looking Back at Role Offsets Have Played in California's Cap and Trade Program

	CP1	CP2	CP3	CP4
DEBs retired	3,276,733	10,697,349	3,411,826	11,812,855
Non DEBs retired	9,521,434	52,020,519	59,297,304	13,218,066
Average Golden DEB Price (USD)		10.62	13.46	20.42
Average Golden Non-DEB Price (USD)		10.62	13.46	16.78
Average CCA price (USD)		13.24	16.30	28.74
Total CA emissions (million tons)	269	985	909	842
Free allocations CA (million allowances)	157	289	234	171
Emissions paid for (million tons)	111	696	675	670
Spend on Emissions in CA (USD)	-	9,213,925,222	11,000,664,407	19,264,892,168
Cost saved by using Offsets (USD)		164,515,898	178,143,588	256,310,880
By using DEBs		28,060,328	9,692,288	98,198,223
By using Non DEBs		136,455,570	168,451,301	158,112,657
Cost saved as %age of spend on emissions		1.8%	1.6%	1.3%
By using DEBs		0.3%	0.1%	0.5%
By using Non DEBs		1.5%	1.5%	0.8%
cCarbon Surplus Bank Estimate (allowances)				
WCI bank at the end of the CP		222,279,320	247,910,853	389,494,161
If Offsets would not have been there		146,763,285	109,685,688	163,256,086
cCarbon Bank index (years)				
At the end of the CP		0.58	0.74	1.18
If Offsets would not have been there		0.39	0.33	0.49

Offsets have played a cost-containment role in California's Cap and Trade Program. Outlined are 2 ways in which to quantify the cost-containment impact.

First is by **looking at the actual cost saved by compliance entities**. While it can be hard to ascertain the actual saving, a rough estimate can be arrived at. The Offsets (DEBs and Non-DEBs) trade at a discount to the Allowances. The table quantifies the difference between the Offsets and the CCAs; and multiplies that with the Emissions that were paid for (Total emissions reported minus free allocations).

A second way is by **estimating what the price of CCAs could have been if Offsets had not been used**. To do that, we have estimated what the surplus bank would be in the market at the end of the compliance periods. Surplus Bank is the bank of Allowances in the market, net of the obligations (emissions). cCarbon builds an estimate every quarter. We use that to estimate the cCarbon Bank Index, which is the Surplus bank divided by the trailing 12 month emissions. This

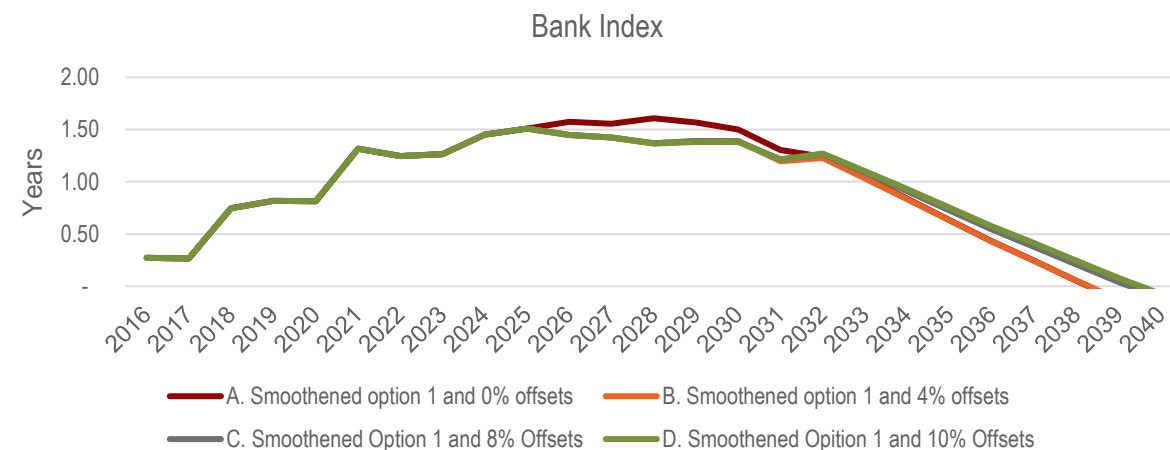
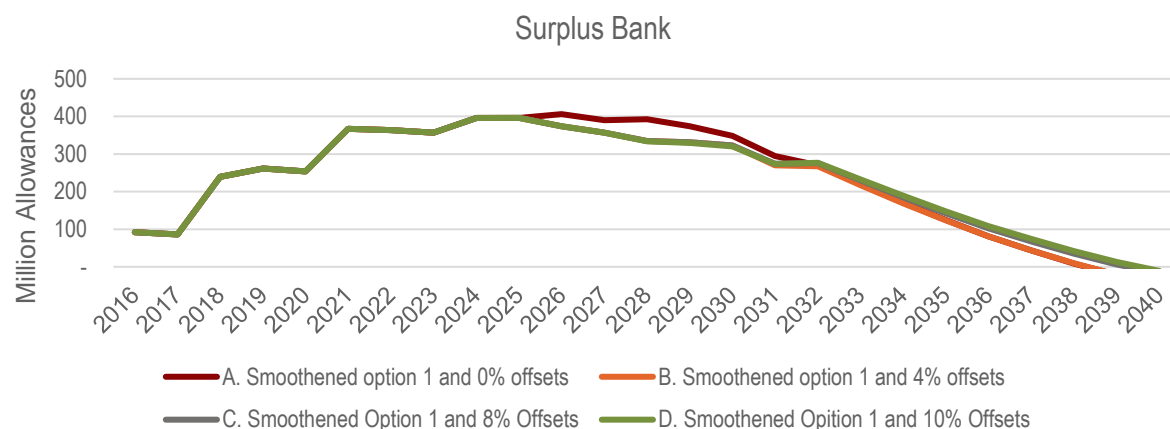
Bank Index, measured in years, indicates how many years of Allowances are available in the market at current emission levels.

There is an **inverse relationship between bank index and prices**. Lower the bank-index, higher the price of an allowance.

The cCarbon economist team tried to model the counter-factual i.e. what if carbon offsets had not been part of the program. The modeling results provides a range – prices could have been higher by anywhere between 15% and 50% - depending on assumptions taken related to the program end-date. In a scenario that the Cap-and-Trade program concluded by 2030 (without change in cap), the current prices would be higher by about 15% and the bank would be exhausted by 2030.

CP1: Jan 2013 – Dec 2014
 CP2: Jan 2015 – Dec 2017
 CP3: Jan 2018 – Dec 2020
 CP4: Jan 2021 – Dec 2023

Looking Ahead as Cap Tightens and Free Allocations Reduce: Role of Offsets



cCarbon's CarbonOutlook™ Model Output for Different levels of Offset Usage

CCA price forecast (USD)	2026	2030	2035
A. Smoothened option 1 and 0% offsets	75.3	149.0	209.0
B. Smoothened Option 1 and 4% offsets	60.3	149.0	209.0
C. Smoothened Option 1 and 8% Offsets	58.5	146.7	207.8
D. Smoothened Option 1 and 10% Offsets	55.6	143.0	206.2

Spend on Auctions from 2026 to 2040	Total (USD million)
A. Smoothened option 1 and 0% offsets	410,963
B. Smoothened Option 1 and 4% offsets	403,767
C. Smoothened Option 1 and 8% Offsets	399,537
D. Smoothened Option 1 and 10% Offsets	393,004

Savings from using offsets from 2026 to 2040	Total (USD million)
A. Smoothened option 1 and 0% offsets	1,649
B. Smoothened Option 1 and 4% offsets	3,735
C. Smoothened Option 1 and 8% Offsets	5,811
D. Smoothened Option 1 and 10% Offsets	6,765

Offsets continue to play a two-pronged role. First is enabling savings for compliance entities to offset their emissions, especially as free allocations reduce rapidly through this decade.

Second is the impact they have on prices.

The program has taken care of the 'easier' emissions- mainly from two sources. The first is imported electricity getting cleaned, and the second is biogenic renewable diesel reducing transportation emissions.

Additional emission reductions are going

to be relatively more expensive and require a higher investments. Correspondingly even if changes are announced to be effective from 2031, we see the impact on prices in this decade itself. This would include announcements related to change in cap, usage of offsets, prices of containment mechanisms, etc.

As seen in cCarbon's modeling, offsets play an impact on reducing the need for ceiling and reserve allowances.



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insights@cCarbon.info
www.cCarbon.info