

Public Workshop to Discuss Potential Changes to the
Low Carbon Fuel Standard

AUGUST 18, 2022



Today's Workshop Topics

- LCFS Status and Trends
- Streamlining Implementation
 - Deemed Complete Date
 - Credit True-up for Temporary Pathways
 - Simplified Tier 1 Hydrogen Calculator
- Potential Updates
 - Emission Factor Update
 - Electricity and Hydrogen Verification
 - EV Base Credit Methodology

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
 - Written feedback may be submitted to the online docket
 - Online docket open August 18 to September 19 (5 pm PST)
- Q&A during the workshop
 - Use the “Raise Hand” function in the GoToWebinar toolbar, which is located to the right of your screen as shown
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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)

Scoping Plan [Webpage](#)

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 Scoping Plan is finalized

LCFS Formal Rulemaking (major steps)

- Issue public Notice of Preparation
- 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

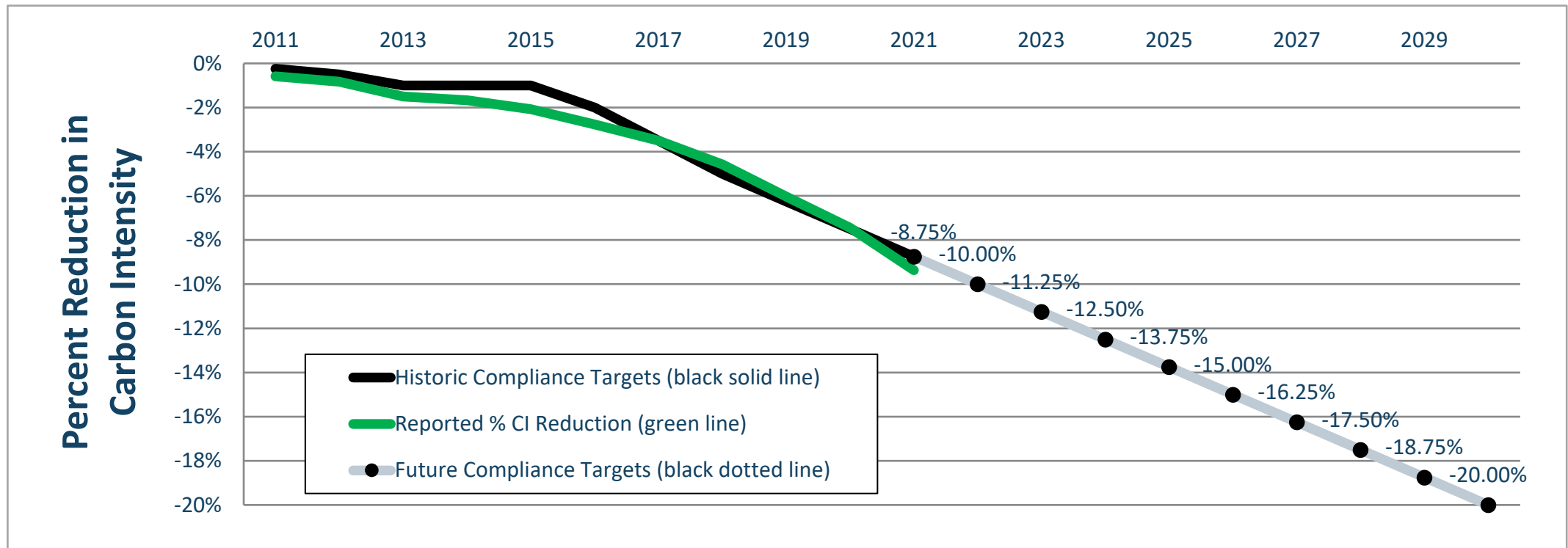
Formal process with specific timelines

* One year to complete once ISOR is published

LCFS Status and Trends

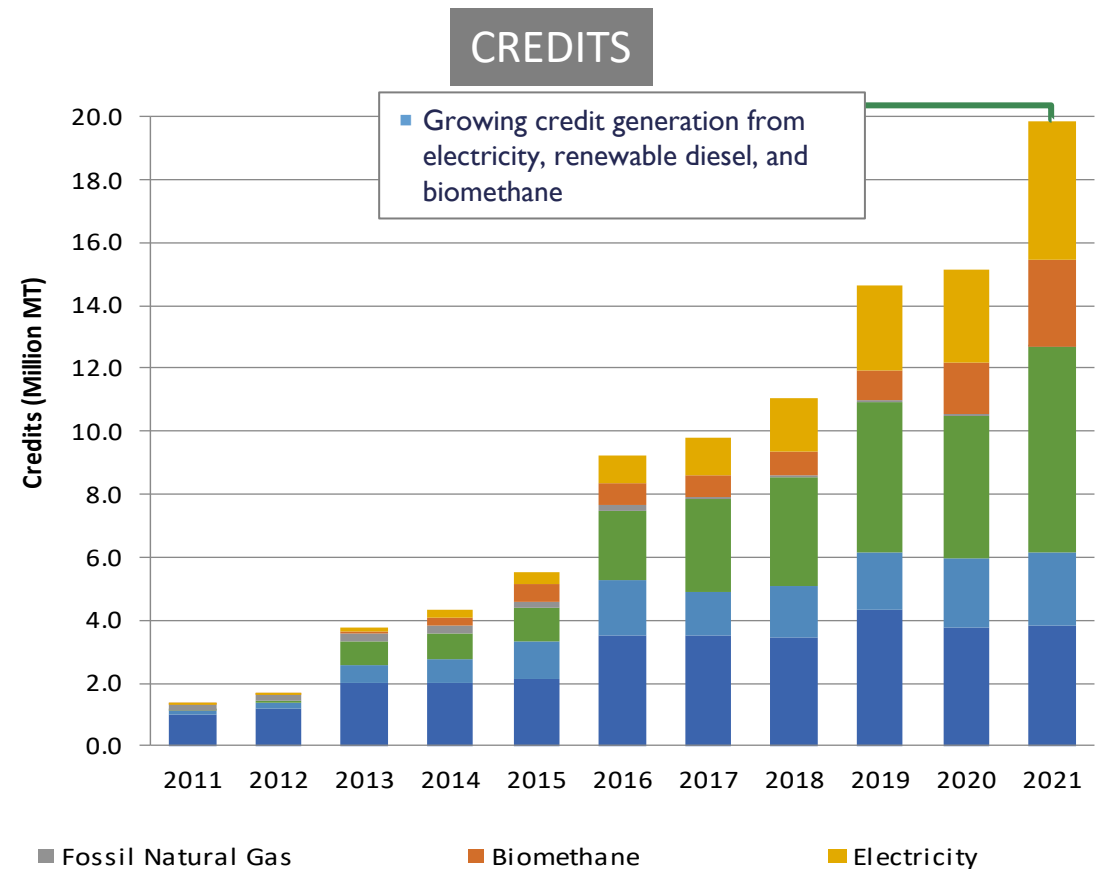
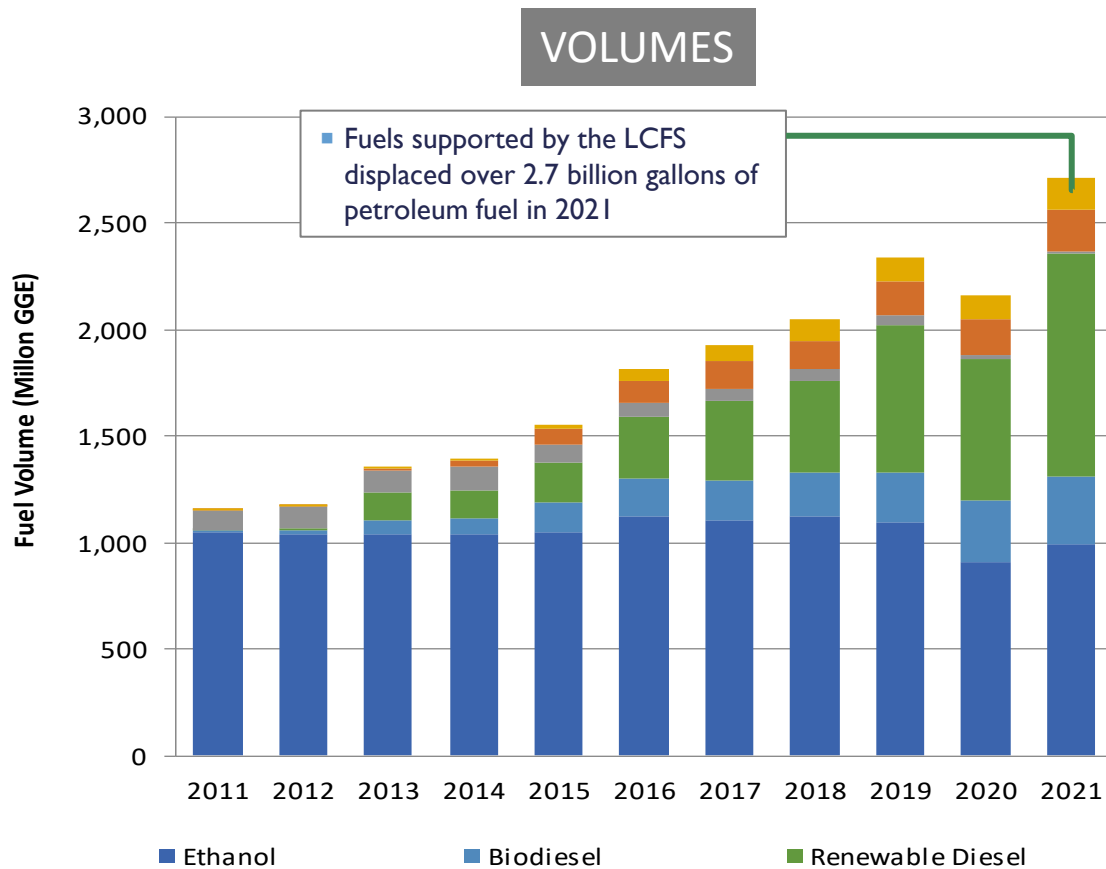
LCFS is Over-Performing

2011-2021 Performance of the Low Carbon Fuel Standard



Carbon intensities based on composite of gasoline and diesel fuels

LCFS Continues to Increase Diversity and Volume of Low-Carbon Fuels

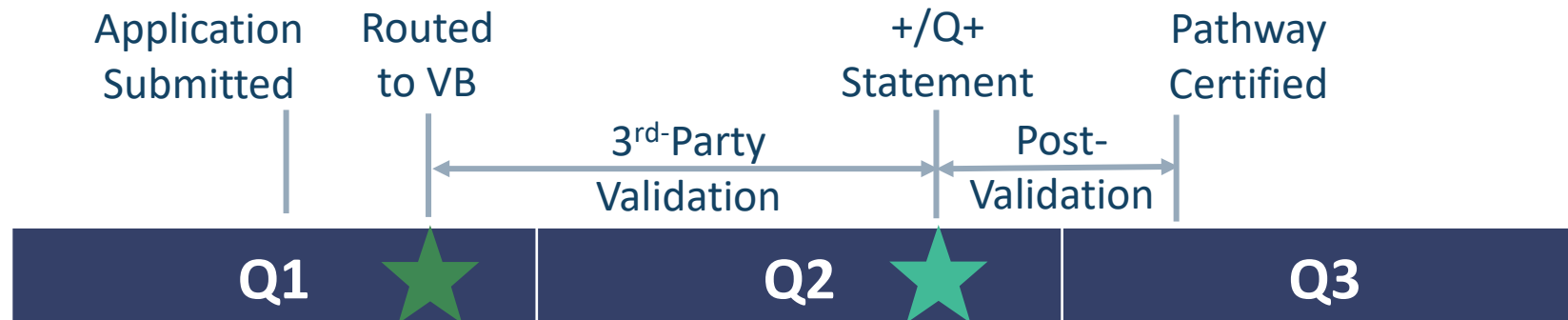


Opportunities to Streamline Implementation

Deemed Complete Date

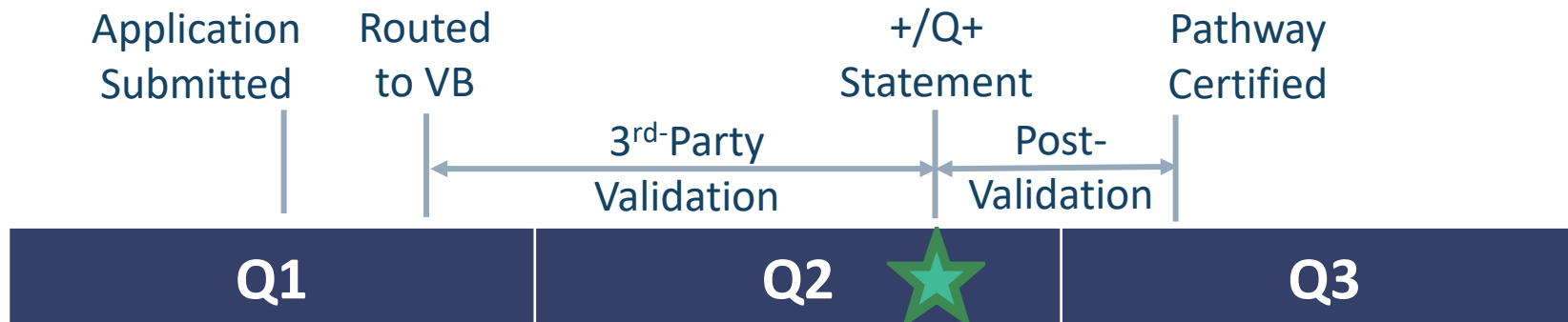
Current Deemed Complete Protocol

- Tier 1 applications are deemed complete (★) when the verification body (VB) issues a positive or qualified positive (+/Q+) validation statement
- Tier 2 applications deemed complete (★) upon routing to a VB



Potential Change to Tier 2 Deemed Complete

- **Potential Change:** Align Tier 1 and Tier 2 deemed complete date (★) when the VB issues a +/Q+ validation statement



Benefits of Aligning Tier 1 and Tier 2 Deemed Complete Date

- Ensure consistency across Tier 1 and Tier 2 applications without preferentially benefiting Tier 2 applications
- Permit detailed review of Tier 2 applications without pressure to deem complete close to end of a reporting quarter

Impacts to Fuel Pathway Holders

- Removes confusion on deemed complete differences between Tier 1 and Tier 2 applications
- Preserves existing market signal
- Minimal impacts to credit generation based on current average application processing times for Tier 2 applications
- Potential true-up of temporary pathways if implemented may alleviate concerns with delays in certification

Temporary Pathway Credit True-Up

Purpose of Temporary Fuel Pathways

- Allows fuel producers to report fuel sales and generate credits during start-up while Tier 1/Tier 2 applications are under review for certification, or if new feedstocks or finished fuels are added to an existing production process
- Uses a conservative carbon intensity score
- Approved initially for up to two quarters with possibility of extension

Potential to Add Credit True-Up for Temporary Pathways

- Upon certification of a fuel pathway, credit true-up could be considered based on the difference in carbon intensities between the temporary pathway and the corresponding certified pathway
- Eligibility effective the first full quarter of operational data coincident with a corresponding temporary fuel pathway

Potential Benefits of True Up

- Could provide additional credits to a fuel pathway holder
- Could alleviate concerns related to:
 - Delays in pathway certification
 - Potential change to deemed complete for Tier 2 applications
- Facility-specific carbon intensity permits better accounting of emission reductions in the program
- Potentially ease pressure to expedite pathway certification

Stakeholder Feedback

- CARB seeks feedback on potential changes under consideration for temporary pathway credit true up:
 - Overlap with requirements for submitting Annual Fuel Pathway Reports
 - Other issues related to implementation

Hydrogen Tier 1 Calculator

Hydrogen Pathways

- Currently, hydrogen (H₂) fuel pathways must either use the Lookup Table or Tier 2 application options
 - Small changes from Lookup Table assumptions require use of Tier 2
 - 60% of H₂ pathways use Tier 2
- Significant staff effort related to
 - Book and claim of renewable attributes from RNG
 - Inclusion of sources of low-CI H₂
- Staff anticipate significantly more H₂ pathways

Potential to Develop a Tier 1 H₂ Calculator

- Expedites review and validation by streamlining application materials and considering standard and site-specific operational inputs
- Permits integration of low-CI sources of hydrogen expeditiously
- Integrates book and claim for hydrogen to facilitate validation and annual verification

Potential Tier 1 H₂ Calculator Pathways

- Steam Methane Reforming (SMR)
 - Natural Gas
 - Renewable Natural Gas (Direct supply and book-and-claim)
- Electrolysis
 - Grid Electricity
 - Direct-supply Electricity
 - Book-and-Claim Low-CI Electricity

Tier 1 Calculator Design Considerations

Inputs	Description
H ₂ production technologies	SMR and electrolysis (standard and site-specific)
Liquefaction and regasification	Liquefaction inputs, process energy use, electricity and other process energy used (standard and site specific)
H ₂ transport and dispensing	Tube trailer (MDT/HDT), rail, ocean tankers, pipeline, transport distance, boil off loss (likely standard only)
Book and Claim	Integrate book and claim match for RNG and low-CI electricity with specific input fields
Others	Feedback from stakeholders

- Staff request stakeholders to provide relevant data and other information related to design considerations summarized in the Table

Additional Ideas for Streamlining

- Staff welcome any additional ideas to streamline pathway application, review and verification processes

Opportunities to Update Implementation

Emission Factor Updates

Emission Factors (EFs)

- Integral part of CA-GREET3.0 model and simplified Tier 1 calculators to quantify life cycle GHG emissions
- EFs embedded in simplified Tier 1 calculators predominantly come from Argonne GREET model, CARB and CEC
- EFs are typically updated as part of LCFS amendments
 - To address changing electricity mix, inclusion of new fuel production and process technologies, updates to science and data and availability of new source models

Emission Factor (EF) Updates

- Staff are considering potential updates to EFs embedded within Tier 1 Simplified CI Calculators
- Lifecycle inventory data are likely to be considered from various sources including Argonne's GREET 2021 model, IEA, EIA, FAO, USDA, EPA, CARB and peer-reviewed literature

Emission Factor (EF) Updates, continued

- Staff may potentially update the following EFs:
 - E-Grid 202X for electricity mix
 - Fugitive emissions from fossil natural gas production and pipeline
 - Updates to CARBOB and ULSD including updates to OPGEE
 - Crop production data
 - Transport emissions by mode
 - Tailpipe emissions from EMFAC
 - Others as required for the Tier 1 Simplified CI Calculators

Criteria for Updates

- Whether EFs are outdated such as due to evolving electricity mix, availability of new data or source model updates (i.e., OPGEE)
- Strong/defensible science and supporting data
- New fuel or process technology

Stakeholder Feedback

- Staff request stakeholder to provide relevant data, peer-reviewed literature and other information to support consideration of updating EFs outlined earlier

Verification Updates

Current Verification Requirement

- System to monitor, report, and verify data
- LCFS supplements the existing work of CARB staff with a verification system that requires regulated entities to retain the services of accredited third-party verifiers
- Verification is vital to ensure all data and information provided to CARB accurately represents the operation of the regulated entity

Potential to Add Transaction Types to Verification Requirement

- With expected expansion of electrification in transportation sector, potentially add verification requirements for these transaction types:
 - EV Charging Transaction Types;
 - eTRU, eCHE, and eOGV Fueling;
 - Fixed Guideway Electricity Fueling; and
 - Fuel Cell Vehicle (FCV) Fueling transaction types, not limited to hydrogen from book and claim biomethane

Potential Exemption to Third Party Verification

- Existing exemption threshold of 6,000 credits or deficits in a calendar year only extends to liquid fuels (LCFS Regulation Section 95500(c)(2)(C))
- Potential to expand the existing exemption threshold to the potential additional transaction types subject to verification
 - Ensure that small credit generators (who might incur verification costs exceeding the credit revenue) would not be deterred from participating in the program

Exemption to Third Party Verification, continued

- With the potential deferred verification for additional transactions types, about 99% credits are still covered by regular verification

Residential Base Crediting

What are Base credits?

- Credits generated from estimated residential plug-in electric vehicle (PEV) charging—called “Residential EV Charging”
- Provided to Electrical Distribution Utilities (EDU) (e.g., SDG&E, PG&E, SCE, SMUD)
- Issued since 2015 on a quarterly basis
- Estimated using “best data available”

Residential EV Charging in the LCFS

- The large EDUs on dedicated PEV rates provide household specific charging events
 - Dedicated PEV rates have declined and utilities are moving to harmonized Time of Use (TOU) structures
 - The future of dedicated rates for PEV charging are uncertain
- The 2018 amendments added incremental crediting for residential PEV charging for low-CI electricity with increasing participation

How Base Credits Are Calculated¹

- The number of on-road PEVs: Quarterly data from the Department of Motor Vehicles
- The average charging rate:
 - A: Quarterly data from EDUs that provide dedicated PEV rate data
 - B: Weighted average of (A) for non-reporting EDUs

¹https://ww2.arb.ca.gov/sites/default/files/2022-07/methodology%20non-metered%20base%20credits_2022update.pdf

Available Data

- The Regulation requires use of the best available data to accurately calculate a representative state-wide residential PEV charging rate
 - **Potential sources for estimating residential EV Charging** are EDU PEV dedicated rates, EDU Time of Use estimation, Onboard telematic charging data, and Emissions Factor (EMFAC) model estimated data
 - **Criteria for evaluation** are sample size, availability, transparency, and ease of reporting

Available Data – Status Quo

- EDU dedicated PEV rate data (or average of dedicated rate data)
 - **Sample Size:** 3k-5k samples from four utilities (<1% of PEVs in CA)
 - **Availability:** The future of dedicated rates is uncertain
 - **Transparency:** Easy to describe and communicate
 - **Implementation:** Streamlined reporting for utilities and auditing for staff

Available Data – TOU Estimation

TOU rates are whole household electricity rates with differential pricing based upon season and time of day provided by EDUs

- **Sample Size:** Potential for high sample sizes of participating households
- **Availability:** Most utilities have implemented TOU rates
- **Transparency:** Aligns with estimation methods from literature
 - Sørensen et al 2021 and Burlig et al 2021
- **Implementation:** Significant effort for utilities to regularly canvas households and demonstrate method to estimate EV charging from whole household metering

Available Data – Onboard Telematics

Residential PEV charging by individual vehicles reported to LCFS

- **Sample Size:** Over 600k vehicles (60% of estimated on-road vehicles) are registered in the LCFS and close to 400k vehicles reporting
- **Availability**
 - Reporting for incremental credits may be limited as the grid average declines
 - Non-OEM data providers exist who gather telematics data from open API platforms (currently used for demand response or optimal charging)
- **Transparency:** Demonstrated method through geofencing
- **Ease of Reporting:** Demonstrated ability to report

Available Data – EMFAC model estimation

EMFAC is an emissions factor model developed by CARB to assist the State Implementation Plan and mobile source regulations

- **Sample Size:** EMFAC is not designed to estimate residential PEV charging—estimates are not intended to reflect charging behavior
- **Availability:** EMFAC is publicly available
- **Transparency:** EMFAC is well documented and inputs are transparent though significant modifications would need to be made to transform model outputs into an estimate of residential PEV charging
- **Ease of Reporting:** Would eliminate reporting requirements

Stakeholder Feedback

- Staff request feedback on the best data available for estimating base credits

Questions/Feedback

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Next Steps

- 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>
 - Submit written feedback by **5PM PST September 19, 2022**
- Further pre-rulemaking workshops later in 2022