State of California

Air Resources Board

Staff White Paper

Framework for Development of a Low Carbon Fuel Standard Verification Program

October 21, 2016

Introduction

A successful greenhouse gas (GHG) reduction program requires a system to monitor, report, and verify (MRV) GHG emissions to aid implementation and tracking of the effectiveness of emission reduction strategies. Historically, the Low Carbon Fuel Standard (LCFS) has relied upon a robust reporting program built around ARB staff evaluating fuel carbon intensity (CI) through the fuel pathway application process and conducting spot-checks on the reporting of quarterly fuel volumes.[1,2]

ARB is now considering supplementing the work of ARB staff with a verification system conducted by independent third-parties engaged by entities reporting to ARB under the LCFS. Conceptually, these verifiers would perform GHG accounting checks in a role similar to the independent, objective evaluations of organizations' financial reports by financial auditors. ARB has extensive experience with an analogous system under the Regulation for Mandatory Reporting (MRR) of Greenhouse Gas Emissions pursuant to the California Global Warming Solutions Act of 2006 (AB 32) and through the verification of GHG compliance offset projects under ARB's Cap-and-Trade Program.[3,4]

Historical examples from analogous low carbon fuel support programs also point to the need to strive for continuous improvement in program oversight, data quality and fraud prevention efforts. Biodiesel fraud cases investigated in the U.S. EPA Renewable Fuels Standard (RFS) program[5] and recent European Court of Auditor's findings[6] regarding implementation of the European Union Renewable Energy Directive reinforce the need for strong government oversight, transparency, independent checks and inclusive stakeholder processes.

This white paper presents overarching considerations for an LCFS verification program, taking into account stakeholder feedback received through prior workshops on this concept[7] and providing the foundation for additional fuel-specific staff work and stakeholder discussions that will inform potential future amendments to the LCFS regulation.

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[1] LCFS Fuel Pathways: https://www.arb.ca.gov/fuels/lcfs/fuelpathways/fuelpathways.htm
[2] LCFS Data Management System: https://www.arb.ca.gov/fuels/lcfs/reporting tool/datamanagementsystem.htm#lrt-cbts
[3] AB 32 explicitly supported verification calling for ARB to "adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance…" Health and Safety Code (H&SC) section 38530(a). Program information on MRR verification is available here: https://www.arb.ca.gov/cc/reporting/ghg-ver/ghg-ver.htm
[4] Offset Verification Program: https://www.arb.ca.gov/cc/capandtrade/offsets/verification/verification.htm
[5] RIN Fraud & Compliance Presentation, Byron Bunker, Director, Compliance Division, Office of Transportation and Air Quality, U.S. EPA, Sept. 22, 2015.
[6] European Court of Auditors' Report "The EU System for the Certification of Sustainable Biofuels" July 2016: http://www.eca.europa.eu/Lists/ECADocuments/SR16_18/SR_BIOFUELS_EN.pdf
[7] March 8, June 2, and July 29, 2016 workshops: https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm

ARB staff is considering mandatory verification of various program aspects including, but not limited to,

- fuel pathway carbon intensities,
- reported fuel quantities (for both high and low carbon fuels), and
- chain-of-custody information (for some feedstocks and finished products).

The objective of the verification program is to ensure integrity in the LCFS credit market through assurance of GHG reduction claims in the LCFS. In pursuit of this objective, the guiding principles when designing a verification program must include:

(1) ARB retention of sole authority over the LCFS program, including verification requirements, as bestowed through the State's legislative and regulatory process;

(2) Continual improvement in the detection, prevention, and correction of errors or fraud;

(3) Identification and implementation of cost reducing strategies, while maintaining verification rigor;

(4) Policy consistency with other ARB verification programs; and

(5) Consideration of the unique attributes of fuel carbon intensities and fuels marketing structure.

The degree of ARB oversight, verifier competency and training, and conflict of interest requirements are expected to be consistent with MRR and Compliance Offset verification programs, while seeking to harmonize, where possible, with existing verification and certification programs, most notably U.S. EPA's RFS Quality Assurance Program (QAP). Program improvements to streamline LCFS data reporting, ease of credit generation and improve quality assurance will likely also be proposed.

1. Objective – Assure accuracy of GHG reductions claims

Independent third-party verification is critical to support a credible GHG reporting and reduction program. Effective verification systems have been shown to improve data quality thereby enhancing assurance when evaluating GHG reduction claims. Examples of compliance and voluntary GHG reduction programs containing some form of third-party verification include:

- U.S. EPA's Renewable Fuels Standard (voluntary QAP),[8]
- European Union's Renewable Energy Directive,[9]

[8] Quality Assurance Plans under the Renewable Fuel Standard Program: https://www.epa.gov/renewable-fuel-standard-program/quality-assurance-plans-under-renewable-fuel-standard-program

[9] European Commission Voluntary Schemes: https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes

- ARB's Cap-and-Trade program (through MRR[10] and Compliance Offset Program[11]),
- Quebec's Cap-and-Trade Program,[12,13]
- European Union's Emissions Trading Scheme,[14]
- Clean Development Mechanism,[15]
- Climate Action Reserve (voluntary),[16]
- Verified Carbon Standard (voluntary),[17] and
- American Carbon Registry (voluntary).[18]

CARB's experience implementing MRR and the Compliance Offset program has demonstrated that mandatory third-party verification is valuable in creating a credible emissions reduction program.

2. Terminology

The following terminology clarifies the "core concepts" needed to understand ARB's verification proposal. While most terms are defined under MRR, these terms apply equally within the LCFS GHG lifecycle framework. LCFS verification is proposed to assure accuracy of credit and deficit generation based on conformance with ARB-certified fuel pathway CI values and accurately reported fuel quantities. In the LCFS program, ARB certifies carbon intensity values for distinct fuel pathways based on submitted evidence and attestation by alternative fuel producers. ARB grants credits and deficits based on fuel quantities (associated with each fuel pathway CI) that are reported by reporting parties.

Key terms include report verification, product certification and auditing; conflict of interest; level of assurance; material misstatement; measurement accuracy and missing data provisions; and accrediting bodies.

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[10] Mandatory Greenhouse Gas Emissions Reporting: https://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm
[11] Offset Verification Program: https://www.arb.ca.gov/cc/capandtrade/offsets/verification/verification.htm
[12] Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere. http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%2015
[13] Regulation respecting a cap-and-trade system for greenhouse gas emission allowances. http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%2046.1
[14] Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council Text with EEA relevance: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012R0600
[15] Clean Development Mechanism: http://cdm.unfccc.int
[16] Climate Action Reserve Verification Body Requirements: http://www.climateactionreserve.org/how/verification/how-to-become-a-verifier/
[17] Verified Carbon Standard: http://www.v-c-s.org/project/vcs-program/validation-verification/
[18] American Carbon Registry: http://americancarbonregistry.org/carbon-accounting/verification/verification

Report Verification, Product Certification, and Auditing

The terms "verification," "certification," and "audit" are all used to indicate that some level of independent assurance is provided, but the terms are not fully interchangeable. The following section clarifies how we intend to use these terms within the LCFS verification program.

The term "verification" applies to assurance that reported information (also referred to as an assertion) is true, complete, and accurate or conforms to required procedures. As explained in guidance provided for the International Organization for Standardization (ISO) standards, "GHG assertions [*such as the asserted CI and reported fuel quantities*] are provided by the responsible party and should be clearly identifiable and capable of consistent evaluation or measurement …."[19]

The term "certification" generally applies to assurance that a product meets specifications or a standard. Under global voluntary certification schemes, certification that a fuel meets the standard can be expected to provide similar assurance to a system that relies on verification that reported information is correct (such as in MRR). Within the LCFS, the term "certified" is used to mean that a fuel pathway application is complete, has been reviewed by ARB, and the applicant attests that final submitted information is true. Fuel pathways are "certified" by ARB to indicate that they are permissible to use in the generation of LCFS credits.

The term "audit" may sometimes be used synonymously with "verification." Staff will strive to specify when the term "audit" is intended to mean ARB audits (or inspections) of regulated parties or ARB-accredited verification bodies versus "third-party audits" used interchangeably in this paper with "third-party verification." The term "audit" also refers to the review of whether a product meets a required standard and can then achieve or retain its certification to that standard.

The proposed LCFS verification definitions will refer to assurance of attestations to the certified CI and reported fuel quantities instead of emissions data reports and will otherwise be similar to definitions provided in MRR. ARB has defined "verification" in MRR to mean a systematic, independent and documented process for evaluation of a reporting entity's emissions data report against ARB's regulatory procedures and methods for calculation and reporting.

ARB has defined "verification statement" in MRR to mean the final statement rendered by a verification body attesting whether a reporting entity's emissions data report is reasonably assured to be free of material misstatement (see discussion below), and whether it conforms to the regulatory requirements. Note that in cases where a reporting entity does not or cannot provide objective evidence to support information they have reported to ARB or does not make

[19] ISO 14065:2013 Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition: https://www.iso.org/obp/ui/#iso:std:iso:14065:ed-2:v1:en

necessary corrections to errors during the verification time frame, then an adverse verification statement is issued.

Conflict of Interest and Consistency with Financial Auditing Principles

The need to mitigate and prevent conflict of interest and establish the expected level of assurance and materiality for auditing is as important in alternative fuel markets as it is in financial markets. International standards on third-party GHG verification are similar to international financial auditing standards. During drafting of the conflict of interest requirements for MRR verifications, ARB staff reviewed reforms put in place by the Sarbanes-Oxley Act of 2002, which was characterized as "the most far reaching reforms of American business practices since the time of Franklin Delanor Roosevelt."[20] To prevent accounting fraud, the Act mandated reforms to improve corporate responsibility and financial disclosures. To oversee the activities of the auditing profession, Sarbanes-Oxley also created the Public Company Accounting Oversight Board (PCAOB).

Verifier integrity is critical to the confidence ARB, credit purchasers, and the public place in the program such that even the appearance of a lack of impartiality is unacceptable. A conflict of interest is a situation in which, because of financial or other activities or relationships with other persons or organizations, a person or body is unable or potentially unable to render an impartial verification statement of a potential client's report to ARB, or the person or body's objectivity in performing verification services is or might be otherwise compromised.[21] In addition to defining conflict of interest, ARB will specify in the LCFS regulation a verification body rotation requirement, a look-back period for review of incompatible activities by verification bodies and individual verifiers, a list of specifically prohibited services that are considered incompatible, and mitigations for allowed professional and personal relationships.

The concept of firm rotation every five to seven years was considered by the PCAOB to protect investors' interests, but later, the concept was shifted to simply require audit partner rotation by the independence standards for financial auditors. ARB prefers the greater protection offered by firm rotation requirements. ARB decided to include a firm rotation of six years in the verification program for MRR. The Offset program has a provision to incentivize auditor rotation at three years by offering a three-year look back period for credit invalidation when a new verification body is hired. LCFS stakeholders have expressed concern that a mandatory firm rotation may adversely impact verifier availability and quality of verification services; however, ARB staff believe there is strong value in having another verification body review actual CI and fuel quantities. Staff's current thinking is to import the six year firm rotation

[20] Full text is available at: http://www.sec.gov/about/laws/soa2002.pdf. Links to all Commission rulemaking and reports issued under the Sarbanes-Oxley Act are at: http://www.sec.gov/spotlight/sarbanes-oxley.htm.

[21] Regulation for the Mandatory Reporting of Greenhouse Gas Emissions Conflict of Interest definition: https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2014-unofficial-02042015.pdf

requirement directly from MRR. However, to help build the eligible pool of LCFS verifiers and to offer flexibility during verification program start-up, staff suggests that existing relationships that reporting entities currently have with assurance providers (whether under MRR, EU RED, or QAP) will not require rotation (i.e., no rotation would be required until a six year relationship had occurred solely as an LCFS verifier).

Levels of Assurance

As explained in GHG verification standards and guidance developed and published by ISO, the level of assurance is specified to establish the level of detail that a verifier designs into their verification plan and sampling plan to determine if there are any material errors, omissions, or misrepresentations.[22] The guidance also recommends that whether "limited assurance" or "reasonable assurance" is required should be based on the needs of intended users of the results of the verification services. Absolute assurance is understood to not be practically achievable. Limited assurance is based on less rigorous evidence-gathering procedures than reasonable assurance and the conclusion must be stated differently. In the case of limited assurance the statement is expressed in the negative, for example, "Nothing has come to our attention that causes us to believe a material error exists." In the case of reasonable assurance the statement is expressed in the positive, for example, "We are reasonably assured no material error exists." Evidence-gathering that supports a finding of reasonable assurance carries lower risk of an incorrect conclusion than does limited assurance.[23]

ARB proposes that verification of information reported under the LCFS be required to be conducted to the standard of "reasonable assurance of no material misstatement," as is required under MRR. "Reasonable assurance" is defined under MRR as "a high degree of confidence that submitted data and statements are valid."[24]

In establishing reasonable assurance of no material misstatement, verifiers must evaluate the risk that "material errors" exist but won't be detected, and then carryout sufficiently rigorous sampling to detect material errors. The sampling strategy is designed to minimize the risk of not detecting material errors. Verifiers must evaluate "control risk"—areas where the reporting entity may not have sufficient data integrity controls in place and mistakes are more likely, as well as consider the potential for fraud.

[22] ISO 14064-3: Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions: http://www.iso.org/iso/catalogue_detail?csnumber=38700 and ISO 14065: Greenhouse gases –Requirements for greenhouse has validation and verification bodies for use in accreditation or other forms of recognition: http://www.iso.org/iso/catalogue_detail?csnumber=60168

[23] International Auditing and Assurance Standards Board International Framework for Assurance Engagements: http://www.ifac.org/system/files/downloads/International_Framework_for_Assurance_Engagements.pdf

[24] Mandatory Greenhouse Gas Reporting Regulation: https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2014-unofficial-02042015.pdf

Material Misstatement

A material misstatement under the LCFS would be defined as a discrepancy, omission, misreporting, or aggregation of the three, identified in the course of verification services that leads a verification team to believe that a report contains errors resulting in an overstatement of the credits generated or understatement of the deficits generated greater than five percent. Errors that result in an understatement of credits generated or overstatement of deficits generated in LCFS reports to ARB would not be a material misstatement.[25] A verifier's finding of material misstatement indicates the possibility of invalid credits or insufficient deficits reported.

Note that a material misstatement threshold is not the same as an allowable CI variation or measurement accuracy (see below). The ARB-certified CI is a "cap" for operations over a one-year compliance period and applicants are expected to evaluate their operations accordingly when applying for, and then reporting operations under, an ARB-certified CI. If the reporting entity believes that the CI has been exceeded for a given reporting period they must work with ARB to use a more conservative CI for that quantity of fuel (including the Temporary Fuel Pathway Codes found in Table 7 of the LCFS rule).[26]

Regarding fuel quantities, reporting entities would be required to correct errors found during verification, regardless of the direction of the error. However, additional credits are not generated retroactively.[27]

Measurement Accuracy and Missing Data Provisions

MRR has clear requirements for measurement accuracy and methods for replacing missing data.[28] The general requirement for MRR measurement accuracy is that–regardless of measurement device type–all devices must be selected, installed, operated, and maintained in a manner to ensure the measured value is within plus or minus five percent of the true value.

Similar to MRR, LCFS compliance also relies on physical/chemical measurements and records demonstrating physical plant operation—meter data, mass balances, chemical use, and chemical analyses. Useful overview of measurement devices can be found in company policies and procedures and the RFS third-party engineering reports submitted to ARB during the pathway application process, but the LCFS has not yet specified formal accuracy requirements. ARB staff is interested in whether such a provision would be helpful in

[25] Based on Offsets Material Misstatement Definition in Regulation for the California Cap on Greenhouse Gas emissions and Market-Based Compliance Mechanisms. https://www.arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_030116.pdf
[26] LCFS section 95488(d)(1): https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf
[27] LCFS section 95486(a)(2): https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf
[28] See Title 17, CCR, sections 95103(k) and https://www.arb.ca.gov/cc/reporting/ghg-rep/guidance/accuracy-missingdata.pdf

facilitating CI and fuel quantity reporting and verification. Note that this concept is separate from the concept of material misstatement.

Accrediting Bodies

The term "accrediting body" means an entity that has the authority, generally derived from government, to determine whether a verification body or certification body has demonstrated its competence to engage in verification or certification activities.[29] Under MRR, ARB acts as an accrediting body consistent with international standards; however, unlike other accrediting bodies, the ARB derives its authority and responsibility from the State's legislative and regulatory process.

Third-party accreditation bodies may provide complementary oversight with ARB's verification accreditation and oversight program. Most product certification bodies and verification bodies participate in a third-party accreditation program to help ensure that their standard setting and evaluation is independent. Accreditation bodies assess organizations against internationally recognized standards and assess an organization's competence, impartiality and performance capability. American National Standards Institute (ANSI) and Accreditation Services International (ASI) are two accreditation bodies that oversee certification bodies that provide third-party auditing services for the certification schemes staff is evaluating, including International Sustainability and Carbon Certification (ISCC), Roundtable on Sustainable Biomaterials (RSB), and Bonsucro.

ARB is open to recognizing or establishing through MOUs relationships with other accreditation bodies established under international standards to complement but not substitute for ARB's oversight responsibility, in keeping with guiding principle #1.

3. ARB Experience Implementing Accreditation and Oversight of Greenhouse Gas Verification Programs

ARB's LCFS verification program will be coordinated with and consistent with its rigorous verification programs for greenhouse gas emissions reporting and compliance offset credits in support of the Cap-and-Trade program. Critical components of ARB's verification programs are:

- Public rulemaking process that is a transparent multi-stakeholder process,
- Strong oversight program to maintain verification consistency and high standards, and
- Consistency with international standards for use in accrediting.

[29] ISO/IEC 17000:2004, 2.6 Conformity assessment – Vocabulary and general principles: https://www.iso.org/obp/ui/#iso:std:iso-iec:17000:ed-1:v1:en

Critical requirements of verification bodies under ARB accreditation are also consistent with ISO 14065 and 14066. A verification body must

- be a legal entity that can be held accountable;
- have strict conflict of interest policies, monitoring, and ability to make necessary changes, including verifier removal, if conflict of interest is identified;
- maintain professional liability (Errors and Omissions) insurance;
- implement verification record retention requirements;
- establish sector competency and appropriate skills within verification teams;
- require appropriate educational and work experience for individual verifiers; and
- take responsibility for subcontractor's performance and conflict of interest review.[30]

Only ARB-accredited individual verifiers and approved verification bodies can provide regulatory verification services under MRR and Cap-and-Trade, and staff is considering similar provisions for LCFS. Applicants that meet education and experience requirements specified in the regulation may take part in ARB's verification trainings and pass the associated exams to demonstrate individual competency. ARB also accredits sector verification specialists to ensure competency for more complex verifications such as oil and gas extraction and refining and transactions of fuels and electricity, as well as for each offset protocol. Verification bodies may include technical experts who provide specific expertise, but that person does not act as a verifier.

In MRR and Cap-and-Trade, ARB continually evaluates verification bodies' services, their professional care and conduct, to ensure the integrity and consistency of verifications. Staff conducts yearly on-site audits and desk reviews of every active verification body. Audit findings are shared with verification bodies and staff confirms whether they have addressed identified issues. Staff conducts thorough performance reviews prior to reaccrediting both individuals and verification bodies. Typically 30 to 40 verification bodies are active under MRR and they verify over 500 GHG emissions data reports annually. The current number of verification bodies resulted from an initial period of growth at the inception of the verification program under MRR, followed by some mergers of verification bodies and some attrition. ARB also offers accreditation training periodically to individuals, as needed, to maintain a robust pool of verifiers.

[30] ISO 14065 – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition: Greenhouse gases –Requirements for greenhouse has validation and verification bodies for use in accreditation or other forms of recognition: http://www.iso.org/iso/catalogue_detail?csnumber=60168 and ISO 14066 – Competence requirements for GHG validation/verification teams: http://www.iso.org/iso/catalogue_detail?csnumber=43277

4. Harmonization Opportunities for Verification of LCFS Credit-Generating Fuels

Feedback provided by stakeholders in response to workshops held in March, June, and July of this year included suggestions to seek ways to avoid duplicative verifications and harmonize to the extent feasible with other programs for specific alternative fuels, thus reducing verification costs in accordance with guiding principle #3. Staff's preliminary review is provided in this white paper to stimulate further stakeholder discussion.

Staff's proposal will seek to harmonize with other programs while:

- Maintaining ARB's compliance oversight and enforcement role with regulated/reporting parties,
- Specifying requirements for verification services to reasonably assure LCFS credit validity, including fraud detection, and
- Achieving appropriate ARB oversight of third-party verification to ensure quality and consistency of verification services.

ARB verification program design features that will be considered in the context of harmonization opportunities include, but may not be limited to:

- Validation/verification site visit timing and frequency coordinated with other regulatory cycles,
- Review of findings by third-party entities not accredited by ARB but provided for other regulatory programs,
- Recognition of feedstock or fuel product-type certifications under mandatory or voluntary certification schemes that meet ARB-specified criteria and, as needed, add ARB-specific requirements.

ARB accreditation considerations for individual verifiers and verification bodies include:

- Mutual recognition of accreditation from other approved accrediting bodies,
- Conflict of interest requirements for verification bodies and verification team members (firm rotation, look-back period, specified services that may be considered verifying one's own work, specified services that may be considered client advocacy or financial interest, professional or personal relationships),
- Experience, education, and professional certification requirements for individual verifiers, and
- Delivery of ARB training and competency testing (e.g., in-person vs. remote, delegated train-the-trainer approach vs. ARB contractor).

Programs mentioned by stakeholders included U.S. EPA's Renewable Fuel Standard (RFS2), the European Union's Renewable Energy Directive (EU RED), and voluntary third-party certification programs that include lifecycle GHG emissions (e.g., Bonsucro, ISCC). The following sections summarize positive features of the U.S. EPA RFS2 program, the EU RED program, and discuss independent oversight standards and structures, also referred to as *governance*, as a complement to ARB oversight functions.

U.S. EPA Renewable Fuel Standard and Voluntary Quality Assurance Program

The goal of the Renewable Fuel Standard (RFS) is to encourage the use of renewable fuels, and requires an increasing volume of renewable fuels be used in the U.S. transportation fuel supply each year. In order for fuel to be considered renewable, it must, among other requirements, achieve a reduction in greenhouse gas emissions when compared to petroleum-derived fuel produced or imported.[31] Renewable Identification Numbers (RINs) are credits created when a company produces qualifying renewable fuel and can be traded or sold to refineries and importers to use for compliance with renewable fuel production requirements.

RINs may be marketed as Q-RINS when they are independently verified under U.S. EPA's voluntary Quality Assurance Program (QAP). The QAP was added to the RFS program to help protect against fraud that was detected in some biodiesel credit sales and currently, about 12 percent of RINs are classified as Q-RINs.[32] Minimum requirements for a QAP include third-party verification of feedstocks at the fuel production facility, verification that fuel volumes produced are consistent with amount of feedstocks processed, and verification that RINs generated are appropriately categorized and match the fuel volumes produced.[33]

All RIN generators,[34] including Q-RIN generators, must retain a qualified certified public accountant (CPA) to conduct a yearly attestation engagement and submit the results to the U.S. EPA. A CPA performs a yearly audit so that they may attest to the validity of the regulated entity's credit transactions. To remain an independent check, this attest engagement may not be performed by the QAP auditor. All RIN generators must also submit a third-party engineering report to U.S. EPA to begin generating RINs and update the report every three years thereafter. Additional engineering reports are required when changes to biofuel production occur within the three-year cycle. The engineering report may be provided by the QAP provider.

[31] U.S. EPA Program Overview for Renewable Fuel Standard Program, https://www.epa.gov/renewable-fuel-standard-program/program-overview-renewable-fuel-standard-program

[32] RIN Fraud & Compliance Presentation, Byron Bunker, Director, Compliance Division, Office of Transportation and Air Quality, U.S. EPA, Sept. 22, 2015.

[33] Federal Register Vol. 79 No. 138, Friday, July 18, 2014. Part II Environmental Protection Agency 40 CFR Part 80 RFS Renewable Identification Number (RIN) Quality Assurance Program: Final Rule.

[34] RIN generators that are not Q-RIN generators are permitted to submit annual attest engagements conducted by an employee that is a Certified Internal Auditor.

Five QAP auditing firms have been approved by U.S. EPA to audit specified fuel types and some have expressed interest in becoming ARB-accredited verification bodies. The QAP auditor must meet U.S. EPA standards (e.g., have a licensed Professional Engineer and a CPA on the auditing team and a confirmation that the auditing team meets conflict of interest requirements) and have its fuel-specific quality assurance plans explicitly approved by U.S. EPA. Remote monitoring systems installed by the QAP provider can reduce the site visit requirement from twice a year to once a year.[33]

A closer examination of the RFS QAP program is needed to identify elements of QAP audits that may support the LCFS verification system.

Elements of the U.S. EPA RFS program and voluntary QAP program should be considered in the LCFS verification program. Both the mandatory and voluntary aspects of U.S. EPA's program specify a minimum site visit frequency, auditor independence, and required competencies. Furthermore, a more detailed evaluation of QAP program audits may suggest other aspects of fuel production facility evaluations which ARB staff may consider acceptable within the context of the LCFS verification program.

LCFS staff currently review the mandatory third-party engineering reports generated under the RFS as a part of ARB's fuel pathway CI certification process. While U.S. EPA requires an annual attestation by an independent CPA separate from the voluntary third-party verification option (QAP) as an additional level of assurance, ARB is proposing mandatory verification instead of voluntary verification to provide more certainty. Staff believes mandatory verification will help to ensure consistent data quality across the LCFS.

ARB staff notes that RFS QAP verification only confirms that a fuel falls within a certain RIN D-Code (fuel-type) category.[35] It does not confirm a fuel's specific CI as will be required for the LCFS, such that QAP verification documents would have limited use in a LCFS CI monitoring and verification process. Further, some potential LCFS fuels would not be part of the RFS program because they do not meet the federal definition of "biomass-based." This would mean that no RFS data would be available for those fuels.[36]

European Union Renewable Energy Directive (EU RED)

EU RED, established in 2009 and amended in 2015, is a renewable fuel volume mandate that includes lifecycle GHG emission reduction targets. EU RED requires the EU to meet at least 20 percent of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets. All EU member states (countries) must also ensure that at least 10 percent of their transport fuels come from renewable sources by 2020. To be

[35] U.S. EPA Approved Pathways for Renewable Fuel: https://www.epa.gov/renewable-fuel-standard-program/approved-pathways-renewable-fuel
[36] ARB LCFS FAQs: https://www.arb.ca.gov/fuels/lcfs/guidance/guidance.htm#faqs

counted toward the target and to receive government incentives, biofuels must meet lifecycle GHG emissions intensity savings as a percent of the comparable fossil fuel that it will be replacing in the market.

In contrast, the LCFS is not limited to renewable biofuels, but also includes natural gas, electricity, and hydrogen as generators of tradable credits. The EU RED fuel CI calculation results in different CI values—compared to LCFS CI values—and does not include an indirect land use component, so the EU RED CI determination methods and values are not directly comparable, but many of the same parameters that are important in the EU RED calculation are relevant to LCFS CIs. For example, the quantification of process energy, fuel production byproducts and feedstock carbon intensity are essential to both LCFS and the EU RED.

EU Mandatory Verification via Voluntary Sustainability Certification Schemes

To discuss opportunities for verification harmonization in a meaningful way, it is necessary to understand how the EU RED biofuel verification requirements are met by voluntary sustainability certification schemes. Approximately 12 percent of the LCFS biofuel producers (same facility or different facility within the same company) are certified by either ISCC or Bonsucro to meet the EU RED lifecycle GHG requirements (ISCC EU or Bonsucro EU versions). The focus of this white paper is on the EU's biofuel verification program oversight design and verification of contributors to GHG lifecycle emissions along the biofuel supply chain (rather than on other aspects of sustainability) and how these parameters relate to LCFS CI accounting.

The EU RED has harmonized with existing voluntary sustainability schemes by approving their use once the EU requirements are accommodated and requiring mutual recognition among the approved schemes along the entire supply chain.[37] European Commission (EC) approvals of certification schemes are based on a desk review, are published, and expire after five years. The criteria for approving certification schemes include meeting standards of reliability, transparency and independent auditing. The EU RED does not specify frequency of site visits, but Member States and approved certification schemes have oversight responsibility. At least one approved certification scheme—ISCC—requires annual audits that must be conducted on site. ISCC requires increased frequency if indications of not following the scheme's requirements or of fraud are found.[38]

[37] Voluntary Schemes Overview. European Commission Communication 2016: https://ec.europa.eu/energy/sites/ener/files/documents/voluntary%20schemes%20overview%20table%20to%20publish_0.pdf

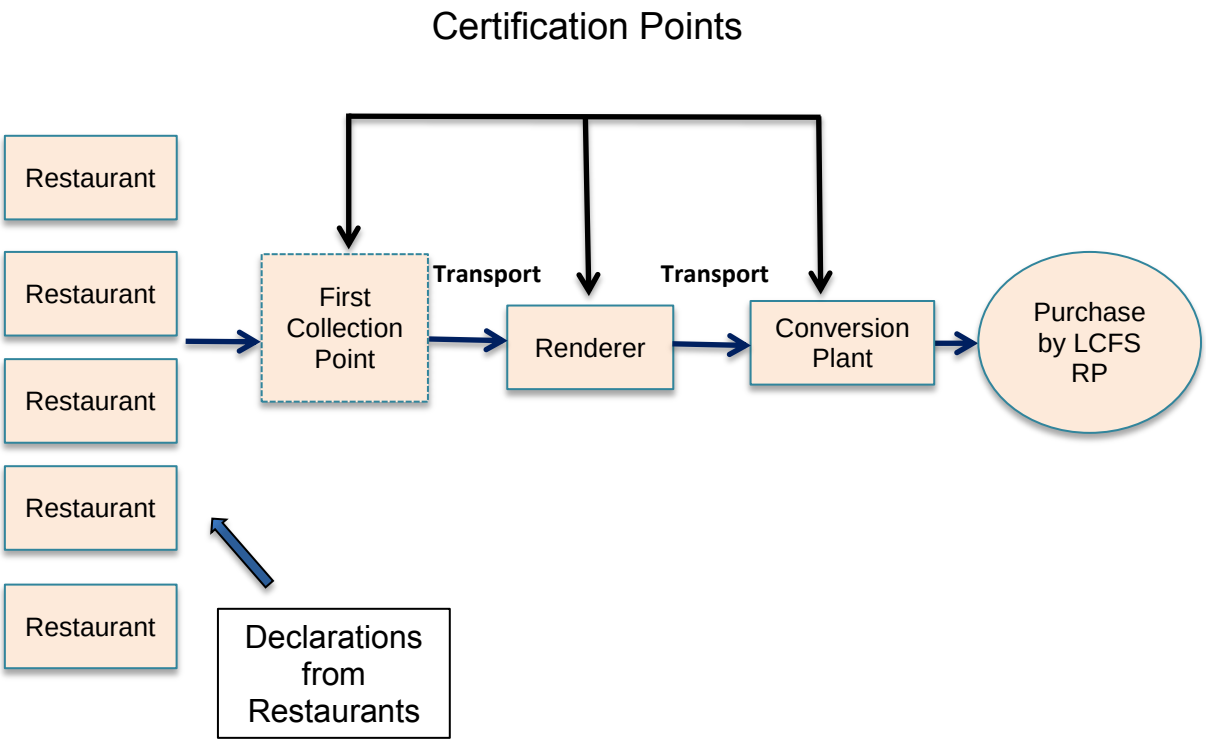
[38] ISCC 204 Audit Requirements and Risk Management Version 3.0: http://www.iscc-system.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/content/documents/ISCC-Zertifizierungs-Prozess/Zertifizierung/Systemdokumente/ISCC_EU/ISCC_204_Audit_Requirements_and_Risk_Management_3.0.pdf&t=1476976615&hash=7518cf7182ef871697c07ba4929738f3459c89aa

The EU RED requires information on place of origin for feedstocks and a mass balance compliance approach[39] along the supply chain. Key points along the supply chain are audited and traceability documents must follow the material as illustrated in Figure 1. If one EU RED-approved voluntary scheme certifies the feedstock and renderer and another voluntary scheme certifies the production plant, the auditor of the production plant must accept the upstream certificates. This model of supply chain certification might be useful in the LCFS program in cases where feedstock production, collection, treatment, or commingling are relevant to the certified CI but are not under direct control of the biofuel producer. The mass balance methodology can be compared to ARB's LCFS guidance[40] on multi-feedstock biofuels and commingled products. Note that under LCFS, producers whose accounting processes do not enable them to track the fuel volume produced in terms of the feedstocks used must label all gallons of fuel produced with the CI associated with the highest CI feedstock.

A few voluntary schemes are designed specifically as international product certification standards, not limited to the EU requirements. These voluntary schemes originally developed and continually improved to meet the needs of food and biofuel end-users for conformance with assurance requirements along global supply chains. They each offer an EU RED-tailored version that specifically addresses the EU RED requirements that are additional to their primary certification standard and would be similarly capable of adding additional LCFS checks as a supplement to their primary standard. Three of the organizations that have been in discussions with ARB staff are RSB, ISCC, and Bonsucro.

[39] Consistent with Article 7c(1) of Directive 98/70/EC and Article 18(1) of Directive 2009/28/EC.
[40] https://www.arb.ca.gov/fuels/lcfs/guidance/guidance.htm#guidance

Figure 1: Used Cooking Oil Supply Chain[41]



More research is needed for specific fuels to determine the extent to which key contributors to lifecycle GHG emissions are treated similarly across both programs. Where important differences exist, an option may be for ARB to review and approve voluntary schemes that add LCFS requirements, in addition to ARB directly accrediting the certification bodies under ARB's verification program. Under all options, ARB would audit the auditors on an ongoing basis to ensure conformance to ARB requirements and assure credit validity.

Continual Improvement of EU RED and Member State Programs

Consistent with guiding principle #2, the EU RED also encourages continual improvement. The EU legislator amended the EU RED in 2015 to require voluntary schemes to report to the European Commission (Commission) annually. While Article 18 (3) of the original legislation[42] requires auditors to verify that "the [*data management*] systems used by economic operators are accurate, reliable and protected against fraud," additional transparency is being required

[41]Figure 1 Adapted from "RSB Roundtable on Sustainable Biomaterials-Certification of Biofuels From Waste: The RSB Approach": http://rsb.org/sustainability/certification-of-biofuels-from-waste-the-rsb-approach

[42] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0028

for procedures and incidents of “non-compliance” and “serious wrongdoing.” The Commission will make these reports available to the public and submit a report in April 2017.[43]

5. How Might Verification Apply to LCFS Credit-Generating Fuels?

Initial CI Pathway Validation

As the first step to generating credits under the LCFS, alternative fuel producers may apply[44] for a CI pathway. There are currently three paths to ARB certifying a CI:

(1) A relatively rigid but simple "Tier 1" treatment is available for first generation fuels. This type of application involves a formal engineering review by ARB staff around a narrow set of GHG accounting input values.

(2) A more flexible but complex "Tier 2" treatment for second generation fuels. This step also involves a formal engineering review by ARB staff. This option has the most flexibility for the applicant to explain complex GHG accounting unique to a given fuel’s production pathway.

(3) A “lookup table option” (which currently is targeted at only second generation fuels). This is the simplest option and does not require full engineering review by ARB staff.

For alternative fuel producers that apply to ARB to receive a certified CI under either the Tier 1 or Tier 2 process, a new step—which may be referred to as a validation step—is being considered that would require third-party verification of the information submitted to ARB to request a fuel pathway CI.[45] An initial site visit would also likely be required for most large fuel production facilities.

Lookup Table CIs will be updated in the regulation amendment and are applicable to all applicants who can meet the pathway description. Staff’s current thinking is that an initial validation step would be determined on a case-by-case basis.

[43] New legal reporting requirements for voluntary schemes. European Commission Communication 09/01/2015 https://ec.europa.eu/energy/sites/ener/files/documents/PAM%20to%20vs%20annual%20reporting.pdf

[44] Fuel Pathway Application Process: https://www.arb.ca.gov/fuels/lcfs/fuelpathways/pathwayapplicationprocess.htm

[45] The current LCFS regulation requires two years of data from fuel production operations to support the fuel pathway CI application (LCFS section 95488(c)(4) (I)2.).

Ongoing CI Verification and Monitoring Plans

Staff plans to implement ongoing verification of CI information on a to-be-determined periodic basis. As part of this process each pathway applicant will need to create a "monitoring plan."

The monitoring plan is a road map intended to demonstrate (to the verifier and ARB) how the alternative fuel producer monitors operations that affect the CI values[46] and monitors the associated fuel quantities. It helps the fuel producer explain their key fuel production processes and data management systems, and it helps verifiers and ARB staff understand how the fuel producer intends to conform to ARB requirements.

The monitoring plan itself should contain required elements that would be prescribed in the regulatory proposal, but plans would not normally be reviewed by ARB staff (but would be available upon request by ARB) and errors in the plan itself would not be subject to enforcement. The actual practices (not the monitoring plan) are compared to the LCFS regulatory requirements and result in the final verification statement, whether positive or adverse. The monitoring plan itself would inform verifying bodies as they develop their client-specific verification plan.

Staff will develop required elements for fuel-specific Tier 1 CI monitoring plans and verification services based on continuing stakeholder discussions, using the monitoring plan requirements in MRR and QAP as a starting point. Application-specific monitoring requirements may be imposed by ARB as needed to substantiate low CI practices for Tier 2 fuels. Note that the suggested first-party monitoring is not the same as, but may be complementary to, the optional remote third-party monitoring that may be developed by QAP providers.

Should Reporting Requirements be Further Clarified to Facilitate CI Verification?

Staff will continue to endeavor to clearly identify how to quantify and report parameters that drive the CI scores for each fuel type. For example, fuel-specific Tier 1 lifecycle GHG emissions calculators, built from CA-GREET, could be developed to further simplify CI application processing and producer compliance monitoring as well as facilitate third-party verification. During application review for the few Tier 2 applicants, staff could impose additional CI monitoring and verification requirements (as pathway operating conditions) to substantiate practices that result in lower CI values. We will seek additional stakeholder input on these issues.

[46] Note that some CI values are provided in look-up tables such that a sensitivity analysis is not applicable. See Tier 2 Lookup Table (Table 6, subsection 95488(c)(4)(F)), which includes three renewable CNG pathways, electricity, and five hydrogen pathways.

Ongoing Verification of Reported Fuel Quantities

Monitoring and recordkeeping requirements related to fuel quantities needed to support ARB compliance audits and verification services include: transactional information such as accounts payable, accounts receivable, contracts, manifests, and bills of lading, and other records to demonstrate physical delivery of feedstocks and products. Much of this information is also relevant to CI determination.

The following table summarizes potential general LCFS verification requirements based on CI complexity:

	Lookup Table Pathways	Tier 1 Pathways	Tier 2 Pathways
CI Complexity Levels	Based on generic pathway description	Producer-specific CI(s) based on limited variables included in Tier 1 calculator	Producer-specific CI(s) based on variables available in CA-GREET model
ARB Engineering Review During Application	No	Yes	Yes
Potential CI Process Updates	Table updates	Considering simplified calculators for each fuel-type built from CA-GREET model	Not Applicable- Must use CA-GREET model
Potential Contents of Applicant's Compliance Risk Identification and Monitoring Plans	• Description and schematic of operations including meter locations • Data collection system description • Description of how reporting errors are controlled, detected, and corrected	Plus, • Mass balance procedures • CI uncertainty based on sensitivity to expected variations in key user-defined inputs[47] (key CI variables)	Plus, ARB-imposed application-specific CI monitoring requirements to substantiate low CI practices (if needed)

6. Preliminary Thinking on the Need for a Fuel-Specific Approach to Risk Analysis for Credit Generating Fuels

The variety of alternative fuel types that generate credits in the LCFS program warrants further fuel-specific stakeholder discussion. The goal of such dialogue would be to propose the specifics of the verification program for each fuel type. ARB staff are interested in reviewing pathway QAPs under the RFS program to identify audit sampling that would be common under

[47] User-defined input values are the yellow data fields in CA-GREET. Other parameters are default values.

both programs and audit sampling that may be additional to LCFS. A fuel-specific dialogue should help to address unique error risks present in individual alternative fuel supply chains and identify appropriate verification exemptions to maintain incentives for investments in alternative fuels that generate small quantities of credits.

ARB will initiate fuel-specific discussions through the stakeholder process laid out in the slides for the October 24th workshop.[48]

7. How Might Verification Apply to LCFS Deficit-Generating Fuels?

In addition to the verification of information underlying credits generation, verification of deficit-generating fuels is necessary. Staff believes the scope of verification should include petroleum fuel volumes as well as refinery crude oil volumes by marketable crude oil name. As discussed in prior workshops, one option for verification responsibility is to match the current initial point of obligation in the program for producers or importers of deficit-generating fuels and then also assure that downstream transactions are reported correctly.

A second option is to align the LCFS point of regulation with MRR and accept verified data under the MRR/Cap-and-Trade program for use in the LCFS program. Currently, in most cases, the LCFS final regulated party's reported deficit-generating fuel volumes are similar to the CARBOB and ULSD fuel transactions verified under MRR. Annual verification would be performed prior to the LCFS Annual Compliance Report Deadline.

Staff are reviewing stakeholder feedback to the proposal to harmonize the regulated party for the LCFS with the reporting party under MRR for petroleum-based fuels. Usually, this will be the position holder at the rack. This would mean that the LCFS compliance obligation cannot be transferred for CARBOB and diesel. Most producers and importers are also major fuel suppliers at the rack and (through contractual arrangements) most obligation appears to be passed to the rack in the current system. Therefore, most parties would have a similar obligation under the second proposal as under the current LCFS regulation but a reduced verification (and cost) burden relative to the first option. Currently, a small number of fuel suppliers who sell fuel at the rack do not accept the obligation when they purchase from fuel suppliers upstream. The benefits of aligning the point of regulation under both ARB programs are ease of administration, elimination of duplicative reporting and verification, and reduced reporting frequency as quarterly reporting would no longer be required for CARBOB and diesel under LCFS.[49]

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[48] LCFS Meetings: https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm
[49] July 29, 2016 CARB LCFS Workshop Presentation: https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm

Stakeholder feedback reflected concern over the amount of time allowed to review, consider, and implement a change in point of LCFS regulation; concern that moving the point of obligation away from refiners and importers would remove their incentive to contribute to the goals of the program; and concern that position holders at the terminal rack have historically had little influence on upstream fuel supplies. Other stakeholders expressed the counter view that the position holder at the rack controls biofuel blending and supported the change as a logical outcome.

8. Conclusion

LCFS program integrity requires that the reporting of credits and deficits be accurate, reliable, and protected against fraud. In addition, should the Board decide in the future to recognize other jurisdiction's LCFS programs, third-party verified credits would likely be helpful in supporting fungibility of credits among programs.[50]

ARB staff is proposing mandatory third-party verification of LCFS fuel pathway carbon intensities, verification of credit generation, and verification of deficit generation to assure data quality across the entire system. Independent verification to a standard of reasonable assurance will be proposed. Staff would prefer that the degree of ARB oversight, verifier competency and training, and independence requirements be consistent with MRR and Offsets verification programs (as noted in guiding principle #4), while seeking to harmonize with existing verification and certification programs (as noted in guiding principle # 3). Continuing LCFS program improvements to support credit generation and credit quality assurance are being proposed to simplify verification program design.

The variety of alternative fuel types that generate credits in the LCFS program warrants further consideration by staff to propose the level of detail in verification program design that has been requested by stakeholders in response to the March, June, and July 2016 workshops. A fuel-specific approach is necessary to address error risk in alternative fuel supply chains and identify appropriate verification exemptions to maintain incentives for investments in alternative fuels that generate small quantities of credits. ARB staff will undertake a fuel-specific approach to verification program design in keeping with guiding principle #5.

[50] Final Statement for Rulemaking Including Summary of Comments and Agency Response p. 53 Pacific Coast Collaborative partners: https://www.arb.ca.gov/regact/2015/lcfs2015/fsorlcfs.pdf