

## *Low Carbon Fuel Standard Proposed Amendments*

July 22, 2011

### *Agenda*

#### **Morning Session**

- Draft Regulatory Language
  - Opt-In/Opt-Out Provisions
  - Enhanced Regulated Party Provisions
  - Mandatory LCFS Reporting Tool (LRT) Use
  - Other Revisions
- Draft Regulatory Concepts
  - Credit Trading
  - Land Use Change

#### **Afternoon Session**

- Draft Regulatory Language
  - Revised Energy Efficiency Ratios (EERs)
  - Certification Process for Method 2A/2B
- Draft Regulatory Concepts
  - Low Energy Refining
  - High Carbon-Intensity Crude Oil (HCICO)
  - Electricity Regulated Party
- Non-Regulatory
  - Enhanced Biofuel Producers Registration

## *Proposed Amendments*

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## *Current Regulation*

- Section 95480.1(b) - allows opting in to generate credits
- Fuel types available to opt in
  - Hydrogen
  - Electricity
  - CNG
  - LNG
  - Biogas
- Silent on how to opt in or out

## *Opting In*

- Voluntary option
- An opt-in party will be treated as a regulated party
  - Subject to all LCFS requirements

## *Selection of Carbon Intensity Value*

- Lookup Table (Method 1)
- Method 2A/2B
- Default CI value based on 2020 targets
  - Gasoline substitute 86.27
  - Diesel substitute 85.24

## *Opting Out*

- 30-day advanced notice
- Confirm opt out
- 30-day follow up
- End of the year report

## *Record Keeping*

Provisions and requirements in section 95484(d)(1) apply

- Retain following records for at least 3 years
  - Product transfer documents
  - Copies of all data and reports submitted to EO
  - Records related to each fuel transaction
  - Records used for compliance or credit calculations
- Provide records within 20 days of written request

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## *Current Regulation*

- Section 95484(a) – Initial regulated party is:
  - Producer (in California)
  - Importer
- Not eligible as initial regulated party
  - Out-of-state fuel producers
  - Transloading operators

## *Producer*

- Out-of-state producers expressed interest in becoming regulated parties
  - Sell and bank credits
  - Transfer of partial compliance obligations
- Revise definition of “*producer*” to include out-of-state producers who voluntarily opt-in to become initial regulated party

## *Import Facility*

- “Importer” owns fuel when received in “import facility”
- “Import facility” excludes transloading facilities because no storage tank present
- Revise definition of “import facility” to include transloading facilities
- Add definition for “transloading facility”

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## ***Mandatory LRT Reporting , §95484(c)(2)***

- Current regulation requires “interactive, secured internet web-based” reporting tool
- Staff proposes to require use of ARB’s LCFS Reporting Tool (LRT)
- Online LCFS Reporting Tool (LRT)  
URL: [www.arb.ca.gov/lcfsrt](http://www.arb.ca.gov/lcfsrt)

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## *Other Revisions*

- Reporting Requirements
  - Section 95484(c)(5)(C) – Significant figures expressed in gasoline gallon equivalent (gge)
    - Eliminate reporting of fuel volume in terms of gge
    - Use units specified in §95484(c)(3)(A) to (D)
  - Section 95484(c)(3)(A)4. – Renewable Identification Number (RIN)
    - Remove RIN reporting
- Carbon Intensity Lookup Table
  - Table 6 – Replace “gasoline” with “CARBOB”

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## ***LCFS Credit/Deficit Calculations, Credit Banking, Trading and Retirement***

### **Section 95484(b) - Calculation of Credit Balance and Annual Compliance Obligation**

#### **New Section 95488 (a-d)**

- (a) – Generation and Acquisition of Transferable Credits
- (b) – Credit Transfers
- (c) – Mandatory Retirement of Credits for the Purpose of Compliance
- (d) – Public Disclosure of Credit and Deficit Balances and Credit Transfer Information

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## ***Proposed Revisions to Section 95484 (b)***

- Proposed changes to Section 95484(b) include:
  - New definition/formula for *Compliance Obligation*
  - Revised formula for calculating *Credit Balance*
  - Criteria for meeting Compliance Obligation
  - Revised method to determine the credit to deficit ratio
- No material change to LCFS stringency or regulated party's compliance obligation

## Proposed Revisions to Section 95484 (b)

- **Section 95484(b) (1)** clarifies compliance period is annual, otherwise unchanged
- **Section 95484(b) (2)** defines *Credit Balance* and annual *Compliance Obligation* as follows:  
$$\text{Compliance Obligation} = (\text{Deficits}^{\text{Gen}} + \text{Deficits}^{\text{Carried Over}})$$
$$\text{Credit Balance} = (\text{Credits}^{\text{Gen}} + \text{Credits}^{\text{Acquired}})$$

- Sum of  $(\text{Credits}^{\text{Retired}} + \text{Credits}^{\text{Sold}} + \text{Credits}^{\text{Exported}})$
- **Section 95484(b) (3)** defines *Compliance Demonstration* and specifies how Compliance Obligation is met
- **Section 95484(b) (4)** defines *Deficit Carryover*
- **Section 95484(b) (5)** conforms *Deficit Reconciliation* to Section 95488

## LCFS Credit/Deficit Calculations, Credit Banking, Trading and Retirement

### Section 95484(b) Calculation of Credit Balance and Annual Compliance Obligation

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## Credit Banking and Trading

As of Q1 2011

- Credits generated quarterly are “banked”
- Credits banked may be:
  - Retained
  - Retired
  - Transferred
- Deficits tracked separately

## Credit Banking Key Concepts

Quarterly generated credits and deficits are independent

- **Example 1:** A deficit generated in Q1 does not displace a credit generated in Q1
- **Example 2:** A deficit generated in Q2 does not displace a credit generated in Q1
- **Example 3:** A credit purchased in Q4 is available for “re-sale” regardless of the number of outstanding deficits
- **Example 4:** A credit generated during Q1-Q4 is available for “sale” regardless of the number of outstanding deficits

## Meeting Obligation with Carried-Back Credits

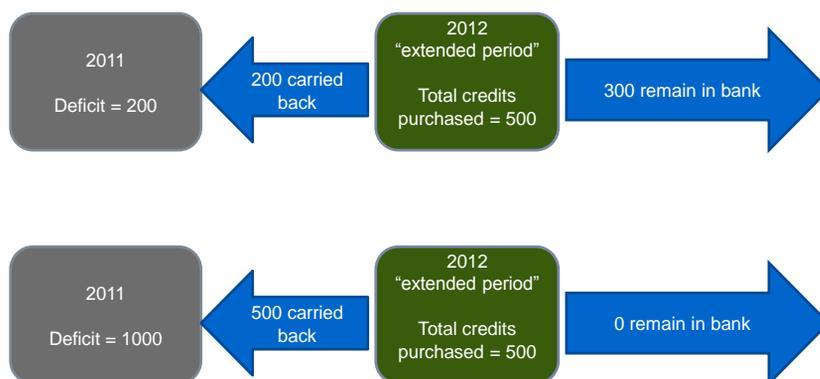
New provision would allow credits to be carried back

- Extended period to purchase credits for compliance
  - Q1 immediately after compliance period
- Regulated party can elect to “carry back” credits
  - Submit Credit Allocation Form along with annual report
- Carry back credits must
  - Have been generated in a prior compliance period
  - Be used to reconcile previous year deficit

July 22, 2011

25

## Example: Credit Carry-Back



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26

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27

## Performing Credit Transfer

- Total Credits available for transfer (see section 95484(b) for  
definition of variables) from Seller's Credit Balance

$$\begin{aligned} \text{Total Credits} &= \text{Credits}^{\text{Gen}} + \text{Credits}^{\text{Acquired}} \\ &\quad - \text{Sum of } (\text{Credits}^{\text{Sold}} + \text{Credits}^{\text{Exported}} + \text{Credits}^{\text{Retired}}) \end{aligned}$$

- "Facilitators"
  - Non-regulated third-party "brokers" can facilitate transfers
  - May not own the credit
  - Credit Transfer Form (CTF)
- Must report required CTF information including the number  
of credits transferred and the price per unit credit

July 22, 2011

28

## ***Documenting and Reporting Credit Transfer***

- Seller and Buyer may agree to transfer as often as needed
- Sellers:
  - Must provide Buyer a signed “Credit Transfer Form”
  - Must provide documentation for each trade regardless of number of credits
- Buyers:
  - Must verify information by signing and dating
  - Must submit transfer agreement to ARB
- Use “Interim” credit transfer process until available in LRT

July 22, 2011

29

## ***“Interim” Credit Transfer Process***

- Manual Process using the Credit Trading Form developed by ARB
- Seller and Buyer complete and sign form
  - InfoPath with Digital Signatures
  - Word document /hardcopy with signatures
- Completed Credit Trading Form submitted to ARB
- ARB executes the transfer
- ARB maintains Credit Account for each regulated party
- Interm Credit Transfer & Credit Allocation Documents:  
[www.arb.ca.gov/fuels/lcfs/ReportingTool/DraftDocs.zip](http://www.arb.ca.gov/fuels/lcfs/ReportingTool/DraftDocs.zip)

July 22, 2011

30

## ***LCFS Credit/Deficit Calculations, Credit Banking, Trading and Retirement***

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## ***Credit Retirement***

- Regulated party with credits at end of year with remaining compliance obligation
  - Must retire enough credits to meet compliance obligation
  - Credit/Deficit ratio (per revised section 95484(b)(3)) recalculated
- Regulated party may specify which credits are to be retired in Credit Allocation Form
  - If not specified, credits to be retired via “default” retirement hierarchy

## ***LCFS Credit/Deficit Calculations, Credit Banking, Trading and Retirement***

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- (d) – **Public Disclosure of Credit and Deficit Balances and Credit Transfer Information**

July 22, 2011

34

## ***Public Disclosure of Reported Data***

- Provide useful information to market participants and protect confidential data
- Monthly and Quarterly Reports on LCFS Credits and Deficits
  - Credit and Deficit Generation on a Quarterly Basis
  - Cumulative information on Credit and Deficit Balances
  - Trading activity: number of credits traded; number of trades; number of parties trading; and average price of traded credits

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32

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## *Outline*

- Contracts
- Pathways to be revised
- EWG recommendations to be incorporated
- EWG recommendations still under review
- Recent model updates (Wally Tyner)
- Schedule for short-term revisions
- Effect on LCFS compliance schedule

## ***Contracts/Outside Work***

- Holly Gibbs: Spatially explicit carbon stocks
- Rich Plevin: Emission factor model
- Wally Tyner: Short term GTAP revisions to update LUC values for existing pathways
- Purdue: Long term GTAP revisions
  - Update LUC values for existing pathways
  - Develop LUC CI values for additional pathways

## ***Pathways to be Revised***

- Corn Ethanol
- U.S. Soy Biodiesel and Renewable Diesel
- Brazilian Sugarcane Ethanol

## ***EWG: Short-Term Revisions to be Made***

- Incorporate cropland pasture for U.S. and Brazil
- Use updated energy sector elasticity values
- Incorporate improved treatment of DGS
- Incorporate modified structure of livestock sector
- Use revised estimates for yield on new cropland
- Use revised emission factors

## ***EWG: Revisions Under Review***

- Developing new emission factors
- Price-yield elasticity value(s)
- Reduce or eliminate LUC credit for reduced food consumption

## *Emission Factors*

- Holly Gibbs to develop spatially explicit carbon stocks for forest and pasture
- Rich Plevin to develop emission factor model, assisted by Sonia Yeh and ARB
- Model will account for:
  - Above and below ground biomass, litter and deadwood
  - Soil carbon
  - Foregone sequestration
  - Conversion by fire
  - Harvested wood products
  - Peatland conversion and cropland pasture conversion

July 22, 2011

41

## *Price-Yield Elasticity Value(s)*

- Considerable disagreement among experts on proper value(s) to use for yield response
- ARB staff intends to use value(s) less than 0.25
- Actual value(s) for short-term model revisions still under review

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42

## ***LUC Credit for Reduced Food Consumption***

- Run new model scenario(s) with and without food consumption held constant
- Considering reducing or eliminating LUC credit for reduced food consumption

## ***Recent Model Updates***

- GTAP 7 Database
- Land supply nesting structure
- Greater flexibility in crop switching in response to price changes
- Endogenous yield adjustment for cropland pasture in response to changes in land rent

# GTAP Modeling Changes Over the Past Year

Wallace E. Tyner, Professor  
Purdue University

## *Schedule*

- Early September – preliminary modeling results for corn ethanol, soy biodiesel, and sugarcane ethanol
- Early October – final modeling results

## *Effect on Compliance Schedule*

- If corn ethanol LUC CI is reduced:
  - Baseline CI for CaRFG decreases
  - Compliance schedule targets for gasoline shift down
- Compliance schedule for diesel is unaffected

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## ***Revised Energy Economy Ratio (EER)***

- Bifurcate natural gas for HD vehicles
  - 1.0 for compression ignition
  - 0.9 for spark ignited
- Revise electricity for LD PHEV/BEV to 2.6

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49

## ***Data for EER Calculation for PHEV/BEV***

- Chevy Volt (electricity only): 93 mpg
- Chevy Cruze (reference vehicle): 28.3 mpg
- $EER = 93 / 28.3 = 3.29$
- Nissan Leaf: 99 mpg
- Nissan Versa (reference vehicle): 28.4 mpg
- $EER = 3.49$
- Average  $EER = (3.29 + 3.49) / 2 = 3.39$
- Average EER is divided by 1.3 to reflect 30% mpg improvement for gasoline vehicles due to Pavley Regs.:  $EER = 3.39 / 1.3 = 2.6$

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50

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51

## ***2A/2B Certification Program***

- Adding new pathways to Lookup Table now requires full rulemaking:
  - Formal comment period(s)
  - Executive Officer Hearing
  - OAL approval
- Cumbersome process
- Certification process would be more efficient (Resolution 09-31)

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52

## **2A/2B Certification Program**

The certification program will:

- Be used to
  - Evaluate and approve/deny Method 2A/2B applications
  - Evaluate and approve/deny staff-developed pathways
- Be modeled after existing ARB certification programs
  - Gasoline Additives (13 CCR § 2257)
  - Aromatic Hydrocarbon Content of Diesel Fuel (13 CCR § 2282)
- Benefit from lessons learned in current 2A/2B program

## **2A/2B Certification Program**

Overall approach

- General requirements for all applications
- Specific requirements for subset
  - Corn ethanol
  - Biodiesel from animal waste
  - Fuels from outside the U.S.
- Required application contents
  - Completed 2A/2B application form
  - Report containing life cycle analysis on proposed pathway

## ***2A/2B Certification Program (Cont.)***

- Required application contents
  - Invoices for all forms of energy consumed (2 typical years)
  - Receipts for fuel sales (same period as above)
  - Documentation of transportation distances if different from LCFS defaults
  - CA-GREET model run for pathway
  - List of all combustion-powered equipment used in fuel production
  - Process flow diagrams for production process

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55

## ***2A/2B Certification Program (Cont.)***

- Air pollution control permits
- Descriptions of co-located facilities (e.g. co-gen)
- Review process has two main components:
  - 30 days for completeness determination
  - 90 days for action on complete application (includes Executive Order)
- Executive Order will contain terms and conditions
  - Modification or revocation if operational conditions not met

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56

## 2A/2B Certification Program (Cont.)

- Record-keeping and reporting requirements:
  - To demonstrate operational conditions are being met
  - Records for
    - Feedstock purchases
    - Fuel volume
      - Produced
      - Sold in California (should reconcile with Reporting Tool data)
      - Energy consumption (electrical and thermal)
      - Quantities of co-products produced

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57

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58

## *Low-Energy-Use Refineries*

- Board directed staff in Resolution 10-49 to consider provisions for low-energy-use refineries
- Simple refineries use less energy to produce transportation fuels
- Staff is:
  - Reviewing submitted proposal
  - Considering other approaches

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59

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60

## *What is a HCICO?*

- Some processes use more energy/emit more GHGs to produce/preprocess oil
- Examples of high intensity production processes
  - Thermal enhanced oil recovery
  - Bitumen mining
  - Upgrading of ultra heavy crude or bitumen
  - Excessive flaring of produced gas
- LCFS based on full lifecycle GHG emissions; need to account for HCICO

## *Outline*

- Current HCICO provision
- Crude Screening Workgroup activities
- Alternative regulatory approaches
- Criteria for evaluating alternatives

## Current HCICO Provision

### Definitions

- “included in the 2006 CA baseline crude mix” or “baseline crude source”
  - Location which contributed two percent or more of the total crude refined in CA in 2006
  - CA, Alaska, Saudi Arabia, Ecuador, Iraq, Brazil, Mexico, and Angola
- “High carbon intensity crude oil” or “HCICO”
  - Crude source with a carbon intensity for “well to refinery gate” of more than 15 g/MJ
  - Average “well to refinery gate” CI for the CARBOB and ULSD pathways is 8.07 g/MJ

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63

## Current HCICO Provision

- Compliance schedule targets based on average Lookup Table values for CaRFG and ULSD
- The average Lookup Table values were calculated using the 2006 baseline crude sources
- Base Deficit: applies to all CARBOB and Diesel
- Incremental Deficit: only applies to fuels derived from HCICO
- Incremental Deficit can be avoided by implementation of emission reduction technologies which reduce the production and transport CI to less than 15 g/MJ

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64

## ***Purpose of HCICO Provision***

- Account for additional emissions beyond the 2006 baseline from the use of HCICO
- Encourage emission reduction activities from these HCICO sources

## ***Screening Process***

- Crude Oil Screening Workgroup met six times
- Developed draft screening process to quickly identify non-HCICO sources
- Sources failing initial screen labeled as potential-HCICO, subject to more rigorous assessment
- Screening process applied to approx. 250 sources, 80 percent identified as non-HCICO

## ***Regulation Revision***

- Proposed revisions to HCICO provision in December
- Alternatives range from amendments to complete revision
- Staff has summarized five potential approaches
- Not limited to these five

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67

## ***Approach 1: Amendments***

- Amendments which provide details for implementing the current provision
- Based on draft screening proposal
- Codifies method used to generate non-HCICO list
- Outline a process to address potential-HCICO sources

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68

## ***Approach 2: California Average***

- Removes designation of “baseline crude sources”
- Base deficit same as current provision
- Calculate a current CA average CI each year
- Incremental deficit applies to all CA refiners if current average CI is greater than baseline CI
- Allows crude slate to shift without penalty if it does not become more emissions intensive

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69

## ***Approach 3: Hybrid***

- Removes designation of “baseline crude sources”
- Base deficit same as current provision
- Incremental deficit applies only to companies with crude oil that becomes more intensive relative to their baseline supply
- Allows companies to shift their crude supply and not be penalized if it does not become more carbon intensive

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70

## ***Approach 4: Company Specific***

- Removes the designation of “baseline crude sources”
- Each oil company would have distinct Lookup Table values and Compliance Targets based on crude slate refined by that company in baseline year
- Incremental deficit applies only when a company’s crude supply intensity exceeds its baseline CI

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71

## ***Approach 5: Worldwide Average***

- Removes any reference to crudes refined in CA
- Bases average Lookup Table values and Compliance Schedule on worldwide average crude oil supply
- Incremental deficit incurred by all refiners if worldwide average crude supply becomes more carbon intensive over time

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72

## *Evaluating Alternative Approaches*

- Criteria identified to evaluate “pros and cons” of alternatives
- Requires refiners to provide significant amount of data and analysis

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73

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74

## *Outline*

- Purpose of Modifications
- Current Language
- Charging Infrastructure Growth in California
- Proposed Modifications
- Justification for Regulated Party Designation

## *Purpose of Modifications*

- Provide clarification of regulated party designation
- Clearly award potential credits for home and public access vehicle charging
- Incorporate vehicle charging applications not foreseen when the regulation was adopted

## ***Current Language***

- Utility is eligible to receive credit for home charging, some public charging
- Non-utility EVSP is eligible to receive credit for electricity supplied through equipment they install
- Business owner with charging equipment is eligible to receive credits through contract with utility
- Homeowner is eligible to receive credits through contract with utility

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77

## ***Charging Infrastructure Growth in California***

- Non-utility EVSP are installing home and public access charging equipment
- Utilities are offering EV rates that encourage off-peak charging
- Utilities are installing second meters for those customers who choose EV rate

---

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78

## *Proposed Language*

- Utilities eligible to receive credits for single and multi-family home EV charging if they
  - offer EV time-of-use rate schedule
  - provide user-friendly online tool for rate comparison
- Non-utility EVSP and utilities eligible to receive credits for public access EV charging equipment they install if they
  - have contract with property owner to maintain or service equipment, or contract with EV owners
- Fleet operators can opt-in to regulation to be eligible to receive credits, or may relinquish regulated party status to utility through written agreement

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79

## *Justification for Credit Allocation*

- Utilities expected to upgrade distribution systems in the future due to increasing loads, including EV home charging
- Utilities may return credit revenues to EV owners (if CPUC approves)
- Non-utility EVSP are establishing public access charging infrastructure

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80

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81

## *Biofuel Producer Registration: The Basics*

- Voluntary, non-regulatory program
- Biofuel producers register to identify:
  - Fuel pathways and carbon intensity (CI) values
  - Physical pathway demonstration (required for LCFS credits)
- Provides regulated parties information needed for LCFS reporting and compliance
- Approximately 200 facilities currently registered

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82

## ***Biofuel Producer Registration: Facility Information***

- Biofuel producers provide facility information to support identifying fuel pathway and CI value:
  - Facility location
  - Type of fuel produced (ethanol or biomass-based diesel)
  - Feedstock type and origin
  - Process fuel/type
  - Co-products
- Biofuel production information
  - Production capacity
  - Annual production volume
  - Annual sales to California
- Producer certifies accuracy of information

July 22, 2011

83

## ***Biofuel Producer Registration: A Tool for Regulated Parties***

- CI values and physical pathway information for registered facilities on LCFS website at <http://www.arb.ca.gov/fuels/lcfs/reportingtool/registerfacilityinfo.htm>
- Biofuel producer information uploaded from registration to LCFS Reporting Tool (LRT)
- Regulated parties need confidence in information for LCFS reporting and compliance

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84

## ***Biofuel Producer Registration: Achieving GHG Goals***

- Accuracy of CI values is essential for achieving LCFS GHG reduction objectives
- How can we improve the registration program to:
  - Provide regulated parties greater confidence in CI values for registered facilities?
  - Help producers identify fuel pathway and CI value?

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July 22, 2011

85

## ***Enhanced Biofuel Producer Registration: Concepts***

We seek input on enhanced registration process:

- Information or records for reporting
- Records to be retained for submittal upon request
- Updates to reflect significant facility change affecting fuel pathway and CI value
- Periodic update to the registration

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July 22, 2011

86

## ***Enhanced Biofuel Producer Registration: Concepts for Proposed Information***

Proposed information to submit with registration

- Copy of RFS2 Registration Engineering Review
  - Includes process flow diagrams, feedstocks, co-product list
- List of permitted equipment from air pollution permit
  - Identifies boilers, dryers, fuel type
- Documentation of wet distillers grain (wet DGS) production and sale
  - Identification of purchasers
- Production capacity and annual sales to California for each registered fuel pathway/CI

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July 22, 2011

87

## ***Enhanced Biofuel Producer Registration: Concepts for Proposed Information***

Proposed records to retain and submit upon request:

- Energy use records (utility bills for previous calendar year)
- Annual co-product sales for wet, dry DGS
- Air pollution permit(s)

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July 22, 2011

88

## Next Steps

- Comments due Aug 5, 2011
- Next public workshops
  - September 2011
  - October 2011
- 45-day comment period begins Oct 24, 2011
- Board hearing – Dec 2011

July 22, 2011

89

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July 22, 2011

90

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July 22, 2011

93

**Thank You**