

Implementing Sustainability Requirements for the California Low Carbon Fuel Standard – A Review of Key Design Elements and Policy Considerations

Sonia Yeh

Institute of Transportation Studies
University of California, Davis

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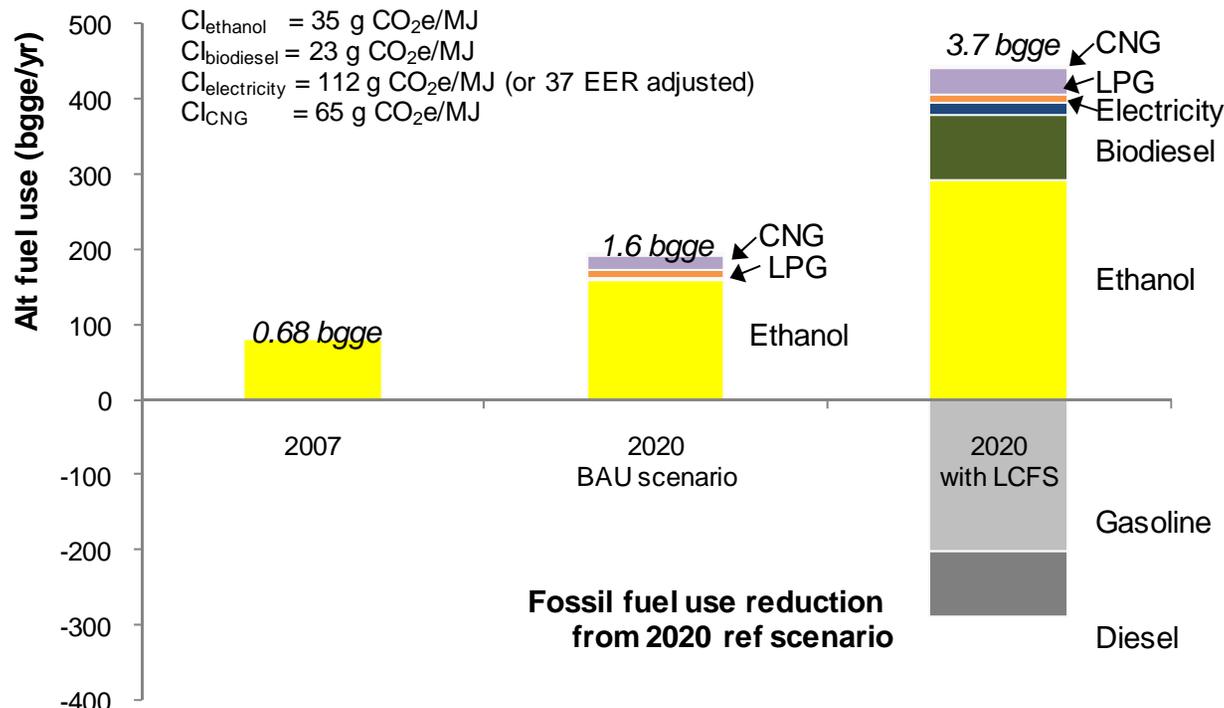
Concerns for “Sustainability” of Biofuels

- Public perception of some sustainability issues associated with biofuels present a challenge for future development of biofuels
- Global wave of sustainability reporting requirements and certification schemes
- As part of the Low Carbon Fuel Standard (LCFS) regulation, California Air Resources Board will adopt sustainability provisions no later than December of 2011

California LCFS will Reduce GHG Emissions and Increase Alternative Fuel Use

- Under the LCFS, alternative fuel use will increase substantially in 2020, most of which are biofuels
- Most biofuels and biomass feedstock are expected to come from domestic sources (except sugarcane ethanol)

One Scenario to Meet the CA LCFS (Yeh et al. 2009b)



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Key Policy Challenges of Implementing Sustainability Requirement for CA LCFS

How to

- integrate sustainability issues into a GHG policy ?
- define and measure sustainability, and verify the performance of these sustainability requirement?
- effectively address sustainability issues associated with market-mediated effects at the system level, such as food prices, indirect land use change (ILUC), and cumulative environmental impacts ?
- create a robust policy framework that reflects evolving scientific understanding and provides a stable compliance environment ?
- provide adequate incentives to encourage innovation and reward certifiably superior performance beyond minimum requirements ?
 - e.g., structured regulatory incentives such as credits or tax breaks

A Review of Major Biofuel Programs in the US and Other Countries

- US Renewable Fuel Standard Program (**RFS2**)
 - *Volumetric requirement*
 - 36 billion gallons of biofuels (21 billion gallons of advanced biofuels) by 2022
- California Low Carbon Fuel Standard (**LCFS**)
 - *GHG intensity target*
 - Reduction of transportation fuel lifecycle GHG intensity by 10% by 2020
- UK Renewable Transport Fuel Obligation (**RTFO**)
 - *Blend requirement*
 - 3.25% come from renewable source by 2010, and 5% by 2014
- EU Renewable Energy Directive (**RED**) and Fuel Quality Directive (**FQD**)
 - *Blend / GHG intensity target*
 - 10% renewable energy in transport by 2020 / 6% transportation lifecycle GHG intensity reduction by 2020

Three Key Design Elements for Implementing Sustainability Requirement and their Challenges

1. Principles and criteria
2. Chain of custody (CoC)
3. Procedures for certification and verification of sustainability reporting, and requirements to monitor or report progress

Sustainability Principles/Requirements in Major Biofuel Programs

- US RFS2
 - Excludes biofuels produced from non-agricultural land
 - Excludes forest biomass from federal lands
- CA LCFS
 - GHG-only policy
 - Includes unspecified requirement for future sustainability provisions
- UK RTFO
 - Environmental : carbon, biodiversity, soil, water, and air
 - Social: workers' rights and land rights
- EU RED
 - Biodiversity no-go areas
 - Conversion of high carbon stock areas prohibited

Principles and Criteria – Increasing Interests and Supports from Int. Orgs, Industries, & NGOs

- International organizations encourage and support the research, modeling at the country level
 - United Nations' Food and Agriculture Organization (FAO), the UN Environment Programme (UNEP), and the G8's Global Bioenergy Partnership (GBEP)
- Commodity-based, biofuel-targeted certifications
 - Roundtable on Sustainable Palm Oil (RSPO), the Roundtable on Responsible Soy (RTRS), the Better Sugarcane Initiative (BSI), the Council on Sustainable Biomass Production (CSBP, focusing on second generation feedstock)
- Internationally consistent sustainability criteria and certification schemes
 - Roundtable on Sustainable Biofuels (RSB)
 - an international initiative involving stakeholders across the entire biofuel supply chain, nongovernmental organizations, experts, governments, and inter-governmental agencies

Principles and Criteria – Comparisons with RSB

	<u>Gov programs</u>				<u>Certification</u>
	California Low Carbon Fuel Standard (LCFS)	US Renewable Fuel Standard Program (RFS2)	EU Renewable Energy Directive (RED), Fuel Quality Directive (FQD)	UK Renewable Transport Fuel Obligation (RTFO)	Roundtable on Sustainable Biofuels (RSB)
Legality			√	√	√
Planning, Monitoring and Continuous Improvement					√
Greenhouse Gas Emissions (Direct)	√	√	√	√	√
Greenhouse Gas Emissions (Indirect)	√	√	Under consideration	Under consideration	Under consideration
Human and Labor Rights				√	√
Rural and Social Development					√
Local Food Security					√
Conservation		√	√	√	√
Soil				√	√
Water				√	√
Air				√	√
Use of Technology, Inputs, and Management of Waste					√
Land Rights				√	√

Principles and Criteria – Key Remaining Implementation Challenges

- Lack of clear definition of wastes/residues/byproducts and marginal/abandoned/degraded land
 - Promoted by policies due to its lower environmental and GHG impacts
 - The status are dynamic rather than static, depending on economic conditions, technology, environmental factors, or other factors
- Some of the sustainability principles and criteria may violate WTO rule
 - The WTO requires that regulations and standards should neither create unnecessary barriers nor discriminate against products with the same physical appearance (properties) but with different production *process* and *production methods* (PPM)
- Continued improvement in scientific understanding of the impacts of alternative fuels contribute to uncertainties in defining, measuring and verifying performance in sustainability

Principles and Criteria – Concerns Central to CA

- CA needs to define sustainability goals/safeguards in collaboration with stakeholders
 - including California Interagency Forest Work Group (IFWG), state agencies, environmental advocates, and regulated parties, and work with national and international partners
- Most of the biofuels/feedstock will be produced domestically, but a consistent framework is needed to deal with imported fuel
- Sustainability issues associated with market-mediated effects at the system level, such as food prices, indirect land use change (ILUC), and cumulative environmental impacts are hard to define, measure and assign responsibility at the individual level

Chain of Custody (CoC) – Fuel Tracking Requirement under Different Programs

- CoC is a mechanism to track information of sustainability performance of feedstock from production, transport, process to delivery
- CARB: Evidence of Physical Pathway for each of the fuels and blendstocks that are delivered, introduced, or removed from the supply chains
- EPA RFS2: regulated parties report balances of RIN* volumes using a *book-and-claim* system (fuels and RINs can be separated)
- EU RED: *mass balance* (documentation can not be separated with fuels delivered)
- UK RTFO: all CoC are accepted, mass balance is preferred

* Renewable identification number (RIN) is a 38-digit code generated by the producer or importer of renewable fuel. The RIN tracks biofuel only at the facility level and has no information

Chain of Custody (CoC) – Additional CoC Requirement for CA?

- The new requirement to track sustainability information at the feedstock level (where and how feedstock is produced), as opposed to fuel level, is likely to impose additional CoC requirement for the LCFS
- The more stringent CoC offers better ability to track and verify lifecycle GHG emissions and sustainability performance of biofuels
- However,
 - Cost tends to increase with increasing stringency of CoC
 - Cost is also strongly dependent on the scale of production, feedstock type, and the complexity of the supply chains
 - The supply chains for dedicated energy feedstocks (e.g., switchgrass) may be simpler in that they seem to have few important uses outside the biofuels production

Certification and Verification – Reporting Requirement under Different Programs

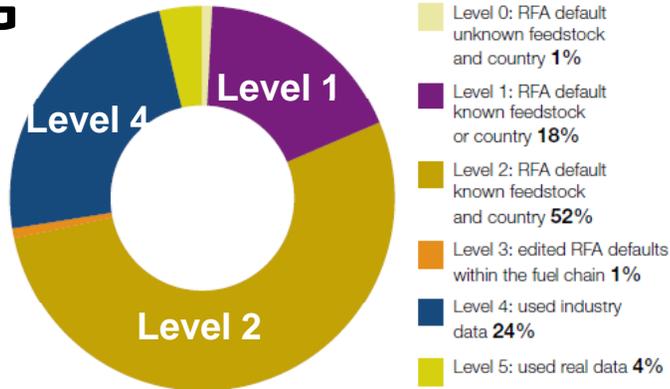
- CARB:
 - GHG: RIN + feedstock origin and production process
- EPA RFS2: additional requirement to renewable fuel producers/importer
 - GHG: reporting of production process and co-products through the EPA Moderated Transaction System (EMTS)
 - Sustainability: record keeping of an affirmation that feedstock meet the definition of renewable biomass
- UK RTFO: mandatory reporting and voluntary certification
 - GHG: tiered reporting system based on accuracy level
 - Sustainability: yes/no + voluntary certification

Certification and Verification – Benchmarking and Auditing Requirement

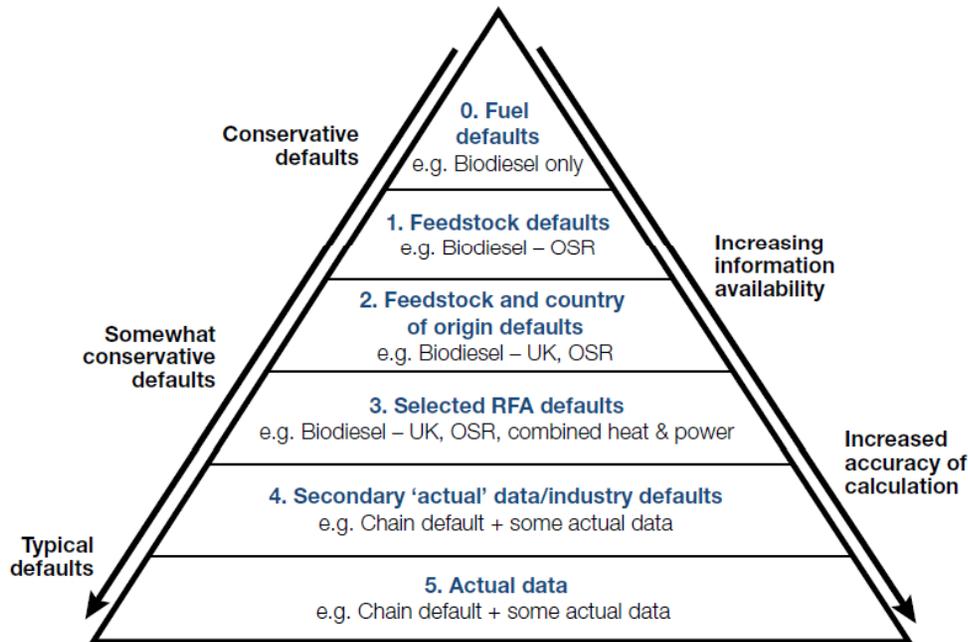
- Benchmarking certification is needed if the standard recognizes and accepts existing certifications as proofs of fulfilling sustainability requirement
- The benchmarking is based on:
 - Criteria and indicators covered by the certification must meet the sustainability requirement (else “gap reporting” is required)
 - The audit quality of the certification
- Provide standard for independent auditing of the information submitted
 - Auditor will verify the accuracy and truthfulness of information submitted
 - Qualification of verifiers will need to be defined

Certification and Verification – UK's One Year Achievement

GHG

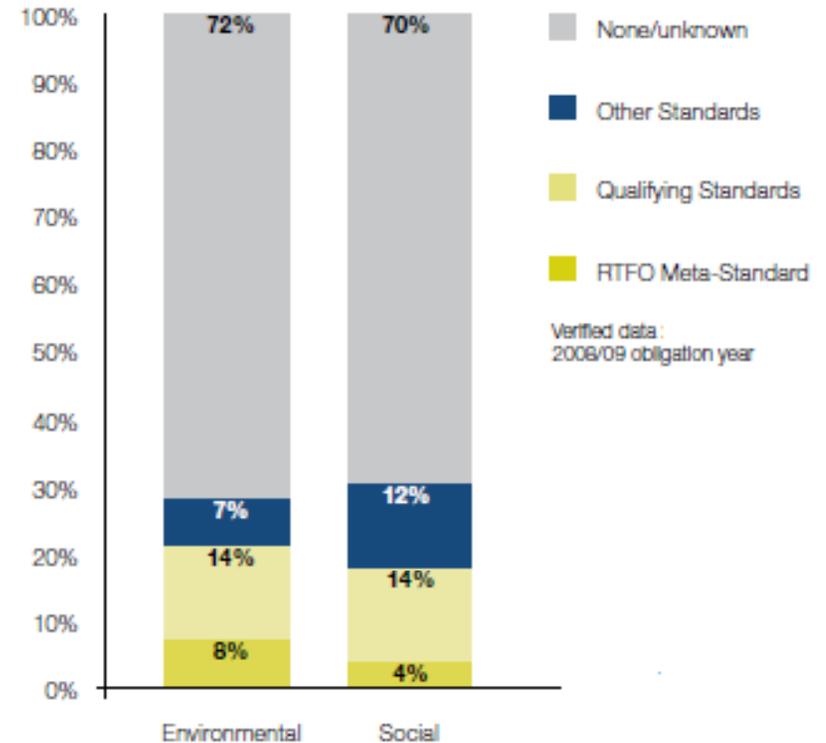


Verified data 2008/09 obligation year



Sustainability

Proportion of biofuel meeting sustainability standards



Source: Year One of the RTFO 2008/2009



Key Policy Recommendations for Implementing California LCFS Sustainability Requirement

- A sustainability scheme can only be effective if the proposed framework
 - Is a multi-stakeholder process
 - is robust but not excessively complicated and acknowledges the limitations of resources, politics, and California’s legal jurisdiction
 - sets measureable and verifiable criteria and standards
 - defines methods of enforcement
 - is consistent with international efforts in sustainability criteria.
- Government assistance in facilitating information sharing, certification, and capacity building will be crucial for the development of the sustainability criteria
- Design incentive mechanisms to encourage innovation, and rewards practices exceeding a minimum standard

Additional Reading

Yeh, Sonia, Daniel A. Sumner, Stephen R. Kaffka, Joan M. Ogden, and Bryan M. Jenkins. 2009a. Implementing Performance-Based Sustainability Requirements for the Low Carbon Fuel Standard - Key Design Elements and Policy Considerations. Institute of Transportation Studies, University of California, Davis. Research Report UCD-ITS-RR-09-42.

Yeh, Sonia, Nicholas P. Lutsey, and Nathan C. Parker. 2009b. Assessment of Technologies to Meet a Low Carbon Fuel Standard. *Environmental Science & Technology* 43 (18):6907-6914. [10.1021/es900262w](https://doi.org/10.1021/es900262w)