



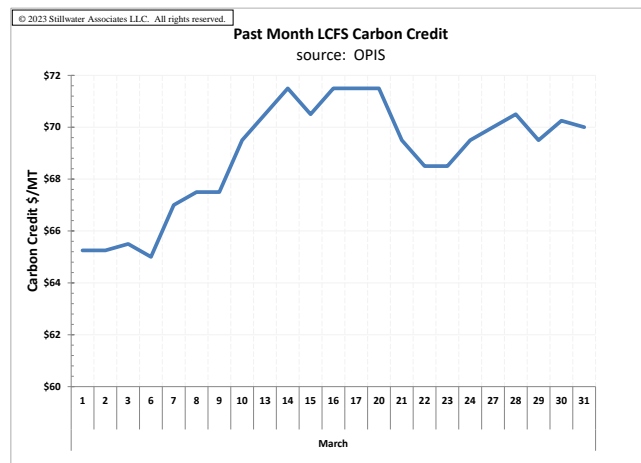
California Low Carbon Fuel Standard (LCFS) Monthly Newsletter March 2023

In this monthly edition...

- **Market:** Credit price increased to \$70/MT; number of trades and volume of credits traded both increased
- **News:** New Mexico’s proposed low carbon fuel (LCF) program failed to be brought to a vote on the House floor prior to the end of the legislative session.
- **Analyses:**
 - 1) Will the LCFS transform into an accounting and funding system for other mandates?
 - 2) The Advanced Clean Cars Program (it’s not really an ICEV-ban)

LCFS Credit Price Trend

For March, LCFS credit prices ranged from \$65 to \$71.50 per metric ton (MT) of carbon dioxide equivalent (CO_{2e}). The month closed out at \$70/MT – \$3.75/MT (~6%) higher than February’s closing price. For the month of March, prices averaged \$69/MT compared to an average of \$125/MT for the same month last year. Based on the 2023 benchmark, a credit price of \$70/MT correlates to 10.52 cents per gallon (CPG) for CARBOB and 10.64 CPG for ULSD.

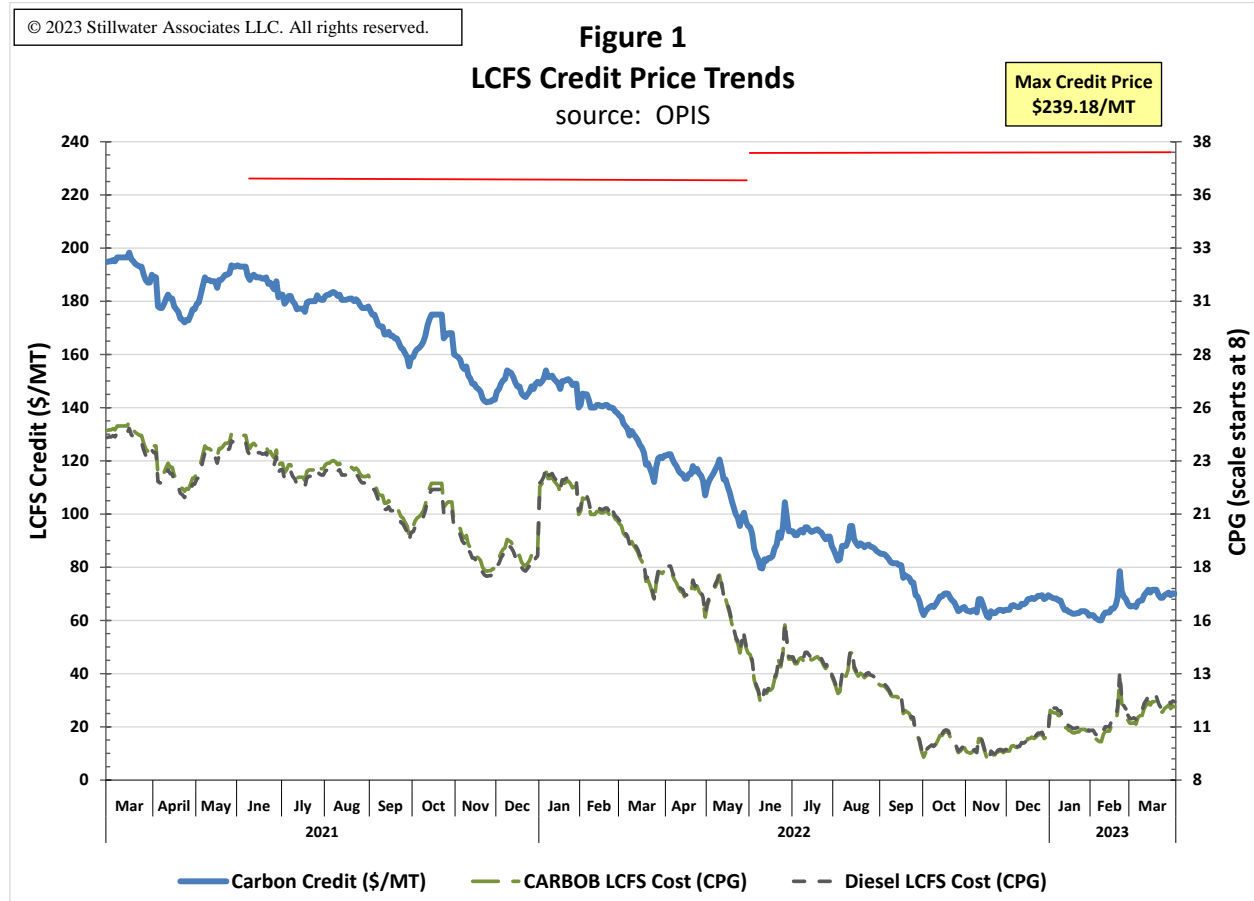


In addition to the direct cost of LCFS fuel deficits, the LCFS program’s incremental crude CI provision adds additional deficits to all CARBOB and ULSD in California. At a credit price of \$70/MT, the March 2023 added cost of the incremental crude provision for CARBOB is 0.92 CPG. For ULSD, the March 2023 incremental crude cost is 1.04 CPG. Given the cost of this additional deficit, the total added cost of the LCFS program for March 2023 is 11.44 CPG for CARBOB and 11.67 CPG for ULSD.



Long-Term LCFS Credit Price Trends

During 2023, LCFS credit prices have averaged \$66/MT, reaching a high of \$78.50/MT on February 22nd and a low of \$60/MT on February 8th. For 2022, the annual average price was \$98/MT. The maximum credit price (or price cap) for June 1, 2022 through May 31, 2023 is \$221.67/MT. Credit price trends for the past two years are displayed in Figure 1 below. The LCFS cost for CARBOB and ULSD displayed includes the cost of the incremental crude provision.



LCFS Credit Trading

Table 1 displays the number, volume, and average price of credits as reported in the California Air Resources Board (CARB) [Monthly Credit Transfer Activity Report for March](#).

**Table 1
LCFS Credit Trading Reported by CARB**

Time Period	Total Transfers (number)	Total Volume (credits-MTs)	Avg. Price (\$ per Credit) Per ARB Report	Price Range (\$ per Credit)	Ave Transaction Size - MT	Transactions per Week
CY 2012	24	164,000	\$17		6,833	0.5
CY 2013	202	887,000	\$55		4,391	3.9
CY 2014	304	1,667,000	\$31		5,484	5.8
CY 2015	578	2,852,000	\$62		4,934	11.1
CY 2016	929	5,343,000	\$101		5,751	17.8
CY 2017	1226	8,875,000	\$89		7,239	23.5
CY 2018	1725	13,334,000	\$160		7,730	33.1
CY 2019	1656	14,146,000	\$192		8,542	31.8
CY 2020	2461	21,728,000	\$199		8,829	47.1
CY 2021	2664	25,279,000	\$187		9,489	51.1
Q1 2022	797	8,240,000	\$163		10,339	62.0
Q2 2022	720	6,712,000	\$141		9,322	55.4
Q3 2022	771	7,063,000	\$109		9,161	58.7
Q4 2022	1028	10,385,000	\$94		10,102	78.2
Jan-23	470	4,564,000	\$81	\$54- \$185	9,711	106.1
Feb-23	161	1,293,000	\$71	\$58- \$134	8,031	40.3
Mar-23	252	2,702,000	\$73	\$58- \$149	10,722	56.9
TOTALS	15,968	135,234,000	\$80		8,469	27.2

Number of RPs	Selling	Buying	Both
	197	24	186

Source: CARB Monthly LCFS Credit Trading Activity Report for March 2023 and prior reports

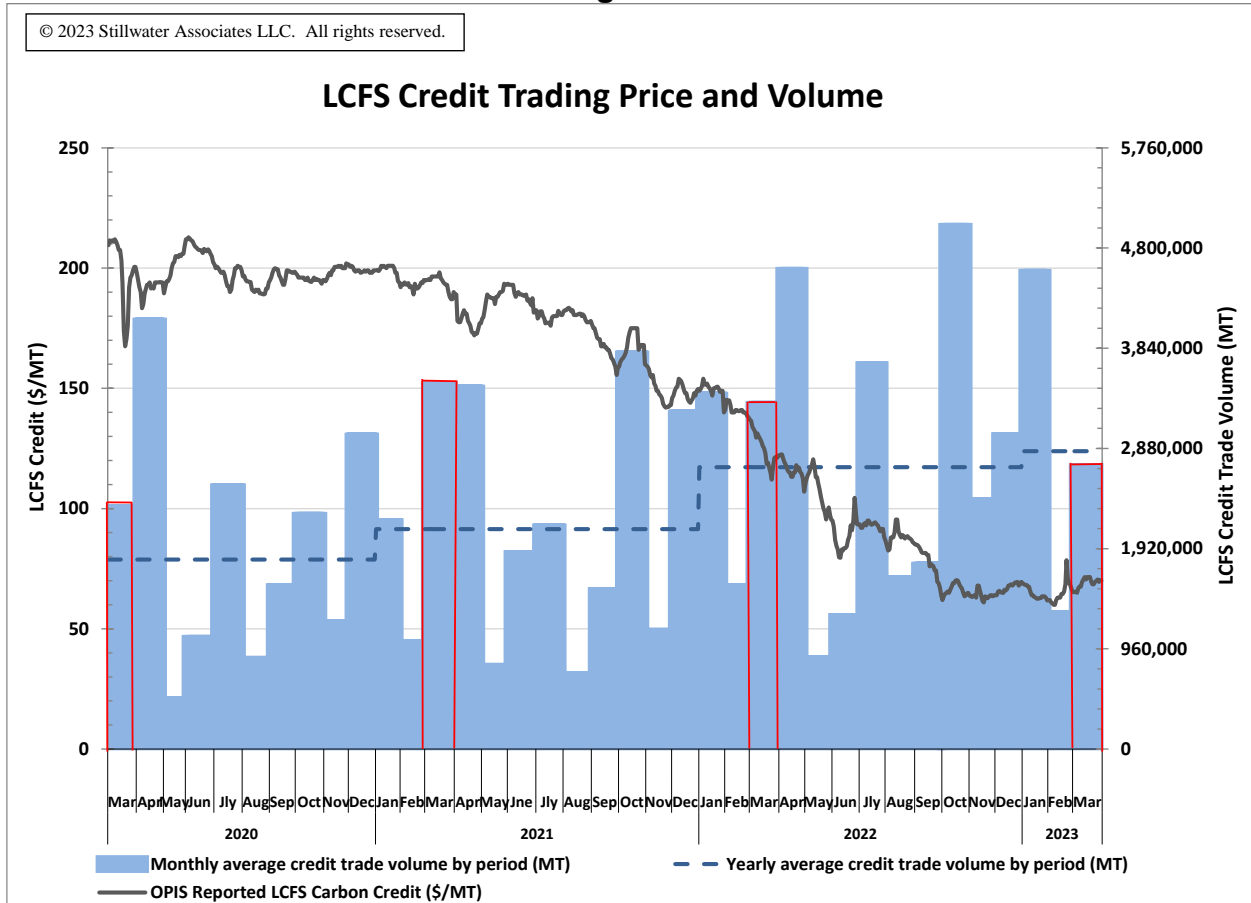
The number of reported transactions increased by ~57%, from 161 in February to 252 in March. The volume of credits increased by ~109%, from 1,293,000 MT in February to 2,702,000 MT reported in March. CARB's reports may include some related party transactions.

The March volume-weighted average price reported by CARB was \$73/MT, which is ~6% higher than the \$69/MT average calculated by daily spot price reports. At a price of \$73/MT, the credits traded in the month of March amount to nearly \$197 million changing hands.

LCFS Credit Trading Price and Volume

Figure 2 below graphically illustrates the monthly average transaction values and the volume of credits traded, as reported by CARB, and shows the LCFS credit price reported daily by OPIS. For ease of comparison, the March volumes are highlighted in red.

Figure 2



Highlight 1: Will the LCFS transform into an accounting and funding system for other mandates?

California's LCFS program has been eminently successful in reducing the carbon intensity of California's transportation energy mix. As of the most recent quarterly data (3Q2022), we estimate that the program has achieved an average CI reduction of 13% from the 2010 baseline. Although the LCFS has been the key driver for these CI reductions, it alone cannot take all the credit; a long list of other state regulations and mandates also incentivize and contribute to transportation fuel CI reductions in the state.

The complementary regulations that impact the performance of the LCFS program fall into several different categories:

1. Those that mandate use of non-petroleum or alternative **fuels**, usually for the purposes of reducing criteria emissions;
2. Those that mandate changes in **engine technology**, again to reduce criteria emissions; and
3. Those that accelerate the **transition of the fleet** to zero-tailpipe-emission vehicles (ZEVs) targeting carbon and criteria emissions.

As readers of this newsletter are well aware, the LCFS is a market-based, technology-neutral program that requires suppliers of high-CI fuels to generate credits by supplying low-CI fuels or purchasing LCFS credits from suppliers of low-CI fuels. Through this credit mechanism, high-CI fuels incur a cost while low-CI fuels receive revenue, effectively subsidizing and incentivizing the production of low-CI fuels.

By contrast, the regulations listed below mandate specific actions and, for the most part, do not include funding mechanisms to incentivize the changes. Since the LCFS captures and incentivizes low-CI fuels no matter the reason for the change, the program will account for the impact of low-CI fuels mandated by other regulations, and the generation of LCFS credits will offer a revenue stream for making the prescribed changes.

Without further ado, here's our list of regulations that have some bearing on LCFS performance. Each regulation and its implications for the LCFS are noted with the date of the latest amendment. This list is extensive but may not be exhaustive as California has a massive web of regulations that cover criteria emissions and greenhouse gas (GHG) reductions.

- [**Advanced Clean Cars II \(ACC2\) Regulation \(2022\)**](#) – The ACC2 regulation establishes ZEV and plug-in hybrid electric vehicle (PHEV) sales requirements from 2026 to 2035 for light-duty vehicles (LDVs) as a percentage of new vehicle sales. The regulation also has provisions to increase ZEV ownership in environmental justice¹ communities. Finally, ACC2 requires manufacturers to meet

¹ According to the [California Attorney General's website](#): "Under state law: "[E]nvironmental justice" means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. (Gov. Code, § 65040.12, subd. (e)). Fairness in this context means that the benefits of a healthy environment should be available to everyone, and the burdens of pollution should not be borne by sensitive populations or communities that already are experiencing its adverse effects."

criteria emission fleet average requirements but excludes emissions reductions from ZEVs thus requiring the reduction of criteria pollutants (NOx, SOx, CO, VOC, and PM) from the new internal combustion engine vehicle (ICEV) fleet. We dive deeper into this regulation in our other highlight analysis article this month.

Impact: *This regulation accelerates the fleet transition from pure ICEVs to battery electric vehicles (BEVs), PHEVs, and fuel cell electric vehicles (FCEVs). This acceleration will cause LCFS credit generation to grow and deficit generation to decline more quickly than if incentivized by the LCFS alone.*

- [Advanced Clean Trucks Regulation \(ACT\) \(2019\)](#) - The regulation is a technology forcing measure to accelerate the deployment of zero-emission trucks and buses where feasible. The regulation requires heavy and medium duty truck manufacturers to sell a prescribed percentage of California sales as ZEVs beginning in 2024 and an increasing percentage through 2035. We will dive deeper into the Advanced Clean Trucks regulation as it pertains to the LCFS in a highlight analysis next month.

Impact: *For the LCFS program, the deployment of HD and MD ZEVs will displace the HD and MD trucks that today are in part fueled with RD, BD and RNG increasing the credits generated and decreasing the deficits generated. To the extent that the volumes of these fuels are reduced, credit generation will be reduced. More likely the fuels that will be displaced will be the high CI petroleum diesel and higher CI RNG from landfills.*

- [Advanced Clean Fleets \(ACF\)](#) (In rulemaking stage as of April 2023. The description herein reflects [March 23 proposed regulation](#).) – This pending regulation covers several areas applying to State and local government medium-duty vehicle (MDV) and heavy-duty vehicle (HDV) fleets, federal fleets, and high priority fleets (those with \$50 million or more in gross revenue or 50 or more vehicles, with specific exemptions). The pending regulation requires compliance with a fleet milestone schedule for ZEV deployment and ICE retirement beginning in 2024. For state and local government fleets, all new vehicle purchases must be ZEVs beginning in 2024. In addition, the proposed regulation sunsets the Advanced Clean Trucks Regulation as of 2036 and replaces it with a requirement that all new MDV and HDV sales be ZEVs. We dive deeper into Advanced Clean Fleets in a highlight analysis next month. This differs from the ACT regulation above in that ACT regulates original equipment manufacturers (OEMs) to sell a certain mix of vehicles while ACF mandates fleet operators to purchase a certain mix of vehicles.

Impact: *This regulation will accelerate the fleet transition from pure ICE vehicles to BEVs, PHEVs and FCEVs and reduce sales of new ICE powered vehicles. This acceleration will cause LCFS credit generation to grow more rapidly and deficit generation to decline more quickly than if incentivized by LCFS alone.*

- [In-Use Locomotive Regulation](#) (In rulemaking stage as of April 2023. The description herein reflects [March 1 proposed regulation](#).) – This entirely new regulation was heard at the November 17th CARB Board meeting, initiating the regulatory process. If adopted, the regulation would require that, by July 2024, each operator establish a spending account in their name and funds to be deposited into the account annually based on usage and emission factors for each locomotive. The funds in the spending account may only be used to acquire the cleanest tiers of locomotives until 2030 or the acquisition of zero emission locomotives or zero emissions locomotive infrastructure. The proposed regulation does not have a renewable diesel (RD) or other fuel mandate, but it does have a provision for approval of alternative compliance plans to meet the criteria emission requirements. It is unknown whether fuel switching could meet these levels.

***Impact:** This regulation, if adopted, will provide a funding mechanism to update the engine technology of the locomotive fleet through 2030. After 2030, the regulation will move the locomotive fleet to zero emission technology which will reduce the use of diesel fuels. To the extent that this transition occurs, LCFS credit generation from the zero emission fuels will grow and deficit generation from diesel fuel will decline more quickly than if incentivized by LCFS alone.*

- [Off-Road Diesel Amendments](#) (Approved in November 2022, in [proposed modified regulatory](#) language 15-day public comment period until April 25th) – The Off-Road Regulation that was first adopted in 2008, requires off-road fleets to reduce their emissions by retiring older vehicles and replacing them with newer models, repowering older engines with newer technology, installing verified diesel emission control strategies in older engines, and restricting the addition of older vehicles to fleets. Some off-road vehicles that are specifically covered by their own regulations (locomotives, marine vessels, vehicles, and cargo handling equipment) and some uses like recreational vehicles, agricultural equipment and implements of husbandry are exempted from this regulation. The proposed amendments would require large and medium sized fleets to use RD beginning in 2024 and small sized fleets to use RD beginning 2028. There are exemptions from the RD requirement for fleets that operate in certain counties, in locations where the temperature is less than 20°F, and when the fleet is comprised entirely of the cleanest vehicle technologies.

***Impact:** For the LCFS program, the Off-Road Diesel Amendments place a statutory mandate for RD use (which CARB Staff estimates to be 270 million gallons per year). The impact could be to increase RD credits and reduce ULSD deficits if the RD supplied is additional to RD that would otherwise be supplied.*

- [Cargo Handling Equipment Regulation](#) ([adopted 2011](#), proposed to amend in 2024): This legacy regulation targets the emissions from cargo handling equipment used at a port or intermodal rail yard and includes rubber-tired gantry cranes, yard

trucks, top handlers, side handlers, reach stackers, forklifts, loaders, aerial lifts, excavators, and dozers. It is expected that the amendments in 2024 would be similar to other regulations that target criteria pollutants and carbon emissions from diesel engines, accelerating the use of cleaner engine and ZEV technologies. Like the commercial harbor craft and off-road diesel regulations, an RD mandate may be included as the amendments are developed.

Impact: *Although the details are not yet available, we expect that the amendments would accelerate the displacement of some diesel in favor of ZEVs and possibly mandate the use of RD. To the extent that the amendments require these changes, credit generation may be accelerated, and deficit generation will be reduced.*

- **[Zero-Emission Forklift Regulation](#)** ([in development](#) for Board consideration in 2023) – CARB has held workshops, and a draft regulation has been distributed. The draft regulation would require that, beginning in 2026, Fleet Operators not acquire or operate a forklift with a diesel engine and essentially ban large spark ignited forklifts outside of specific types and applications. The draft regulation will require forklift fleets to phase out older forklifts in their fleets by model year beginning in 2028.

Impact: *While the regulation is still in draft form and the Board adoption process has not begun, if the draft regulation is adopted it will accelerate the conversion of the forklift fleet operating in California to ZEV technology. This would accelerate credit generation from ZEVs and reduce deficit generation from diesel and gasoline.*

- **[Solid Waste Collection Vehicle Regulation](#)** (2019): In 2019 the regulation was amended to add diesel fueled single engine on-road heavy cranes with requirements to upgrade a prescribed percentage of their fleet to 2010 or newer model year engines beginning in 2019.

Impact: *This regulation's impact on the LCFS program is minimal unless the newer engines have a greater fuel efficiency which will result in lower diesel use.*

- **[Clean Miles Standard Regulation](#)** (2021) – This regulation applies to the transportation network companies such as Uber and Lyft. It is intended to accelerate the deployment of ZEVs in ride sharing by applying yearly targets for GHG emissions per vehicle miles traveled (VMT) adjusted for the number of people carried.

Impact: *This regulation will accelerate the penetration of ZEVs in this high VMT category of LDVs. For the LCFS, this will accelerate the electricity and hydrogen fuel use at the expense of CARBOB and ethanol.*

- [Commercial Harbor Craft Regulation Amendments \(2021\)](#) – Commercial Harbor Craft (CHC) is a wide-ranging category of vessels that do not otherwise meet the definition of ocean-going vessels or recreational vessels. Importantly, CHC fuel use falls under the LCFS. We discussed the CHC Regulation briefly in an article published on the Stillwater Associates website in [November 2022](#) and covered it in detail in the November 2022 edition of the LCFS Newsletter. This regulation primarily sets the reporting and engine requirements for new and in-service CHCs. A provision in the regulation implemented a requirement beginning in 2023 requiring that CHCs be fueled with RD (R100 or R99).

***Impact:** For the LCFS program, the CHC regulation places a statutory demand for RD use (which CARB Staff estimates to be 55 million gallons per year). The impact could be to increase RD credits and reduce ULSD deficits if the RD supplied is additional to RD that would otherwise be supplied.*

- [Transport Refrigeration Units \(TRU\) Regulation \(2022\)](#) – The 2022 amendment to the TRU regulation aims to achieve particulate matter (PM) emissions reductions from diesel-powered TRUs, lower the global warming potential of the refrigerant used, and increase the use of zero-emission TRU technology for truck TRUs. Beginning in 2023, specified percentages of Truck TRUs will need to operate with zero emission technology. Truck TRUs are a relatively small percentage of TRUs. The thrust of the regulation is to implement PM emissions control and refrigerant technology on existing diesel powered TRUs and set standards for new TRUs.

***Impact:** The impact of this regulation on the LCFS will not be major, but it will accelerate electricity use for truck TRUs in place of diesel. With that, there will be a moderate corresponding increase in credits and a decrease in deficits.*

- [Ocean-Going Vessels at Berth \(2019\)](#) – This regulation applies to port visits by ocean-going vessels (greater than 400 feet in length or 10,000 gross tons in weight or with an engine larger than 30 liters) and requires a CARB Approved Emission Control Strategy to control PM, nitrogen oxide (NOx), and reactive organic gas (ROG) emissions at berth. Approved strategies must meet the emissions criteria specified in the regulation through source testing or can be met using shore power supplied to the vessel. The requirement for a control strategy begins in 2023 for container, refrigeration cargo, and passenger vessels and applies to all types of ocean-going vessels in 2027. There are provisions for certain exemptions in the regulation.

***Impact:** Although this regulation does not directly impact fuels, its provisions will speed implementation of shore power at berth in California. Since the LCFS program has a provision for eOGV Fueling (i.e., providing shore power to an ocean-going vessel at-berth), this regulation may speed the growth of credits generated in this category.*

- [Zero-Emission Airport Shuttle Regulation \(2019\)](#) – Applying to fleet owners and operators that service regulated airports. This regulation requires that 33% of a fleet be ZEVs by the end of 2027 increasing to 100% by 2035.

Impact: *This mandate reduces consumption of diesel, gasoline and natural gas as current airport shuttles are replaced with ZEV airport shuttles. The diesel, gasoline and natural gas that is displaced will be a combination of petroleum fuels and renewable fuels. As a result, volumes of petroleum gasoline and diesel as well as ethanol, biodiesel (BD), RD, and renewable natural gas (and associated credits/deficits) will decline.*

- [Phase 2 and Tractor-Trailer Amendments Regulation \(2018\)](#) – This regulation aims to reduce GHG emissions from heavy-duty longbox-type semitrailers that transport freight within California by establishing emission standards and other requirements applicable to HD tractors and trailers. The regulation establishes CO₂ emissions standards for engines by model year through 2017 and requires use of compliant aerodynamic technologies and low-rolling resistance tires to ensure reductions of GHG emissions from affected HD tractors and trailers.


Impact: *This regulation reduces consumption of petroleum diesel and thus will reduce the deficits generated by the diesel fuel pool.*

- [Innovative Clean Transit \(2018\)](#) – This amendment replaced the prior Fleet Rule for Transit Agencies and requires that, beginning in 2023 for large transit agencies, a prescribed percentage of new bus purchases must be ZEVs. Beginning in 2029 for both large *and* small transit agencies, *all* new bus purchases must be ZEVs. There are exemptions for school districts and hardships along with other provisions. A provision in the regulation requires that, beginning January 1, 2020, a large transit agency must purchase only RD or RNG when renewing fuel purchase or delivery contracts.

Impact: *For the LCFS, this regulation places a mandated demand for RD and RNG that will be reflected in LCFS credit generation. Another impact of this regulation is that the buses replaced by electric or fuel cell buses will be both diesel and natural gas powered, impacting the volumes used (and associated credits/deficits) of these fuels which include BD, RD, and RNG. Interestingly, if buses burning -300 CI RNG (as an example) are replaced with EVs consuming nominally zero-CI electricity, this switch may serve to decrease credit generation.*

Highlight 2. The Advanced Clean Cars Program (it's not really an ICEV-ban)

In our January newsletter, we introduced our Demystifying California's Vehicle Rules series. In February, we offered Part 1: Why California Vehicle Rules Matter. This month, in Part 2 of the series, we zoom in on the Advanced Clean Cars II (ACC2) regulation.

 **Bottom Line Up Front (BLUF):** California's ACC2 does not ban internal combustion engine vehicles (ICEVs), which CARB acknowledges will remain on the road for many years to come. Rather, ACC2 establishes a set of vehicle emissions standards, new vehicle sales rules, and requirements for original equipment manufacturers (OEMs) to meet, all of which collectively drive the light-duty vehicle (LDV) market toward electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs).

The [Advanced Clean Cars \(ACC\) Program](#) first emerged in 2012 shortly after the LCFS was launched and consolidated the previous ZEV and LEV programs under one umbrella called ACC. The ACC program was focused on light-duty vehicles (LDVs, aka passenger cars and light trucks) because LDVs are the source of 70% of the transportation sector's emissions. ACC standards apply to model year (MY) 2015 – 2025. The program includes two main elements:

- 1) The [ZEV program](#) which originally [started in 1990](#) and includes battery-electric vehicles (BEVs), hydrogen fuel cell (FCEVs), and PHEVs, and
- 2) The [Low Emissions Vehicle \(LEV\) program](#) which started back in 1990 and has been revised three times.

As discussed last month, the CAA allows other states to adopt California's rules. [This table](#) lists the Section 177 states that have adopted CA's vehicle standards as of May 13, 2022.

What's the Buzz All About?

In 2022, CARB updated the ACC rules and proposed [ACC2 program](#) regulations, which push the program forward even further, including a mandate that all *new* passenger vehicles (cars, trucks and SUVs) sold in California be zero emission by 2035.² The ACC2 program impacts MY 2026 vehicles and beyond.

While the buzz about ACC2 often frames the program as an internal combustion engine (ICE) vehicle ban, that is not entirely accurate. ACC2 *is* a *new* "ICE-ban" in that all new vehicle sales in 2035 must be zero emission vehicles. Aside from that, ACC2 does not address used-vehicle sales, does not mandate ICEV owners relinquish their vehicles, or that ICEV owners stop driving their ICE vehicles. Furthermore, PHEVs sometimes qualify for ZEV credit under ACC2, and these vehicles still operate partially on an internal combustion engine. ACC2 is a mix of incentives to switch to ZEV/PHEVs, environmental justice (EJ) provisions, and increasing [emission standards](#).

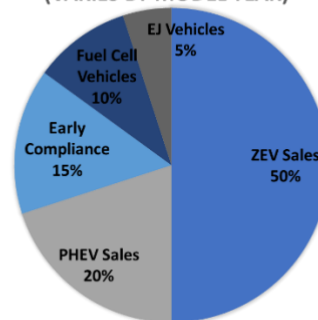
OEMs are the Main Stakeholders Impacted

² ACC2 defines zero-emission as "zero exhaust emissions of any criteria pollutant (or precursor pollutant) or greenhouse gas, excluding emissions from air conditioning systems, under any possible operational modes or conditions."

ACC2 primarily impacts OEMs who manufacture and deliver LDVs and light-duty trucks for sale in California; it does not create new requirements for vehicle owners. (Note that this differs from the medium- and heavy-duty space where the ACF regulation mandates covered fleet operators to purchase ZEVs.) ACC2’s embedded and updated [ZEV regulation](#) mandates an increasing percentage of ZEV sales from MY 2026 until MY 2035, from 35% to 100%, respectively. This means OEMs need to shift production, which may impact consumer options.

The regulation allows multiple ways for OEMs to get “ZEV credit” to achieve compliance, using tools other than ZEV sales. For example, up to 20% of the ZEV requirement can be satisfied through PHEV sales, assuming the PHEVs meet certain criteria (MY 2026+), which may vary by MY. Another 15% of the ZEV requirement can be achieved via early compliance; another 10% can be achieved via FCEVs (MY 2026-2030); and 5% of the requirement (MY 2024-2031) can be achieved through “EJ vehicles.”³ See

POTENTIAL ACC II COMPLIANCE OPTIONS
(VARIES BY MODEL YEAR)



the pie chart for a visual depiction of these options. ACC2 also includes flexibility to bank and trade credits, in some cases to include trading among other Section 177 ZEV states. Each of the alternate compliance mechanisms have more specifications and fine print (e.g., mileage range criteria, emission standards, proportional values), but the point is, ACC2 has thoughtfully included compliance flexibility for the first few years of the program. (It is also important to note there are exceptions for small volume manufacturers.)

For the ICEVs Still on the Road

From the [LEV IV](#) perspective, ACC2 mandates increasingly stringent emissions standards for particulate matter (PM) and GHG, which is measured on a Fleet Average basis. The goal is to keep improving the emissions of ICEV engines (including PHEV engines), since many will remain on the roads for years to come. CARB’s estimates indicate as much as 50% of vehicles on the road in 2035 will be ICEVs. LEV IV applies to passenger cars, light-duty trucks, and medium-duty vehicles for MY 2026 and beyond. Not surprisingly, there are similarities in CARB’s approach to rolling out the ZEV regulation and LEV IV. Like the new ZEV regulations, LEV IV also incentivizes some technology rather than banning others, as well as including some flexibility in the implementation process over time.

³ According to the [Initial Statement of Reasons](#): “Additionally, staff further bolstered the proposal since the SRIA in the area of equity and environmental justice (EJ), already a multi-faceted effort in ACC II, and one that sits within a larger set of actions – from incentive programs to other regulatory measures – intended to protect priority populations. Following continued input from external stakeholders and internal equity partners, staff are proposing to add a third category to increase affordable access to ZEVs and PHEVs by providing an incentive for manufacturers to offer lower priced vehicles. This is especially important in the earlier years of the proposed ACC II program when battery costs are higher. **The EJ vehicle values are aimed at providing manufacturers with incentive for targeted actions that would help achieve more equitable outcomes.**”

Once again, OEMs are the primary stakeholder directly regulated under ACC2, as opposed to individual consumers who are indirectly impacted. The most relevant metric OEMs need to meet is fleet average emissions. In terms of how the fleet averages are calculated, this is where CARB included some compliance flexibility. For example, until MY 2025, 100% of ZEV sales are included in the calculation for Fleet Average; between MY 2026-2028, ZEVs are gradually phased out from the average; finally, for MY 2029+, ZEVs are not included in the Fleet Average calculation. The phase out of including ZEVs in the calculation means it will be more difficult over time for OEMs to meet the standards without changing the composition of their fleet.

Similarly, from MY 2025-2028, emission-adjusted PHEVs are included in the Fleet Average, but for MY 2029+, PHEVs can no longer include an emission adjustment, but they can still be included in the fleet average (unlike ZEVs). Lastly, ACC2 includes new standards for aggressive driving (a testing cycle where emissions are measured including hard accelerations and braking) and cold starts, as well as specifying that flex fuel, bi-fuel, and dual-fuel⁴ vehicles must meet emissions standards for both the gasoline/diesel and gaseous/alcohol tests.

If this already sounds complicated, rest assured it gets even more so. The regulations are very detailed about requirements for compliance, and the different types of phasing over time add to the complexity. If you have concerns about business strategy in California or the West Coast because of these new regulations, Stillwater can help you work through them.

Next month, we will look at Advanced Clean Trucks and Advanced Clean Fleets. Stay tuned!

Stillwater sees things others miss. We have been tracking developments in California's LCFS, Oregon's CFP, and Washington's CFS and the corresponding credit and fuels markets since each program's inception. Our Associates leverage decades of experience in the transportation fuels industry to provide the insights offered in this newsletter. We are also available to provide more in-depth and personalized analysis and outlooks for our consulting clients. If you find yourself wanting a deeper dive on the subjects we've covered in this newsletter, [contact us](#) to learn how we can help.

⁴ Dual-fuel operation means the engine uses two fuels (e.g., gasoline and propane) at the same time. Bi-fuel operation means the engine can use either fuel separately.

LCFS in the News – March

- On March 1st, [The Sacramento Bee reported](#) that members of California’s state legislature questioned CARB chair Liane Randolph concerning the agency’s climate action plans. Concerning the LCFS, Randolph said: “We know the low-carbon fuel standard needs to be more aggressive. We know cap and trade needs to be more aggressive, full stop. But there’s a lot of questions as to how to do that and what the best next steps are. We are beginning that process and everything is on the table.”
- On March 1st, [Rural Life reported](#) that University of California, Davis’ Professor Frank Mitloehner told an audience at Lincoln University that financial incentives like the LCFS were helping California dairy farmers get to a climate-neutral position.
- On March 7th, CARB released a [Tier 2 pathway application from Madera Renewable Energy](#) for low-CI electricity from dairy manure biogas for a [10-day public comment period](#).
- On March 7th, the [Weekly Credit Transfer Report for February 27 - March 5](#) was posted on CARB’s website.
- On March 8th, [Freight Waves highlights](#) how new rules in California regarding trailer refrigeration units (TRUs) will require refrigerants with less warming potential and a reduction in particulate matter emissions. Furthermore, TRUs of a certain size must register with CARB and report on various data points. But these new rules are not stand-alone regulations without incentives. As reported by FreightWaves: “Particularly for emissions initiatives in California, there is always a question: Who gets the credits? The fuel markets in the Golden State have the Low Carbon Fuel Standard (LCFS) as a key component of economic decisions.”
- On March 8th, CARB published a [Tier 2 pathway from U.S. Venture, Inc.](#) for biogas from dairy manure at the company’s Augean RNG project for [10-day public comment period](#).
- On March 10th, CARB published an [innovative crude method application from Crimson Resources Management](#) for [10-day public comment period](#).
- On March 10th, CARB published [two Tier 2 pathways](#) from U.S. Venture for biogas from dairy manure at the company’s U.S. Gain RNG facility Clover Hill in Campbellsport, WI and the Yellow Jacket Swiss Valley RNG project in Warsaw, NY for 10-day public comment periods.
- On March 14th, [the Defense Visual Information Distribution Service \(DVIDS\) reported](#) that the U.S. Navy has generated its first LCFS credits for electrification projects at a naval base in San Diego. “Since signing an Intergovernmental Support Agreement with the Port of San Diego in September 2022, \$4.5 million has been generated” from the sale of LCFS credits.
- On March 14th, [Reuters reported](#) on Chevron’s announcement that the company is collaborating with agribusiness firms Corteva Inc and Bunge Ltd to produce renewable fuels from canola crops. As Reuters reported: “U.S. state programs, led by California’s Low Carbon Fuel Standard (LCFS), reward fuel producers for decarbonizing by producing renewable fuels, and the producers have responded by ramping up production of such ‘greener’ fuels.”

- On March 14th, the [Weekly Credit Transfer Report for March 6-12](#) was posted on CARB's website.
- On March 15th, Holland & Knight [released an "Eyes on Washington" podcast](#) episode diving deep into state LCFS programs and changes coming down the pike.
- [JetBlue and Shell Aviation have announced](#) a new collaboration "bringing additional supply of sustainable aviation fuel (SAF) to Los Angeles International Airport (LAX), targeting commencement of delivery in the first half of 2023." JetBlue is expected to "take delivery of 10 million gallons of blended SAF at LAX over the next two years and an option to purchase up to 5 million gallons more in the third year, either at LAX or other airports in JetBlue's network."
- On March 15th, CARB published a [pair of Tier 2 RD pathways](#) from Jaxon Energy for [public comment](#).
- On March 21st, the [Weekly Credit Transfer Report for March 13-19](#) was posted on CARB's website.
- On March 28th, the [Weekly Credit Transfer Report for March 20-26](#) was posted on CARB's website.
- [Hawaiian Airlines has reached an agreement](#) with Gevo, Inc. to purchase 50 million gallons of sustainable aviation fuel (SAF) over five years. Gevo expects to supply the SAF from a facility to be constructed in the Midwestern United States and begin deliveries to Hawaiian's gateway cities in California starting in 2029.
- On March 4th, the [Weekly Credit Transfer Report for March 27 - April 2](#) was posted on CARB's website.

Oregon CFP News

- On March 1st, [KTVZ News Channel 21 reported](#) that the "first electric school bus for Bend-La Pine Schools – and the first east of the Cascades – is ready to hit the streets of Central Oregon." The school district acquired the electric bus through Pacific Power's electric mobility grant program, in conjunction with the CFP.
- On March 9th, [Targray announced](#) the opening of two new biodiesel terminals in Oregon. "Located in Portland and Eugene respectively, the new terminals are strategically positioned to ease supply concerns for wholesale fuel distributors, retailers and refineries in the state which has a mandatory 5% biodiesel blending requirement in place to help curb emissions and transition towards clean energy in the fight against climate change."

Washington CFS News

- On March 1st, the Washington Department of Ecology (hereafter Ecology) sent an e-mail with Clean Fuels Standard (CFS) program updates including a video recording of the [Alternative Fuel Platform registration training](#) and important CFS program dates and deadlines:
 - March 9 - Backstop aggregator [informational webinar](#). A backstop aggregator is a non-profit organization appointed by Ecology to collect unclaimed credits from electric vehicle charging, sell those credits, and

- reinvest the revenue into transportation electrification in disproportionately impacted communities.
- March 15 - Deadline for [backstop aggregator applicants](#) to submit the required [letter of intent](#) as part of the [complete application](#).
- March 31 – Deadline to register to claim credits for the first quarter.
- April 1 – Quarter 1 reporting begins.
- On March 15th, the Washington Department of Ecology (hereafter, Ecology) disseminated an e-mail with reminders concerning the Clean Fuel Standard. To receive these CFS e-mails from Ecology directly, [subscribe here](#). Upcoming deadlines and events highlighted in the latest e-mail include:
 - March 23 – Fuel Supply Equipment registration training
 - March 31 – Deadline to register to claim credits for the first quarter & deadline for backstop aggregator applicants to submit part two of the [complete application](#)
 - April 1 – 1Q2023 reporting begins
- On March 20th, [The Tri-City Herald reported](#) that Tidewater Terminal Company has received \$3.1 million in federal matching funds to complete a new biodiesel distribution hub at their Snake River Terminal in Pasco, Washington.
- On March 30th, the Washington Department of Ecology announced that “Due to unforeseen challenges with the technology development for the Washington Fuels Reporting System (WFRS), and the development of the supporting documents, the reporting period for quarter one of 2023 will both begin and end later than originally scheduled. Ecology currently estimates the delay to be approximately two weeks.”

Canadian CFR News

- On March 1st, the Low Carbon Fuels Division of Environment and Climate Change Canada published an update regarding training packages on Fuel LCA Model CI Calculations. The RNG & Biogas and the Charging Stations examples are now available on the [CFR Google Drive](#), and the RNG & Biogas training package can be found in the folder “7 – RNG & Biogas Example”. It shows how to model the production of the fuels at a farm using an anaerobic digester. The Charging Stations training package can be found in the folder “6 – Fuelling Station Examples”. It shows how to model the supply of electricity from electricity from the grid, on-site solar panels, and on-site wind farms.
- On March 1st, The Low Carbon Fuels Division of Environment and Climate Change Canada posted a factsheet for credit creation for 2022 on the [CFR Google Drive](#) in folder [4 - Credit Creation](#). The factsheet provides guidance to registered creators during the credit creation process for the 2022 compliance period. It includes start dates for provisional credit creation, deadlines for submission of reports, and section 21 agreements.

BC-LCFS News

- On March 1st, the Province of British Columbia posted the [February 2023 Monthly Credit Market Report](#) for the BC-LCFS program.

- On March 13th, [The Vancouver Sun reported](#) that British Columbia Premier David Eby met with Washington state Governor Jay Inslee and highlighted the fact that U.S. climate incentives (including state-level LCFS programs, the federal Renewable Fuel Standard, and the newly enacted Inflation Reduction Act of 2022) prove challenging for B.C. According to Eby: B.C. needs a “strong federal partner” to develop its own incentives at the provincial level to become “a formidable competitor for American business around clean energy.”
- On March 31st, the Province of British Columbia posted updated [RCLF-012 Approved Carbon Intensities](#).

Proposed Minnesota CTFS

- On March 6th, [SF 2584 Clean Transportation Fuels Standard](#) was introduced into the Minnesota state senate. The bill proposes a 25% CI reduction vs 2018 by 2030, 75% by 2040, 100% by 2050. It prohibits credit generation from carbon capture and sequestration, biofuels grown on cropland with less than five consecutive years of cropping history, and renewable natural gas from any new or expanded livestock facility. It gives extra credits for low carbon agricultural practices, including use of cover crops.
- On March 9th, [SF 2584 Clean Transportation Fuels Standard](#) (CTFS) was referred to the Senate State and Local Government and Veterans Committee which held a hearing on the bill on March 10th. On March 13th, the bill was voted out of committee “as amended” and re-referred to the Senate Environment, Climate, and Legacy Committee. The bill proposes a 25% CI reduction vs 2018 by 2030, 75% by 2040, 100% by 2050. It prohibits credit generation from carbon capture and sequestration if used for enhanced oil recovery, biofuels grown on cropland with less than five consecutive years of cropping history, and renewable natural gas from any new or expanded livestock facility. It gives extra credits for low carbon agricultural practices, including use of cover crops. Note that a [companion bill \(HF 2602\)](#) was also introduced into the Minnesota House on March 6th, but that bill has yet to see any action. Minnesota’s 2023 legislative session ends May 22nd.
- On March 13th, [Ethanol Producer Magazine published](#) a write-up on the proposed Minnesota CTFS.
- On March 13th, [The Progressive Farmer \(by DTN\) published a piece](#) highlighting the concerns voiced by Minnesota’s agricultural and biofuels advocacy groups concerning the proposed CTFS in that state. These groups feel the proposal favors EVs over biofuels.

Proposed New Mexico LCFS

- On March 4th, legislators in the New Mexico House Government, Elections, and Indian Affairs committee debated [House Bill 426](#) (HB426) which would implement an LCFS-style program in that state. After amending the bill to require consumer impacts to be considered, the committee reported it out with a “Do Pass” recommendation.

- On March 11th, [The Santa Fe New Mexican published](#) an op-ed from Graham Noyes, executive director of the California-based Low Carbon Fuels Coalition, arguing in favor of a Clean Transportation Fuels Standard in New Mexico.
- On March 18th, [House Bill 426](#) (HB426), which would have implemented an LCFS-style program in that state, failed to be brought to a vote on the House floor prior to the end of the legislative session.

Proposed Vermont LCFS

- The [Clean Fuels Program bill](#) (S.24) saw no action in March. Vermont's 2023 legislative session ends May 19th.

Proposed New York CFS

- [Senate Bill 1292](#) and [Assembly Bill 964](#) – bills which would establish a clean fuel standard in New York state saw no action in March, but the [New York League of Conservation Voters published a piece](#) strongly supporting the approval of a Clean Fuel Standard (CFS) in New York. New York's 2023 legislative session ends June 8th.

Proposed Illinois CTS

- On March 10th, [Senate Bill 1556](#) which would establish an Illinois clean transportation standard to reduce the CI of on-road transportation by 20% by 2038 was re-referred to the Senate Assignments Committee. Illinois' 2023 legislative session ends May 19th.

Situational Awareness

- On March 1st, [Speedway Digest reported](#) that “all 27 race cars competing in the NTT INDYCAR SERIES season-opening event will run on Shell's 100% renewable race fuel. It's a first for a U.S.-based motorsports series.”
- On March 1st, [Bloomberg reported](#) that “Makers of renewable diesel in the US imported about 530,000 barrels of used cooking oil from China in January and February, and they're expected to bring in 239,000 barrels next month, according to analytics firm Kpler. The shipments are the first US imports of the oil in the firm's data dating back to 2017.”
- On March 1st, [Fox28 News reported](#): “A bill backed by a Spokane lawmaker seeking to address aviation greenhouse gasses passed the Washington state Senate with a large bipartisan majority on Wednesday. [Senate Bill 5447](#), sponsored by Sen. Andy Billig (D-Spokane) would use tax incentives to encourage aviation industry companies to buy and manufacture aviation biofuels.” [According to Biodiesel Magazine](#), the bill also directs Washington State University to convene a work group to further development of alternative jet fuels. The bill has been transferred to the Washington House of Representatives for consideration, and it is scheduled for a hearing in front of the House Committee on Environment and Energy on March 9th.
- On March 2nd, the [North Carolina Department of Transportation released](#) its draft [Clean Transportation Plan](#) outlining a strategy for reducing GHG emissions in

North Carolina by promoting use of EVs and encouraging transit and non-motorized ways of getting around.

- “Hydrogen is the smallest, lightest and most abundant molecule in the universe. On Earth, it does not occur by itself naturally, but can be separated from water (H₂O) or hydrocarbon compounds (fossil fuels) like gas, coal and petroleum to be used as an energy source. It’s already used for rocket fuel, but it is now being pushed as a clean and safe alternative to oil and gas for heating and earthly modes of transport. Political support is mounting with almost \$26bn of US taxpayer money available for hydrogen projects thanks to three recent laws – the Inflation Reduction Act, the Bipartisan Infrastructure Act and the Chips Act. Hydrogen is politically hot, but is it the climate solution that its cheerleaders are claiming?” [Read the rest of this article from The Guardian](#).
- On March 8th, [The Verge published an article](#) concerning e-fuel and whether it can replace EVs. The conclusion? “E-fuel will probably be too expensive and inefficient for cars, but it just might work for planes.”
- On March 8th, [farmdoc daily posted a new report](#) from the Department of Agricultural and Consumer Economics at the University of Illinois at Urbana-Champaign entitled “Overview of the Production Capacity of U.S. Renewable Diesel Plants through December 2022”
- On March 9th, [The Verge reported](#) on Delta Airlines’ plans to “leave fossil fuels behind” using sustainable aviation fuel.
- On March 10th, [FleetPoint reported](#) that Logistics UK is calling on the Government of the United Kingdom to develop “a low carbon fuels strategy to enable the sector to meet the phase out dates for traditional vehicle fuels and technologies.”
- On March 13th, [Biofuels Digest reported](#) that “Viridos, focused on the production of algae biofuels primarily in the form of SAF and renewable diesel, has raised \$25M in a Series A equity investment led by Breakthrough Energy Ventures, joined by Chevron and United Airlines Ventures. The funding will be used for R&D to further increase algae oil productivity to reach commercially deployable levels.”
- On March 14th, The U.S. Department of Energy’s (DOE) Bioenergy Technologies Office (BETO) announced that it has partnered with the U.S. Department of Agriculture, U.S. Department of Transportation, U.S. Environmental Protection Agency, and other federal agencies to launch the [Sustainable Aviation Fuel \(SAF\) Grand Challenge](#) website highlighting a comprehensive roadmap for scaling up new technologies to produce SAF on a commercial scale.
- On March 15th, [The Western Producer published an article](#) indicating that, according to two lobbying groups, “Canada’s biodiesel and renewable diesel sectors will be obliterated by a new subsidy program [the Inflation Reduction Act of 2022] in the United States unless the Canadian government responds in kind.”
- On March 22nd, [Canadian Mining Journal reported](#) that “Canada will see 700,000 more energy jobs in a net-zero 2050 than exist today, according to a new report from Clean Energy Canada with modelling from Navius Research.”

- On March 22nd, [Ethanol Producer Magazine reported](#) that four U.S. senators from the Midwest reintroduced the Next Generation Fuel Act, a bill that aims to establish a “high-octane, low-carbon fuel standard.” Similar bills have been introduced each of the past three years. The Next Generation Fuels Act would “establish a minimum research octane number (RON) standard of 98 for gasoline, which is higher than the typical octane of 91. It also requires the added octane value to reduce carbon emissions by at least 40 percent compared to regular gasoline. Fuels containing 20 to 30 percent ethanol would meet these requirements.”
- On March 23rd, [The Western Producer reported](#): “The food vs. fuel debate is resurfacing as North America’s oilseed sector braces for surging demand from the burgeoning renewable diesel industry.”
- On March 23rd, [the Alliance for Automotive Innovation released its analysis](#) of the U.S. EV market for 2022. The report shows that EVs made up 7% of new car sales in the U.S. last year and 20.1% and 11.5% of new car sales in California and Oregon, respectively.
- On March 28th, the [Oregon Department of Environmental Quality announced](#) \$13.3 million in funding for 14 projects “helping to establish a network of new and leading-edge zero-emission charging stations.”
- On March 29th, [the Clean Air Task Force \(CATF\) published](#) an outlook for U.S. hydrogen hubs.
- On March 29th, [the University of Illinois published](#) an “Overview of the Production Capacity of U.S. Renewable Diesel Plants for 2023 and Beyond.”
- On March 30th, [Marketplace published an episode](#) on the labor shortage which “stands in the way” of a clean energy transition in the U.S.
- On March 30th, [the Biden administration confirmed plans](#) to update its charging station locator tool within the U.S. Department of Energy’s [Alternative Fueling Station Locator](#), to include the “charging cost and charging speed, or power output—at the port level—for each publicly accessible charger.”

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