Low Carbon Fuel Standard
Public Workshop: Potential Changes to the Low Carbon Fuel Standard
JULY 7, 2022
Purpose

Discuss options for utilizing LCFS to accelerate transportation decarbonization

• Present current LCFS status and trends
• Identify considerations for carbon intensity target updates
• Identify options for improving alignment between LCFS and incentives needed for infrastructure and fueling
• Discuss concerns raised about LCFS and crop-based feedstocks
• Solicit stakeholder feedback, including opportunities to support equity

Note: This workshop does not include a full list of potential changes staff are considering
Workshop Logistics

• Workshop materials and online docket available on the LCFS Meetings and Workshops page: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops

• Written feedback may be submitted to the online docket
  • Online docket open July 7 to August 8 (5 pm Pacific)

• Q&A during the workshop
  • 1) Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
  • 2) When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself
LCFS as part of State climate policy

2022 Scoping Plan: Path to Carbon Neutrality

- May 2022 – Draft Plan
- June 2022 – Board Hearing 1
- Late 2022 – Board Hearing 2 (final proposed plan)

Broad policies and path to meet climate goals

LCFS Pre-Rulemaking

- Informal Workshops
  - Evaluate LCFS trends
  - Discuss alignment with Scoping Plan signals
  - Solicit public input on additional changes for consideration

Potential changes while the Scoping Plan is finalized

LCFS Formal Rulemaking (major steps)

- Issue public Notice of Preparation (NOP)
- Develop language and economic analysis
- Dept of Finance review
- Initial Statement of Reasons (ISOR) and public comment period
- Board Hearing 1
- Respond to comments
- Board Hearing 2 (adoption)
- Office of Administrative Law review
- Implementation begins

Formal process with specific timelines

* One year timeline to complete once ISOR is published
LCFS Status and Trends
LCFS is Over-Performing

2011-2021 Performance of the Low Carbon Fuel Standard

Carbon intensities based on composite of gasoline and diesel fuels

Historic Compliance Targets (black solid line)
Reported % CI Reduction (green line)
Future Compliance Targets (black dotted line)
Credit and Deficit Balances

Total Credits and Deficits (MT)
for All Fuels Reported Q1 2011 - Q4 2021

Metric Tons (MT)

Credits
Deficits
Cumulative Bank

2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3 Q4
2015Q1 Q2 Q3 Q4
2016Q1 Q2 Q3 Q4
2017Q1 Q2 Q3 Q4
2018Q1 Q2 Q3 Q4
2019Q1 Q2 Q3 Q4
2020Q1 Q2 Q3 Q4
2021Q1 Q2 Q3 Q4
LCFS Continues to Increase Diversity and Volume of Low-Carbon Fuels

VOLUMES

Fuels supported by the LCFS displaced over 2.7 billion gallons of petroleum fuel in 2021

CREDITS

Growing credit generation from electricity, renewable diesel, and biomethane

Fuels supported by the LCFS displaced over 2.7 billion gallons of petroleum fuel in 2021.
LCFS is a Critical Part of California’s Climate Portfolio

Significant reductions in transportation emissions are needed to reach carbon neutrality and improve air quality.

LCFS is a key mechanism that supports:

• Reducing and replacing fossil fuels
• Accelerating investment in low-carbon fuel production and the associated infrastructure buildout
• Providing long-term price signals needed to support transition to ZEVs and decarbonizing remaining liquid fuel demand
Decarbonization Accelerating

- ZEV targets and low-carbon fuels (EO N-79-20)
- Biofuel production capacity expansions (renewable diesel, alt jet)
- Regulations requiring use of low-carbon fuels
- Unprecedented spending on climate mitigation in recent State budgets
Considerations for 2030 CI Adjustments

- Supply and demand for alternative fuels
- Carbon intensity trends of alternative fuels
- Clean fuels programs in other jurisdictions
- Alignment with transportation and equity objectives
Options for 2030 CI Adjustments

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<tr>
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<th>2030 CI Reduction Target</th>
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<tbody>
<tr>
<td>Current Target</td>
<td>20%</td>
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<tr>
<td>Scenario A</td>
<td>25%</td>
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<tr>
<td>Scenario B</td>
<td>30%</td>
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*Target scenarios are for public discussion purposes only*
Considerations for Post-2030 CI Targets

• Alignment with EO N-79-20, including 100% truck fleet turnover to ZEVs by 2045 where feasible
• Regulations with post-2030 milestones (Advanced Clean Trucks/Proposed Advanced Clean Fleets, Advanced Clean Cars II, etc)
• Diverse fuel mix to decarbonize off-road equipment and heavy-duty vehicle fleets
• Balance long-term market signal with uncertainty in modeling inputs
• Staff soliciting feedback on other data, studies that should be considered
Public Feedback Requested on Post-2030 CI Targets

- Do we need five-year interim CI targets between 2030 and 2045?
- What are the risks and benefits associated with setting a 2045 CI target this far in advance?
- What is an appropriate timeframe for which to set a target in advance?
Next Steps on CI Targets

• Materials presented at this workshop are just the first step

• Review and incorporate additional data, studies, and stakeholder feedback

• Workshop in Fall 2022 to evaluate supply and demand of alternative fuels in California and feasibility of various CI targets

• Staff will present preliminary modeling and solicit alternatives
Opportunities in the LCFS to advance transportation policy
Aligning LCFS Incentives

- LCFS program sends market signal to diversify transportation fuel pool and displace fossil fuels
- Program must utilize targeted market signals to incentivize projects needed for long-term decarbonization
- Limited available credits should be targeted for actions in need of additional support to displace fossil fuel consumption
Policy Alignment: 2018 Amendments

Regulation updated in 2018 to align with policy drivers at the time, including the following new opportunities:

**Fuel Pathways**
- Alternative Jet Fuel
- Crediting periods for avoided methane
- Book & Claim accounting for low-CI electricity

**Project-based Crediting**
- Carbon Capture & Sequestration
- Direct Air Capture

**ZEV Infrastructure Crediting, LDVs**
- Hydrogen Refueling Infrastructure (HRI)
- Fast Charging Infrastructure (FCI)
Principles for Alignment

• Further incentivize private investment in transportation decarbonization
• Phase out incentives for mature low-carbon technologies
• Accelerate deployment of ZEV refueling infrastructure
• Holistic approach to considering and promoting equity
• Support exportability of the program to other regions
• Reflect changes in technologies, data and stakeholder feedback
Electric Forklifts

- Electric forklifts were added to the LCFS in the 2015 readoption
- Total cost of ownership is lower than other ZE applications even without LCFS benefit
- The forklift fleet population is mostly electric
  - Over 50% of forklift fleets (class 1-5) are electrified
- Credits issued to electric forklifts have grown substantially
  - In 2021 27% of electricity credits came from electric forklifts
Opportunities for Credit Phase-Outs?

• California is successfully transitioning forklifts
  o N-79-20 calls for 100% transition to ZE off-road equipment
  o Zero-Emissions Forklift Regulation\(^1\) would require purchases after 2025 be ZE

• Staff is soliciting feedback on phase-out of credits for electric forklifts

• Staff also seeks public feedback on other crediting opportunities or equipment that should be phased out

\(^1\)Potential proposed amendments to CCR Sections 3000-3005
Infrastructure Crediting in LCFS

- Goal: Support buildout and operation of ZEV refueling infrastructure while vehicle deployment increases
- Concept: Credit hydrogen stations and DC Fast Chargers (DCFC) based on fueling capacity minus any dispensed fuel
- Infrastructure credits decline over time as more vehicles are deployed
LCFS Support for ZEV Refueling Infrastructure, Light-Duty Vehicles

Approved hydrogen stations in HRI provision

Approved fast charger sites in FCI provision

- 66 Hydrogen Stations
- 2,690 DC Fast Chargers at 410 sites
New Opportunities: Medium- and Heavy-Duty (MHD) ZEV Refueling Infrastructure

• Executive Order N-79-20 directs a transition to ZEVs
• Both battery-electric and H2 fuel cell technologies in MHD vehicle sector needed
• Advanced Clean Trucks and proposed Advanced Clean Fleets show substantial need for public retail charging and refueling
• Opportunity to support MHD/HHD refueling infrastructure, similar to existing HRI and FCI LD provision

Important Factors to Consider for Infrastructure Crediting

- **Eligibility**: what role should LCFS credits play in building out infrastructure? Dedicated fleet refueling or public refueling?

- **Level of support**
  - **Total Credits**: How many possible HRI/FCI credits should be available?
  - **Crediting Period**: What is appropriate crediting period for incentivizing long-term investment and operation?
  - **Max Station Capacity**: How large should stations be in initial network of stations, relative to refueling demand?
## MHD HRI: Design Considerations

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>MHD HRI</th>
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| **Eligibility**                | • Located in California  
                                 | • Publicly accessible  
                                 | • Primarily serves MHD vehicles                                    |
| **Total Credits**              | • 2.5% of previous quarter deficits                                   |
| **Crediting Periods**          | • 15 years or when total HRI revenue exceeds capital expenses for the station, whichever is earlier |
| **Max Station Capacity**       | • 3000 kg/day, and would credit based on 50% of the nameplate capacity |
MHD HRI: Public Feedback Requested

• What are the mechanisms to track station availability for quarterly reporting?

• How can eligibility requirements be designed to best support behavior of MHD ZEVs utilizing public refueling infrastructure?

• Should we incorporate requirements for sites to be capable for both LD and MHD vehicle refueling?

• What are some of the expected capital and operational expenses to MHD stations?
# MHD FCI: Design Considerations

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| Eligibility               | • Located in California  
                          • Publicly accessible  
                          • Primarily serves MHD vehicles (connector types to support?) |
| Total Credits             | • 2.5% of previous quarter deficits                                  |
| Crediting Periods         | • 5 years or when total FCI revenue exceeds capital expenses for the station, whichever is earlier  
                          • Expected CapEx costs for stations?                                  |
| Max Station Capacity      | • TBD: At what size nameplate power is too small to be useful for truck charging? |
MHD FCI: Desired Feedback

- Location recommendations and Network affects: Should there be location and/or network requirements associated with an MHD FCI program? If so, what should the requirements be?
- Recommendations for treatment of sites capable of both LD and MHD vehicle charging
- Expected capital and operational expenses to MHD stations
- Is MHD charging equipment life different from LD, based on increased use rates?
Fuels and Vehicle Applications [1 of 2]

• The LCFS may consider new fuels subject to the regulation in pursuing its goal to diversify and decarbonize California’s transportation fuel

• Staff is considering including or excluding certain fuel types and application
  • In 2025 hydrogen will likely surpass the low volume exemption threshold, making hydrogen a required reportable fuel
  • Jet fuel is a significant transportation GHG contributor for California and difficult to decarbonize. Staff is considering requiring intrastate fossil jet fuel in the LCFS
• Staff is also considering the inclusion of other fuels as opt-in for novel applications
  • E.g., dimethyl ether, methanol, ammonia
  • Zero-emissions applications for rail, agricultural equipment, commercial harbor craft and airport ground support equipment under Tier 2 EER-adjusted CI pathways

• Staff requests stakeholder feedback as to how the LCFS could best support the decarbonization of these sectors and support novel technologies
Areas of Further Consideration
Crop-based Feedstocks for Biofuel Production

• Feedback received:
  • Increasing lipid-based feedstock for biofuels may result in food v fuel conflicts
  • Recommended that CARB set an upper limit on biofuel volumes from lipid-based feedstocks

• Staff evaluating need for adjustments to avoid deforestation, land conversion, and adverse food supply impacts
Treatment of Land Use Change in LCFS

• LCFS accounts for life cycle GHG emissions from crop-based fuels

• Land use change (LUC) analysis quantifies indirect effects of using crop-based biofuels

• Extensive modeling in 2015 readoption to establish LUC CI values, with uncertainty analysis

• LUC emissions incorporated into final certified fuel pathway CIs when utilizing crop-based feedstock
Treatment of Crop-based Biofuels in other Jurisdictions

• The European Union limits biofuels produced from food and feed crops to 1% above baseline use in that member state in 2020 or a maximum of 7%. EU further limits the use of biofuels with “high ILUC risk” to 2019 levels and declining to zero by 2030

• Renewable Transport Fuel Obligation in the UK puts a cap of 3.83% for crop-based fuels which declines to 2% by 2032

• The Federal Renewable Fuel Standard (RFS2) limits various types of biofuels when setting annual renewable fuel volume obligations

• Some Clean Fuels Programs use mechanisms such as sustainability to potentially limit crop-based biofuels
Fat and Oil Feedstock Trends in the LCFS

- The share of vegetable oil feedstocks has increased in California and nationally in recent years.
- Clean fuels programs in Oregon, Washington, Canada, Brazil and EU will likely increase global demand for crop-based fuels.
Public Feedback Requested on Crop-based Biofuels

• What are the potential risks of increased use of crop-based biofuels?
• What data sources or studies should staff review to evaluate potential impacts of future growth in crop-based biofuels?
• Should staff consider a cap on crop-based biofuels?
• If so, what mechanisms could staff consider or implement as part of the upcoming rulemaking?
Supporting Equity in the LCFS

• LCFS is part of California’s strategy for a technologically feasible, cost effective and equity-focused transition to a carbon neutral economy

• LCFS requires utilities to invest credit proceeds in transportation electrification projects for low-income and disadvantaged communities and rural areas.
  o Projects include new and used vehicle rebates, charging infrastructure, electrification of trucks and buses, and outreach
  o Investment requirements begin in 2022 and increase to 50% over time
  o Utilities must report annually on their projects and expenditures
Public Feedback Requested on Equity in the LCFS

- Staff are evaluating a holistic approach to equity – how to leverage programs and policies to support successful long-term transition to zero emission vehicles
- What additional support is needed for achieving the holistic goal?
- What should be the role of LCFS in supporting the various aspects of a holistic goal?
Workshop Logistics

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Next Steps

• Submit written feedback online through August 8, 2022
  • Link to submit written feedback found on the LCFS Meetings and Workshops webpage: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops

• Further pre-rulemaking workshops in summer 2022