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Advisability for Harmonization

This chapter addresses the advisability of harmonization of the California LCFS program with other international, federal, regional, and state LCFS-like programs, one of the topics of review required by the LCFS regulation.

A. Introduction

Harmonizing LCFS programs means bringing key elements of different LCFS regulatory frameworks into accord with one another, while recognizing that these elements will not necessarily be (or need to be) identical. For example, it is important for LCFS programs to consider the carbon intensity (CI) of alternative fuels, rather than simply consider alternative fuel volume requirements. Although the carbon intensities of fuels in differing LCFS programs may differ due to regional differences in the energy required for feedstock production, the feedstocks used for electricity production, and the transportation distances of feedstocks and fuels used for estimating CI, the inclusion of CIs in all LCFS programs will encourage the production of lower CI fuels.

Harmonizing fuel programs between state, federal, and foreign jurisdictions is useful to ensure the optimum reduction of greenhouse gas (GHG) emissions. Similar fuel program frameworks reduce the possibility of fuel shuffling across different jurisdictions, and they reduce the administrative burden for both regulated parties and regulatory agencies. Program elements that should be considered for harmonization include LCA analysis, sustainability requirements, reporting requirements, and credit calculations. For LCA analysis, the model used for calculation (CA-GREET, GHGenius, etc.) is not important as long as all facets of fuel production (feedstock production, feedstock transportation, fuel production, fuel transportation and storage, and ILUC) and fuel use are similarly considered. The harmonization of LCFS programs is not without risks. Harmonization must not be achieved at the expense of actual GHG emissions or environmental considerations. For example, harmonizing the California LCFS with programs that do not fully consider ILUC could make it difficult to achieve real GHG emissions on a global scale, and programs lacking sustainability provisions could promote environmental damage.

The California LCFS is performance-based and is designed to reduce GHG emissions from transportation fuels by 10 percent by 2020. The regulation establishes annual performance standards that fuel producers and importers must meet beginning in 2011. The LCFS applies, either on a compulsory or opt-in basis, to all fuels used for transportation in California. These transportation fuels include California reformulated gasoline, California ultra-low-sulfur diesel fuel, E85, compressed or liquefied natural gas, biogas, electricity, and compressed or liquefied hydrogen.

The metric for California's LCFS is carbon intensity (CI), and it is expressed in terms of grams of CO₂ equivalent per mega-Joule (gCO_{2e}/MJ). CI is based on the premise that

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each fuel has a “lifecycle” GHG emissions value. This lifecycle analysis (LCA), also known as well to wheel analysis (WTW), estimates the GHG emissions associated with crude recovery (or feedstock production), crude transportation (or feedstock transportation), fuel production, fuel transportation, and use of low carbon fuels in motor vehicles. The LCA includes both direct and indirect emissions associated with producing, transporting, and using the fuels. Land use change effects, both direct and indirect, are also considered in CI valuation.

Providers of transportation fuels (referred to as regulated parties) must demonstrate that the mix of fuels they supply meet the LCFS intensity standards for each annual compliance period. Regulated parties are required to use an interactive, secured Internet web-based form, such as the LCFS Reporting Tool (LRT), to submit quarterly status reports and an annual compliance report. They must report all fuels introduced into the California transportation fuel system and track the fuels’ CI through a system of “credits” and “deficits.” Credits are generated from fuels with lower CI than the standard. Deficits result from the use of fuels with higher CI than the standard. A regulated party meets its compliance obligation by ensuring that amount of credits it earns (or otherwise acquires from another party) is equal to, or greater than, the deficits it has incurred. Credits and deficits are generally determined based on the amount of fuel sold, the CI of the fuel, and the efficiency by which a vehicle converts the fuel into useable energy. The calculated metric is tons of GHG emissions. This determination is made for each year between 2011 and 2020. Credits may be banked and traded within the LCFS market to meet obligations.

The California LCFS provides added flexibility for the regulated parties. The regulation is performance-based, and fuel providers have several options. Fuel providers may incorporate new or improved technologies in fuel production to existing pathways to reduce the CI of their fuels (Method 2A). They may also develop new pathways (Method 2B).

B. Harmonization of California LCFS with Other Programs

A number of California legislative and policy directives support the California LCFS. The State legislature and various State agencies have approved a number of measures that promote the use of renewable fuels, mandate reductions in GHG emissions, and encourage the use of non-petroleum-based fuels.

In 2006, the Legislature passed and Governor Schwarzenegger signed Assembly Bill (AB) 32, referred to the California Global Warming Solutions Act of 2006. AB 32 required the Board to develop a plan to reduce GHG emissions in California to 1990 levels by 2020. Among other provisions, AB 32 required the ARB to identify and adopt discrete early actions in 2007 and to approve a scoping plan in 2008. In April 2006, Governor Schwarzenegger signed an executive order (Executive Order S-06-06) that established targets to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources. One of the executive order

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provisions specified that, by 2020, 40 percent of biofuels used in the State should be produced in the State. In January 2007, Governor Schwarzenegger signed an executive order (Executive Order S-01-07) that established the goal of developing an LCFS to reduce the CI of transportation fuels by at least 10 percent by 2020 and to consider whether the LCFS should be listed as a discrete early action. In November 2007, the California Energy Commission and the Board each approved the "State Alternatives Fuel Plan (Fuels Plan)," required pursuant to Assembly Bill 1007. The Fuels Plan presents strategies and actions California must take to increase the use of alternative nonpetroleum fuels. An LCFS was anticipated as part of this Plan and it is consistent with the goals of the Fuels Plan. In December 2008, the Board approved the AB 32 Scoping Plan to reduce GHG emissions in California to 1990 levels. The Scoping Plan identifies how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms, and other actions. The California LCFS regulation is listed as one of the key measures in the Scoping Plan.

At the federal level, Congress adopted a renewable fuels standard (RFS) in 2005 and strengthened it (RFS2) in December 2007 as part of the Energy Independence and Security Act of 2007 (EISA). The RFS2 contains, among other provisions, increasing volumes of biofuels every year, up to a required volume of 36 billion gallons by 2022. Of the 36 billion gallons, 16 billion gallons must be advanced biofuels from cellulosic sources. Successful implementation of the RFS2 would result in significant quantities of low-CI biofuels that could be used toward compliance with California's LCFS. In addition, successful implementation of RFS2 would signal that the necessary technological breakthroughs to produce second and third generation biofuels have occurred. When ARB developed the LCFS regulation, staff worked with U.S.EPA in an effort to harmonize the respective fuel programs.

ARB has also been coordinating with representatives from Oregon, Washington, NESCAUM (a regional organization of eight northeastern states), British Columbia, Ontario, and the European Commission. ARB staff coordination with representatives of other government agencies will continue because the ultimate success of any LCFS is dependent on adoption across jurisdictions. Although other program frameworks are dissimilar to LCFS, there is a great deal of interaction and cooperation amongst representatives from the different agencies.

C. Background on Other State, Province, and Regional Programs

Several LCFS programs are under development or in consideration in other regions within U.S. and Canada. This section briefly describes these programs and their current status.

1. Northeast/Mid-Atlantic Regional Clean Fuels Standard Update

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Eleven northeast and mid-Atlantic states¹ are currently participating in the evaluation of a regional Clean Fuels Standard (CFS), which would lower the average carbon intensity of transportation fuels in the region and support the development and use of alternative fuels such as advanced biofuels, electricity, and natural gas. A 2009 Memorandum of Understanding signed by the Governors of the eleven states committed the states to developing a program framework and conducting an economic analysis of the potential impacts of the program.

Northeast States for Coordinated Air Use Management (NESCAUM)² is providing technical and policy support to the state governments in this effort, and conducted the economic analysis on behalf of the states. NESCAUM completed its analysis and published a report detailing the results in August 2011. Among the key findings were that that the program could provide small but positive economic benefits while reducing greenhouse gas emissions and dependence on imported petroleum fuels.

The states have maintained an active stakeholder process, and are currently in a public comment period during which interested parties may provide feedback on the results of the economic analysis. Additionally, the states and NESCAUM held two public stakeholder meetings—in Boston on September 20, 2011, and in Baltimore on September 22, 2011—to discuss the findings of the analysis and solicit input from stakeholders and interested parties.

The states and NESCAUM are continuing to develop a potential framework for the program, addressing issues such as identification of regulated parties, treatment of fuels derived from high-carbon sources, indirect land use change, and others. NESCAUM is also closely following other efforts to develop or analyze fuel carbon intensity standards. The states have not made any final program decisions at this time, and are continuing to evaluate framework options based on input from stakeholders and the best available science.

2. Oregon

An LCFS program was authorized by the Oregon Legislature in 2009 as part of House Bill 2186. The Department of Environmental Quality (DEQ) was tasked to design the program. The DEQ convened a 29-member advisory committee, reflecting a broad range of stakeholders that are potentially regulated or affected by the program, to discuss various aspects of program design. The DEQ released in January 2011 draft rules reflecting the recommendations of the advisory committee and will consider final proposed rules in December 2011. The proposal is modeled after California LCFS while being customized to meet conditions in Oregon. The proposal mandates a 10

¹ The eleven states are Connecticut, Delaware, New Hampshire, New Jersey, New York, Maine, Maryland, Massachusetts, Pennsylvania, Rhode Island, and Vermont.

² The economic analysis report and other materials related to the evaluation of a Clean Fuels Standard can be found on the NESCAUM website: <http://www.nescaum.org/topics/clean-fuels-standard/>

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percent GHG reduction that is to be achieved by 2022. The Oregon LCFS program does not cover propane, which was specifically excluded from HB 2186. The program also exempts farm and logging trucks. There are several safeguards to protect low carbon fuel producers, regulated parties, and consumers from unintended negative effects of low carbon fuel standards, such as an inadequate supply of low carbon fuels or a non-competitive price of fuel with its neighbors. Such safeguards include a series of exemptions, deferrals, and periodic program reviews. Although the methodological approaches of the Oregon LCFS have not been finalized, they appear similar to the California LCFS.

The Oregon DEQ is currently reaching out to key stakeholders and working with other governments that are implementing or studying similar programs to work through common issues. Staffing and revenue considerations are being analyzed given changes in agency funding and the expectation is to have the rules finalized by December 2011.

3. Washington

Executive Order 09-05 directs the Washington Department of Ecology to assess LCFS provisions that would best help the state meet its GHG goals. Final GHG plan developed in 2010 noted “a number of questions that we will continue to assess before making a recommendation to the Governor on whether or not we believe Washington should implement [an LCFS program].” The final report on LCFS was published in February 2011. The plan assumes carbon intensity will be reduced 10 percent from 2007 levels by 2023, with reductions beginning in 2014.

4. British Columbia

British Columbia (BC) currently has an LCFS program that applies to transportation fuels manufactured, brought into, or received in BC. The GHG reduction targets are same as California LCFS program, i.e. a 10 percent reduction in carbon intensity by 2020, but the BC program includes propane as a regulated fuel. LCFS credits are not restricted from use in other programs; however, credits generated outside the LCFS program cannot be used for compliance. Although there are similarities with the California LCFS, there are also some important differences. In contrast to the California LCFS, the BC program does not, at this time, include indirect land use change (ILUC). The model used for estimating the direct CI is GHGenius, similar in principle to CA-GREET model but with some differences. BC is participating in federal development of sustainability criteria in Canada.

5. Midwestern Governor’s Association

The Midwestern Governor’s Association represents Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Ohio, South Dakota, and Wisconsin. The Advanced Transportation Fuels Advisory Group is currently undertaking studies and discussions of

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a Low Carbon Fuels Policy. According to the 2010 Low Carbon Fuels Policy Document, proposed recommendations are to use 2005 as baseline for reductions and to require 10 percent reductions within 10 years of implementation.

D. Background on National Programs

1. RFS2

Congress adopted a renewable fuels standard (RFS) in 2005 and strengthened it (RFS2) in December 2007 as part of the Energy Independence and Security Act of 2007 (EISA). The RFS2 requires fuel producers to use a progressively increasing amount of biofuel, culminating in at least 36 billion gallons of biofuel by 2022. RFS2 differentiates between "conventional biofuel" (corn-based ethanol) and "advanced biofuel." Advanced biofuel is renewable fuel, other than corn-based ethanol, with lifecycle GHG emissions that are at least 50 percent less than GHG emissions produced by gasoline or diesel. The RFS2 does not specifically require GHG reductions for the various categories of renewable fuels and is not a carbon intensity standard like the LCFS. However, there are specific requirements for the different classifications of renewable fuels. In general, these specifications are set relative to the baseline lifecycle GHG emissions for gasoline and diesel fuel sold or distributed in 2005.

U.S. EPA is responsible for implementing the volume requirements in the RFS2. Section 211(o) of the Clean Air Act (CAA or the Act), as amended, requires the U.S. EPA Administrator to annually determine a renewable fuel standard that is applicable to refiners, importers, and certain blenders of gasoline, and publish the standard in the Federal Register. On the basis of this standard, each obligated party determines the volume of renewable fuel that it must ensure is consumed as motor vehicle fuel. This standard is calculated as a percentage, by dividing the amount of renewable fuel that the Act requires to be blended into gasoline for a given year by the amount of gasoline expected to be used during that year, including certain adjustments specified by the Act. In 2010, U.S. EPA made changes to the RFS2 program as required by the EISA. The revised statutory requirements established new specific annual volume standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel that must be used in transportation fuel. The following charts show the volumetric requirements of the EISA, and the revised standards for 2010 and 2011.

EISA Renewable Fuel Volume Requirements (billion gallons)

Year	Cellulosic biofuel requirement	Biomass-based diesel requirement	Total Advanced biofuel requirement	Total renewable fuel requirement
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2008	n/a	n/a	n/a	9.0
2009	n/a	0.5	0.6	11.1
2010	0.1	0.65	0.95	12.95
2011	0.25	0.80	1.35	13.95
2012	0.5	1.0	2.0	15.2
2013	1.0	a	2.75	16.55
2014	1.75	a	3.75	18.15
2015	3.0	a	5.5	20.5
2016	4.25	a	7.25	22.25
2017	5.5	a	9.0	24.0
2018	7.0	a	11.0	26.0
2019	8.5	a	13.0	28.0
2020	10.5	a	15.0	30.0
2021	13.5	a	18.0	33.0
2022	16.0	a	21.0	36.0
2023+	b	b	b	b

a To be determined by EPA through a future rulemaking, but no less than 1.0 billion gallons.

b To be determined by EPA through a future rulemaking.

Revised Standards for 2010 and 2011

Fuel Category	Percentage of Fuel Required to be Renewable		Volume of Renewable Fuel (in billion gal)	
	2010	2011	2010	2011
Cellulosic biofuel	0.004%	0.003%	0.0065	0.0066
Biomass Based Diesel	1.10*	0.69%	1.15*	0.80
Total Advanced biofuel	0.61%	0.78%	0.95	1.35
Renewable fuel	8.25%	8.01%	12.95	13.95

**Combined 2009/2010 Biomass-Based Diesel Volumes Applied in 2010*

Although the RFS2 requires the production of specified volumes of lower carbon biofuels, the fuel carbon intensity reductions it would achieve in California would be substantially below the reductions the LCFS is designed to achieve. The federal RFS would deliver only about 30 percent of the GHG benefits of the proposed regulation, and does not incent fuels such as natural gas, electricity, or hydrogen. California's LCFS complements the federal RFS2.

2. Consideration of a National LCFS

A national LCFS policy is desirable to bridge across the portfolio of state and regional LCFS policy initiatives under development. Such a policy would aim to provide comprehensive and consistent incentives across the nation for greenhouse gas emissions reductions from transportation fuels, offering potential policy benefits for the environment, fuel consumers, regulators, and regulated parties. A National LCFS Study project was created in January 2009 to respond to key information gaps regarding a potential national LCFS. This study is a collaboration between researchers from six research institutions, including Institute of Transportation Studies; University of

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California, Davis; Department of Agricultural and Consumer Economics/Energy Biosciences Institute; University of Illinois, Urbana-Champaign; Margaret Chase Smith Policy Center and School of Economics; University of Maine; Environmental Sciences Division, Oak Ridge National Laboratory; Green Design Institute of Carnegie Mellon University; and the International Food Policy Research Institute.

Consistent with the California LCFS, the National LCFS Study envisions a policy would respond to specific, documented market failures and barriers that, taken together, are expected to limit the effectiveness and economic efficiency of advancing transportation sector mitigation with economy-wide climate policy instruments, such as carbon taxes and cap-and-trade schemes. Within this context, the primary objectives of the national LCFS project are to:

- Compare LCFS with other policies for reducing anthropogenic GHG emissions from transportation; and
- Develop policy design recommendations for a national LCFS policy that would be effective, implementable, and compatible with a broader portfolio of climate policies.

Policy design recommendations are intended to define at a high level a national LCFS policy framework that would be effective, implementable, broadly compatible with state and regional initiatives underway, complementary to a broader portfolio of national and international climate policies, and acceptable to the majority of the stakeholders. It also aims to harmonize state-implemented LCFSs and reduce potential conflicts or even counterproductive policy measures. Policy design recommendations will cover issues related to program coverage and scope, baseline and targets, fuels and vehicle characteristics, fuel pooling, measuring lifecycle carbon intensity (including spatial boundary, land use change, uncertainty), default and opt-in reporting, point of regulations, chain of custody, market mechanisms, compliance, penalties and cost containment, sustainability safeguards, and interactions with other policies.

E. Background on Other Countries' Programs

As a part of its plan to reduce overall GHG emissions, the European Commission amended the European Fuel Quality Directive 98/70/EC on December 17, 2008, to include the de-carbonization of transport fuel. Unlike the California LCFS, the European Fuel Quality Directive does not include a lookup table of CIs for specific transportation fuels. However, suppliers will be required to report on the lifecycle GHG emissions of the fuel (petrol, diesel, and gas-oil) they supply and reduce these emissions from 2011 onward. Suppliers will be required to gradually reduce GHG emissions per unit of energy by up to 10 percent in 2020. This is to be accomplished through the use of biofuels, alternative fuels, and reductions in flaring and venting. The fuel directive applies to suppliers of fuel for road vehicles, non-road machinery (including inland

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waterway vessels when not at sea), agricultural and forestry tractors, and recreational craft when not at sea.

Sustainability requirements are also included in the European Fuel Quality Directive. For example, biofuels are prohibited from being made from raw material obtained from land with biodiversity value; biofuels cannot be from made from raw material obtained from land with high carbon stock (wetlands, continuously forested areas, peat lands); and biofuels shall not be from made from raw material obtained from land that was peat land in January 2008 unless it is proven that the cultivation and harvesting of this raw material does not involve drainage of previously undrained soil. Member States require economic operators to show that sustainability criteria above have been fulfilled; Economic operators must use a mass balance system to ensure that sustainability criteria apply to all raw materials used in biofuels production.

Member States require economic operators to show appropriate and relevant information on measures taken for soil, water and air protection, the restoration of degraded land, and the avoidance of excessive water consumption in areas where water is scarce. Member States shall take measures to ensure that economic operators submit reliable information and to make available to the Member State upon request the data that were used to develop the information. Furthermore, Member States require economic operators to arrange for an adequate standard of independent auditing of the information they submit. The auditing shall verify that the systems used by the economic operators are accurate, reliable, and fraud-resistant.

F. Priority Areas for Possible Harmonization

1. Lifecycle assessment (direct and indirect)

The LCFS regulatory framework builds upon estimates of the CI of each regulated fuel pathway. CI is determined using lifecycle assessment (LCA) of the aggregate quantity of GHG emissions associated with the production, transport, storage, and use of a fuel, including the “direct” effects and “indirect” effects. As the name implies, direct effects (or attributional emissions) are those that are directly connected with the production and use of a fuel, such as the growing and harvesting of the feedstock, the transport of the feedstock to the biorefinery, the emissions from the biorefinery, the transport of the fuel from the biorefinery, and vehicle tailpipe emissions. Indirect effects (or consequential emissions) are generated by secondary processes (usually by supply/demand dynamics of fuel feedstocks) set in motion by a fuel production process.

Several models are currently in use to perform LCA of fuels. For example, the California LCFS program uses CA-GREET (California version of the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation model) to determine direct effects and GTAP (Global Trade Analysis Project model) to determine indirect effects due to land use change. The RFS2 and European programs use FAPRI/FASOM (Food and Agricultural Policy Research Institute/ Forest and Agricultural

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Sector Optimization Model) and RED/FQD (Renewable Energy Directive/ Fuel Quality Directive) methodologies, respectively, for the LCA under those programs. While the individual models being used by different jurisdictions may differ in some respects, the emphasis for a harmonization effort should be to strive for consistency in the data and on the assumptions used in conjunction with these models so that the overall results can be meaningfully compared.

Harmonization of LCA methodologies between jurisdictions could reduce the potential for leakage and fuel shuffling. For example, suppose a biofuel production facility is assigned different CI values under different LCFS programs or one LCFS program includes ILUC estimates in lifecycle analyses and another LCFS program does not. Inconsistencies in CIs will create incentives to shuffle fuels between states to reduce penalties under the individual programs. It is important to note that the actual direct CI values for the individual fuel pathways are not expected to be identical but are expected to vary between different jurisdictions. This results not so much due to variation in assessment methodology but rather due to local influences on the inputs to the fuel production chain (e.g. type of energy use in the refinery, local transportation inputs for the feedstocks and products, etc.). However, as long as the GHG accounting methodologies are fundamentally similar and are using similar assumptions for data inputs, the potential for leakage and shuffling could be minimized.

An important benefit provided by the harmonization of LCA under similar programs is the reduced need to undertake new analyses for every region. Other jurisdictions can use the LCA values or inputs for fuels approved under Method 2A/2B of the California LCFS program, with specific modifications to reflect regional effects where needed. A set of best LCA practices once established in a jurisdiction can serve as a learning experience for others without the need to replicate the efforts, thus reducing the burden for all programs.

2. Fossil fuel/HCICO treatment

The California LCFS includes a provision for addressing high carbon intensity oil (HCICO). The inclusion of HCICOs in the California LCFS regulation recognizes that some crude oils require additional energy to produce (e.g., bitumen mining or thermally enhanced oil recovery techniques) or emit higher levels of GHG emissions during the production process (e.g., excessive flaring). Since the California LCFS considers full lifecycle assessment, these additional GHG emissions should be taken into account if California refineries process these crudes. An important goal of the HCICO provision is to provide a signal for oil producers to engage in emission reduction activities, such as reducing flaring, improving energy efficiency, and using carbon capture and sequestration.

Other jurisdictions do not address the HCICO issue. Harmonization of the treatment of HCICO across jurisdictions will boost the signal to crude oil producing companies for GHG emission reduction activities and promote innovation. An important additional

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benefit of harmonization in this area is a reduction in carbon leakage due to shuffling. A harmonization effort will require the development of consistent a methodology to determine carbon intensity of crude oil production from various processes and sources around the world. ARB staff is currently working on a tool that standardizes this methodology, while a concurrent effort is underway in Europe. Once developed, this tool will be used to assess variations of crude production emissions on a periodic basis. This tool will be made available for use by other jurisdictions as well.

3. Sustainability

Harmonized sustainability criteria could reduce the burden on businesses and reduce the scope for fuel shuffling. The Board directed staff in Resolution 09-31 to work with appropriate state and federal agencies, environmental advocates, regulated parties, and other interested stakeholders to develop sustainability provisions to be used in implementing the LCFS regulation. ARB staff has been working with these stakeholders, as well as with national and international partners to address potential sustainability issues arising from the worldwide demand of biofuels.

Staff is assessing how existing laws and regulations address sustainability for the management and harvest of biofuel feedstocks and biofuel operations. Also, because several other countries have initiatives that are farther along than the LCFS, staff is following the development of certification and benchmark systems developed by other countries, organizations, or industry groups that can serve as models for California. We will continue to work with these entities to ensure our process is in harmony with theirs, to the extent feasible.

For more information about the workgroup and their progress, please see the environmental chapter of this report.

4. Reporting and chain of custody

Harmonized chain of custody and reporting requirements could reduce the burden on businesses operating in several jurisdictions. Under the California LCFS program, staff has worked with stakeholders to establish procedures for reporting information under the program. An integral part of this effort has been the development of a web-based reporting tool for fuel producers to use to establish compliance under the program. Regulated parties use the LCFS Reporting Tool (LRT) to electronically manage accounts, enter or import fuel data, submit electronic reports and corrections, and track credits and deficits. Additionally, ARB staff has established a voluntary Biofuel Producer Registration program to help facilitate biofuel transactions by giving buyers and sellers of biofuels a common online resource containing registered CI values and physical pathway information that can be traced to specific production facilities. This, in turn, helps regulated parties to use registration data for LCFS reporting and compliance purposes. The reporting and tracking tools developed under the California LCFS program can be made available to other states' programs, thus reducing the need to

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reinvent the wheel. Aligning the reporting requirements across jurisdictions and nationally would serve to reduce the administrative burden for the regulated parties that have to report to both federal and state programs; however, the fundamental structure of the different state and federal programs may not always make it feasible to have identical reporting structures. For example, the reporting requirements under the RFS2 and California LCFS are not the same due to programmatic differences.

5. Credit market

A credit market that allows import/export of credits between LCFS programs will potentially enhance the compliance flexibility provided under the individual programs. The LCFS credits, denominated in metric tons of carbon dioxide equivalent (MTCO_{2e}), are based on an analysis of the transportation fuel's full lifecycle carbon intensity (CI). A key consideration for the success of an expanded credit market is to ensure equivalent CI reduction value associated with credits generated under separate programs. This in turn can be achieved by harmonization of the other elements of the program such as LCA methodologies, treatment of crude oil, compliance schedules, reporting methodologies, credit accounting methodologies, etc. Inconsistencies of credit values will potentially result in shuffling of credits between programs, undermining the potential benefits of expanded markets.

The California LCFS program currently allows the export of LCFS credits to other GHG reduction programs (the AB 32 programs) that would accept those credits. To date, however, other AB 32 programs have not been structured to accept LCFS credits. Pending harmonization of various elements of the California program with the programs of other states, it may be feasible to open the market first to other Western states and eventually to other U.S. states.

Summary

The harmonization of LCFS programs is important for ensuring that global GHG emission reductions actually result from these programs. Harmonizing LCFS programs to the extent practical will help to create an environment where credits may be freely traded, fuel shuffling will be inhibited, and the burden on regulated parties and regulatory agencies will be lessened. ARB will continue to work with representatives from other government LCFS programs in an effort to harmonize LCA methods, sustainability requirements, reporting requirements, and credit trading mechanisms.