

**DOCKETED**

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## **Ethanol Record in California**

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*Additional submitted attachment is included below.*

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**Ethanol Record in California (part 1 of 2)**

*Additional submitted attachment is included below.*

## Ethanol Record in California

In 1999 California was the first state to ban methyl tertiary-butyl ether. When MTBE was phased out of its reformulated gasoline program in 2003, the state opted to use ethanol at the minimum, 5.7 percent, that would meet the 2 percent oxygen requirement under the then-current Clean Air Act.

The BioEnergy Action Plan, as set in Governor Schwarzenegger's In April 2006, calls for an increase in the production of biofuels in California. Goals are to increase in-state biofuels production to 20 percent by 2010, to 40 percent by 2020, and to 70 percent by 2050.

In June 2009, the California Air Resources Board announced changes to its reformulated gasoline regulations and predictive model to ultimately allow for the greater use of ethanol. On August 29, 2009 CARB finalized the rule to allow higher ethanol blends, stating that all fuel sold in California must be compliant with the new CARB Phase 3 standards after December 31, 2009.

Rules were passed allowing E10 to be used in California as of January 1, 2010, providing an important new market for Midwest ethanol producers. The increase in ethanol consumption in California supports two public policies.

First, the federal Renewable Fuels Standard requires greater use of fuels like ethanol through 2022.

Second, California's new low carbon fuel standard (LCFS) mandates a reduction in the state's overall greenhouse gas (GHG) emissions in the next ten years. By 2020, the LCFS calls for the state's GHG emissions to be reduced to 1990 levels, and by 2050 achieving an 80% reduction in GHG emissions.

California's program for biofuels under climate-change policies includes CARB's "indirect land use change" (ILUC). As crops as used to produce biofuels, crop prices increase with demand, so farmers respond by clearing land and bringing it into agricultural production. This theory is not supported by actual data, but was adopted into the biofuels section of CARB's structure for the low-carbon fuel standard. A direct emissions measurement combines the ethanol plant's location, fossil-fuel for in-process energy, distillers grain byproduct, and transport energy, important for imported Brazilian ethanol converted from sugarcane residue. Direct emissions values range from 47 for Brazilian ethanol to U.S. Midwest ethanol at 69 gCO<sub>2e</sub>/MJ (grams of carbon dioxide equivalent per megajoule of fuel.) CARB assigns corn-based ethanol with ILUC values up to 30 gCO<sub>2e</sub>/MJ for older plants, which have been retired since 2017 to alleviate oversupply.

The total carbon intensity (CI) of corn-based ethanol ranges from:

- 99 gCO<sub>2e</sub>/MJ for a Midwest ethanol plant using coal-burning electricity producing dry distillers grain
- 77 for a California standard-process plant powered by 20 percent biomass producing wet distillers grains.
- 70 for the latest Midwest plant using wood as process fuel and conversion of partial cellulosic ethanol.
- Brazilian sugarcane-based ethanol has CI of 73 gCO<sub>2e</sub>/MJ when passing through main shipping and receiving ports.

In 2008, California consumed 951 million gallons of ethanol at the previous 5.7 percent blend level. From 2011 to 2016 ethanol generated 11.9 million credits with corn ethanol generating 9.3 million credits, 36.3 percent of all credits.

In 2018, 1.12 billion gasoline gallon equivalent of ethanol was consumed in California (at 12 percent average blend level). The CAGR for ethanol in California since 2008 is slightly greater than 100% per year. In 2019 E85 sales of 41 million gallons were a CAGR increase of about 30% from 3 million gallons in 2010. E85 sales will be the main growth factor, from approx. 500 retail stations at 2020 years end, expected to double by 2022.

D-3 RINs earned for production of cellulosic ethanol are currently \$1.57/gal and the value will not increase unless the EPA mandates more cellulosic biofuels to be produced, which is not likely. Cellulosic ethanol with a CI of 10 would get LCFS credits of \$2.13 at the current price of carbon credits, earning a total value of \$3.70/gal for CE to California less \$0.40/gal for shipping from the Midwest. Those projects that implement carbon capture and sequestration (CCS) would earn higher negative credits.

Joseph Degenfelder August 1, 2020