

Low Carbon Fuel Standard Compliance and Enforcement Working Group 2 Meeting

May 9, 2008

California Environmental Protection Agency



Air Resources Board

Agenda

- Introduction
- Summary of Previous Meetings
- Energy Act (EISA 2007)
- Biofuel Tracking
- Carbon Intensity Default Values
- Determination of Alternative Carbon Intensity Values

Summary of Previous Meetings

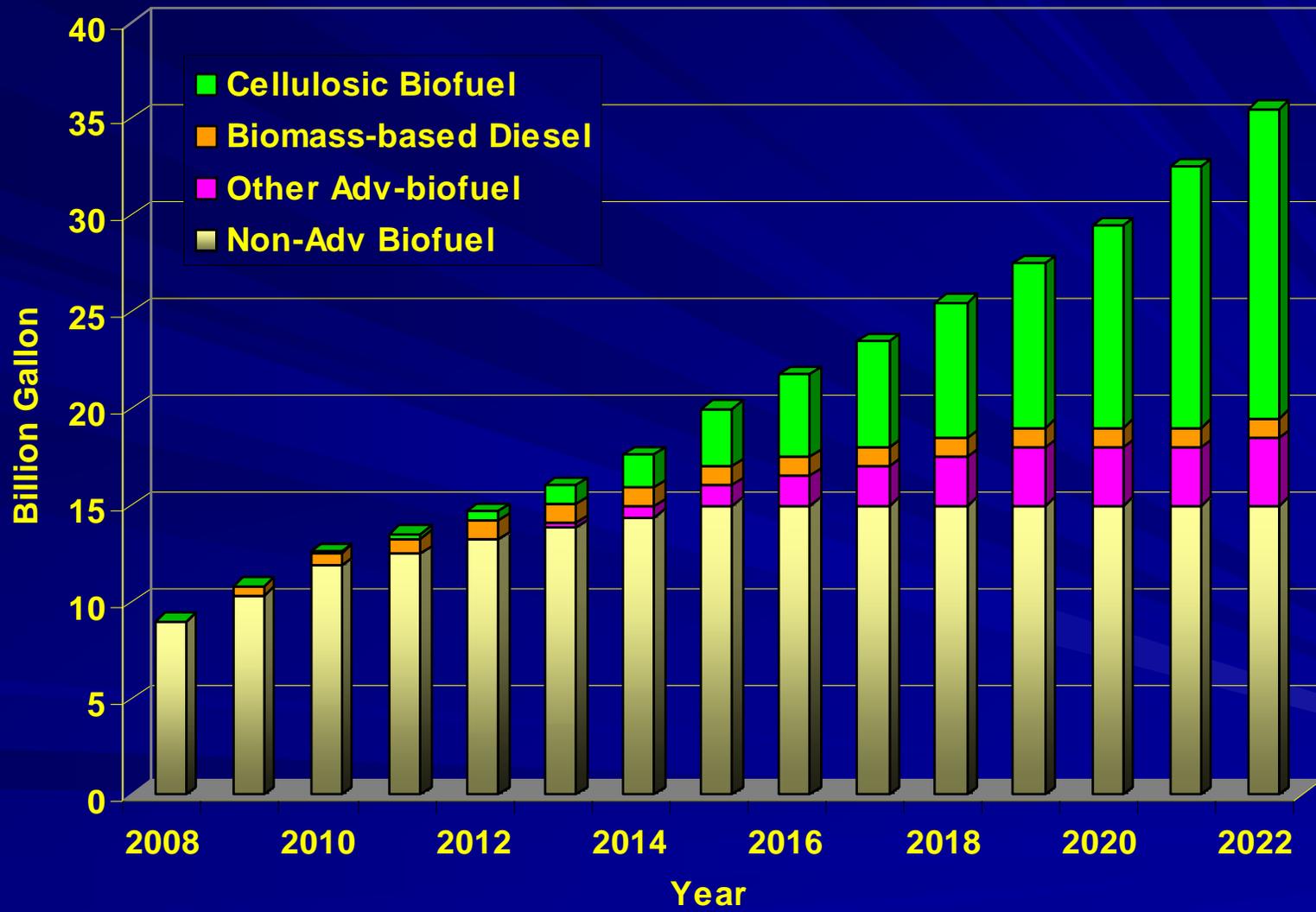
- Discussed U.S. EPA Renewable Identification Number (RIN) System
- Introduced UK Renewable Transport Fuel Obligation (RTFO) Reporting System
- Proposed a Combined Tracking and Reporting System for LCFS

Energy Independence and Security Act of 2007 (EISA 2007)

Energy Independence and Security Act of 2007 (EISA) Volume Requirements

Year	Total Advanced Biofuel			Total Renewable Fuel (Billion Gallons)
	Biomass-Based Diesel	Cellulosic Biofuel		
2007	-	-	-	4.7
2008	-	-	-	9.0
2009	0.5	-	0.6	11.1
2010	0.65	0.1	0.95	12.95
2015	1.0	3.0	5.5	20.5
2020	1.0	10.5	15.0	30.0
2022	1.0	16.0	21.0	36.0

EISA 2007



Some Definitions

- Other Advanced Biofuel is not defined in the EISA 2007
- Its volume requirements is determined by:

$$V_{\text{Other Adv Biofuel}} = V_{\text{Total Adv Bio}} - V_{\text{cell}} - 1.5V_{\text{Biomass Diesel}}$$

EISA 2007

- Rapid schedule
 - Final rule: December 19, 2008
 - Effective date: January 1, 2009
- Still based on RIN system
 - Only change: D code
- ARB/U.S. EPA coordination

Biofuel Tracking

Structure of RIN

- RIN is a 38-character numeric code generated by producers/importers

KYYYYCCCCFFFFFFBBBBRRDSSSSSSSSSEEEEEEEEE

K = RIN assignment code (1=assigned, 2=unassigned)

YYYY = Year batch is produced/imported (when it leaves the facility)

CCCC = Company registration ID

FFFFFF = Facility registration ID

BBBBB = Producer assigned batch number

RR = Equivalence Value for the renewable fuel

D = Renewable type code

SSSSSSSS = RIN Block Starting Number

EEEEEEEE = RIN Block Ending Number

Proposed Approaches

- Staff acknowledged:
 - Fungibility issues of RINs and renewable fuels
 - Great challenge in tracking a physical pathway
 - Limitation of RIN facility ID data
 - Complexity of RIN/renewable fuel transaction reporting
- Staff proposed to coordinate with U.S. EPA and using RIN to track renewable fuel for LCFS

Staff Appreciation

- Thanks stakeholders:
 - Valero: John Braeutigam
 - Chevron: San Ramon Headquarter Office
- Thanks U.S. EPA

LCFS Requires RINs Plus Supplemental Information

- For all the renewable fuels:
 - Report to ARB the RINs used for compliance in RFS2 for California facilities
- For low carbon intensity (LCI) biofuels:
 - Report purchase contracts of the LCI fuels
 - Demonstrate the physical pathway of LCI fuels delivering from producer/importer to California

LCFS Carbon Intensity Default Values

LCFS Default Value Based Reporting System

- Report based on default values
- Set default values to be conservative
- LCFS provides lookup table consists of levels of default values
- Values to be determined by ARB revised GREET model

Hierarchy of Default Values

- Fuel type
- Feedstock
- Feedstock origin
- Processing characteristic

Covered Fuel Types

- Gasoline
- Diesel
- Ethanol
- Biodiesel/Biomass-Based Diesel
- CNG, LNG, LPG
- Electricity
- Hydrogen

Hierarchy of Default Values: Ethanol

Fuel Type	Feedstock	Feedstock Origin	Processing Characteristic
Ethanol	Corn	US Midwest	Dry Mill
			Wet Mill
		US Other Regions	Dry Mill
			Wet Mill
	Sugarcane	Brazil	-
	Cellulosic Biomass	US Domestic	-
		Outside of US	-

Industry Average (Not Default) Values of Ethanol

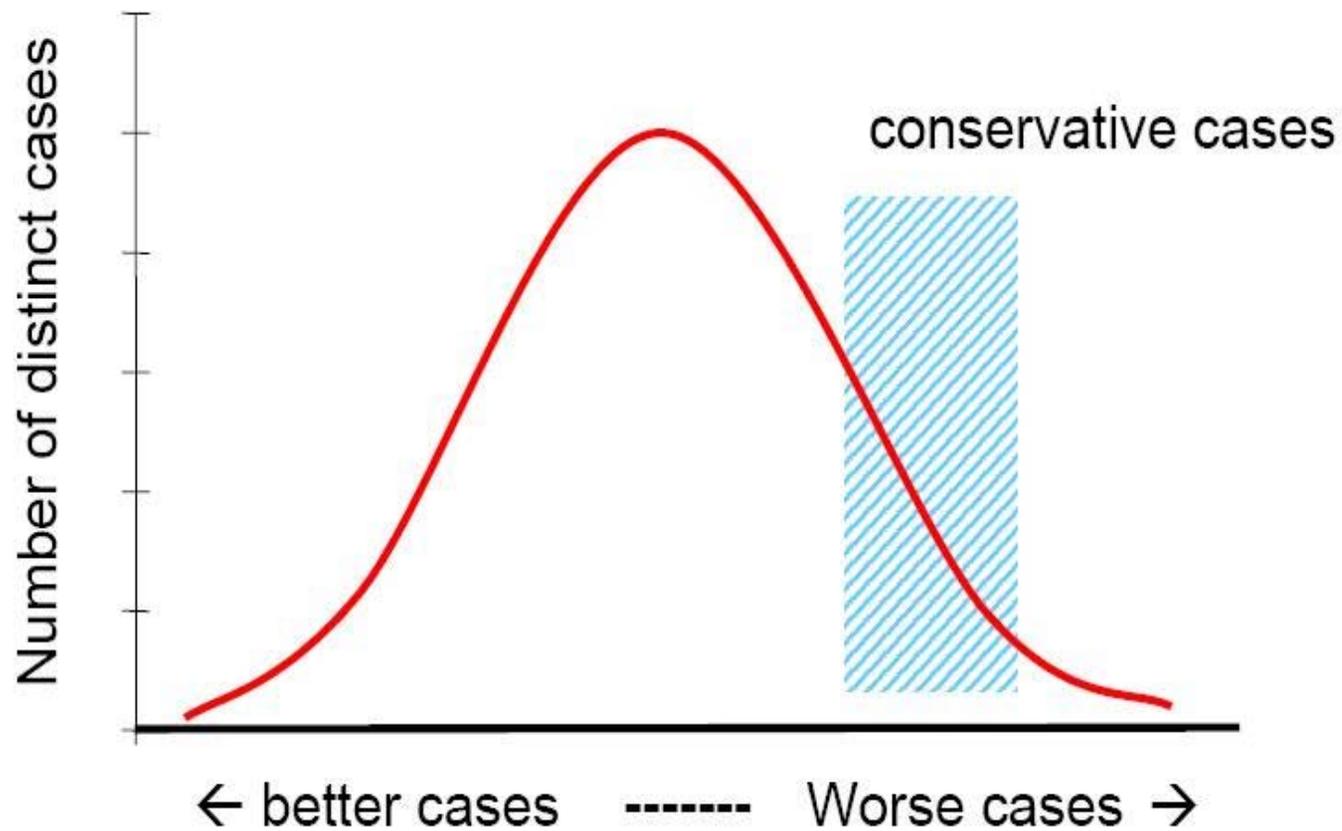
- GREET pathway for ethanol has provided:

Fuel Type	Feedstock	Feedstock Origin	Processing Characteristic	GHG Intensity (gCO ₂ e/MJ)
Ethanol	Corn	US Midwest	Dry Mill	76.5
			Wet Mill	90.1

Definition of Conservative

- Should not be the industry average
 - Could result in significant underestimate
- Should not be the absolute worst case
 - Increase reporting burden of most of obligated parties
 - Increase review/verification burden of ARB

Definition of Conservative



Accuracy levels and default / actual values

Type of Default Value	Accuracy Value
Fuel default	1
Feedstock default	2
Feedstock & origin default	3
Production process default	4
Selected default	5
Actual data	6

Determination of Alternative Carbon Intensity Values (Accuracy Level 5 or 6)

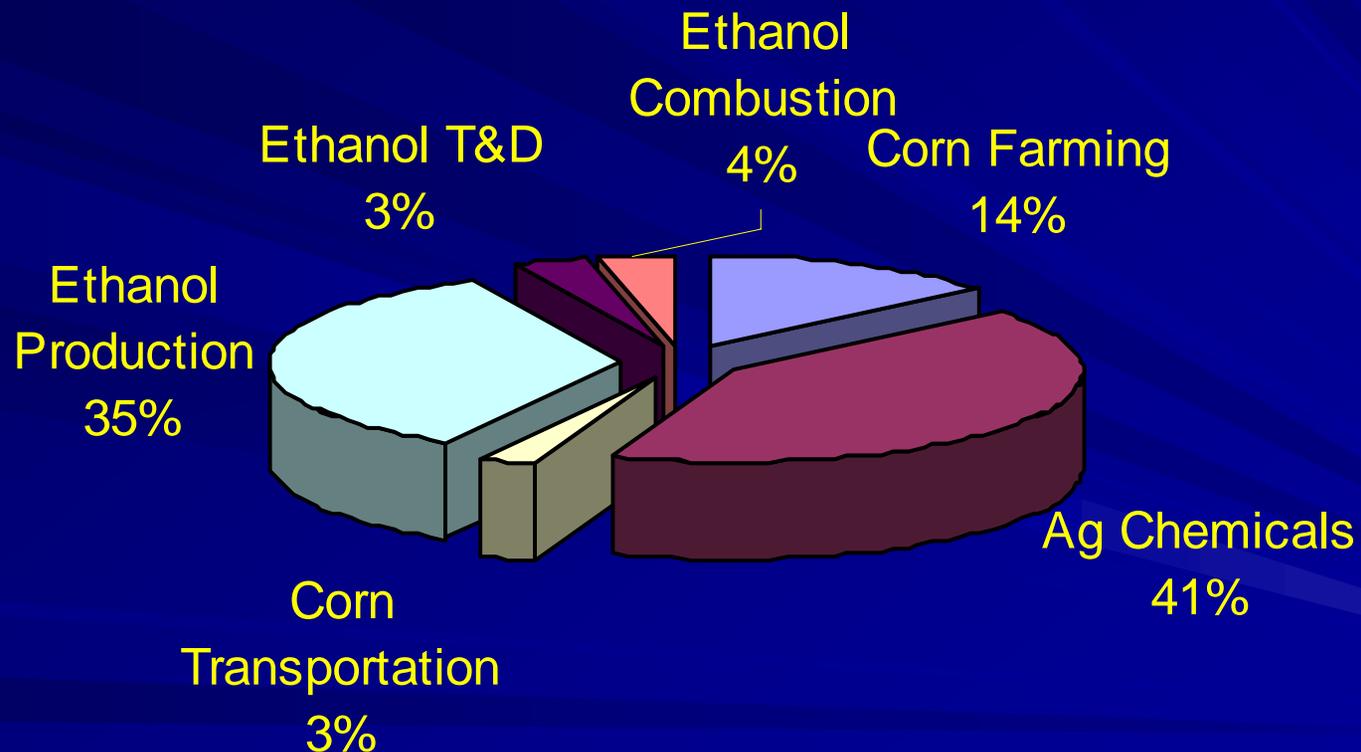
Ethanol Fuel Pathway

Stage in Pathway	Component
Corn Production	Corn Yield
	Cultivation Energy Input
	Ag-chemicals Energy Input
	Soil Emission
	Land Use Change
Corn Transportation	Transport Mode Share & Distance
Ethanol Production	Ethanol Yield
	Energy Breakdown & Input
	Co-Product
	Denaturant
Ethanol Transportation/Distribution	Transport Mode Share & Distance
Ethanol Combustion	Denaturant Energy Fraction
	Carbon Ratio by weight

Actual Data Calculation Tool: Ethanol

- Different from GREET model
 - Change values, not methodologies/assumptions
- Develop 5 modules based on stage in fuel pathway
 - Corn Production
 - Corn Transportation
 - Ethanol Production
 - Ethanol Transportation/Distribution
 - Ethanol Combustion
- Each module lists all the data that allow to change
- All the changed data are subject to ARB verification

Impacts of Individual Inputs on Ethanol GHG Intensity



Calculation of Actual Data: Corn Production

Component in Fuel Pathway	Data Allow to Change
Corn Yield	Amount (bu/acre)
Cultivation Energy Input	Fuel Consumption (Btu/bu)
	Fuel Share Percentage
Ag-chemicals Energy Input	Individual Amount of Use (g/bu)
Soil Emission	N ₂ O Emission (g/bu)
	CH ₄ Emission (g/bu)
Land Use Change	Carbon Intensity Value (gCO ₂ e/MJ)

Calculation of Actual Data: Corn Transportation

Component in Fuel Pathway	Data Allow to Change
Corn Transportation	Transport Mode
	Distance (mile)

Calculation of Actual Data: Ethanol Production

Component in Fuel Pathway	Data Allow to Change
Ethanol Yield	Amount (gal/bu)
Energy Breakdown & Input	Fuel Type
	Fuel Share Percentage
Co-Product	Co-Product Type
	Co-Product Yield
Denaturant	Denaturant % by Volume

Calculation of Actual Data: Ethanol Transportation & Distribution

Component in Fuel Pathway	Data Allow to Change
Ethanol Transportation & Distribution	Transport Mode
	Distance (mile)

Calculation of Actual Data: Ethanol Combustion

Component in Fuel Pathway	Data Allow to Change
GHG Emission from Ethanol	Denaturant Energy Fraction (%)
	Carbon Ratio by weight (%)
	Ethanol Density (g/gal)

LCFS Reporting Requirements

■ Carbon Information Report:

- Batch Number
- Fuel Quantity
- Fuel Type
- Feedstock Type
- Feedstock Origin
- Process Characteristic
- GHG Intensity (gCO₂e/MJ)
- Accuracy Level

■ RINs and Supplemental Information Report

Open Discussion

For More Information

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■ Visit our website at:

<http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>