California’s
Low Carbon Fuel Standard

September 13, 2007
Agenda

- Introduction and workshop overview
- Presentation
  - Background
  - Development of LCFS
  - Presentation by UC
  - Presentation by USEPA
  - Presentation by CEC
  - Process
  - Technical working groups
  - Schedule
- Discussion
- Next meeting
A statewide goal to reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020.

Goal will be accomplished by establishing a Low Carbon Fuel Standard (“LCFS”) for transportation fuels sold in California.
Rationale for LCFS

- Required to meet the GHG reduction goals of AB 32

- Executive Order S-01-07 directed ARB to determine if a LCFS can be adopted as a discrete early action measure

- June 21, 2007 hearing, the Board approved LCFS to be one of the discrete early action measures
Benefits of LCFS

- Help to meet the GHG reduction goals of AB32

- Reduce dependency on petroleum-based fuels by displacing 20% gasoline consumption

- Diversify California’s options for transportation fuels
LCFS Benefits (Cont’)

- Create a market for low carbon fuels and a stable investment environment

- Enlarge renewable fuels market by expanding California’s alternative fuels markets by 3 to 5 times, while reducing GHG emissions

- Promote direction of technology innovation with lower carbon foot-print

- Promote more alternative fuel and hybrid vehicles
Potential Lower or Very Low Carbon Fuels

- Lower carbon ethanol from more efficient corn conversion processes or sugar cane
- Very low carbon ethanol from “cellulosic” materials that have 4-5 times lower GHGs than today’s corn
- E10: increase ethanol blend from current 5.7%
- E85: high blend ethanol for flex fuel vehicles
- Biogas, Biodiesel, Renewable Diesel, Biobutanol
- Electricity and Hydrogen
- CNG, LNG, LPG
Development of LCFS: UC Reports

- University of California Study: A Low-Carbon Fuel Standard for California
  - Part 1: Technical Analysis
  - Part 2: Policy Analysis

- Serve as basis for LCFS

- Both reports available on ARB’s Low Carbon Fuel Standard Program website at http://arb.ca.gov/fuels/lcfs/lcfs.htm
Presentation by UC
Presentation by CEC
• AB 1007 requires CEC, in cooperation with ARB and other state agencies, to develop and adopt a state plan to increase the use of alternative transportation fuels
  – Alternative fuel defined as nonpetroleum fuel, including electricity, ethanol, biodiesel, hydrogen, methanol, or natural gas

• One component of the plan is a full fuel cycle assessment of alternative transportation fuels considering emissions of
  – Criteria air pollutants
  – Air toxics
  – Greenhouse gases
  – Water pollutants
  – Other substances that are known to damage human health

• The plan set goals for 2012, 2017, 2022, 2030, and 2050
Development of LCFS: Key Principles

- **Governs intensity.** Not amount of fuel sold
- **Measured on lifecycle basis.** Fuel providers must decrease overall greenhouse gas emissions
- **Market-based.** Allows averaging, banking and trading to lower cost and provide flexibility
- **Performance-based.** Sets carbon reduction standards and methods to calculate compliance
- **Fuel-neutral.** Fuel providers can choose which fuels to sell and in what volumes
Fuel providers will have different options by which to comply, including:

- Only produce fuels that meet the standard
- Selling a mix of higher and lower carbon fuels that on average meet the standard
- Using previously banked credits
- Purchasing credits from other fuel providers who earned credits by exceeding the standard
LCFS Development Process

- **Initiate public workshops**
  - Initiate the public workshop process
  - Workshop meetings **every 4-6 weeks**

- **Establish working groups**
  - Establish 4 working groups to concentrate on specific areas of the LCFS
  - Meet between workshops
  - Present information for workshops
Coordinate activities
- Coordinate with other California State agencies (CEC, others), USEPA, EU, UK, and other international organizations

Initiate work
- Using UC work as the basis, initiate work on areas where additional information/data are required
  - UC and others provide assistance
Proposed LCFS Working Groups
## Proposed LCFS Working Groups

<table>
<thead>
<tr>
<th>#</th>
<th>Group Topic</th>
<th>Lead ARB Staff</th>
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<tbody>
<tr>
<td>1</td>
<td>Lifecycle</td>
<td>Anil Prahbu</td>
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<tr>
<td>2</td>
<td>Compliance and Enforcement</td>
<td>Jing Yuan</td>
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<tr>
<td>3</td>
<td>Policy and Regulatory Development</td>
<td>Christina Zhang-Tillman</td>
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<tr>
<td>4</td>
<td>Environmental and Economic</td>
<td>Reza Lorestany</td>
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Lifecycle
Group #1 Work Items

- Lifecycle GHG Determinations
  - Land use (sustainability)
  - Default values
  - Uncertainty of values
  - Production pathways
  - Environmental justice
  - Other issues
Compliance and Enforcement
Group #2 Work Items

- Implementation System
  - Tracking fuels and feedstocks
  - Certification of feedstocks
  - Others
Policy and Regulatory Development
Group #3 Work Items

- Harmonization and consistency with USEPA, EU, International LCFS systems
- Cap and trade issues
- Upstream emissions
  - Refining, conventional and non-conventional crude weightings
- World Trade Organization issues
- Credit vehicle or fuel?
  - Diesel
  - Electricity producers
  - PHEV and electric vehicles
  - Innovation credits (e.g. CCS)
- Vehicle efficiency issues
Environmental and Economic Group #4 Work Items

- Economics evaluation
- Multimedia Evaluation
# AB 32 Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>2007</td>
<td>Publish list of early actions</td>
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<tr>
<td>2008</td>
<td>Mandatory reporting &amp; 1990 Baseline</td>
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<tr>
<td>2009</td>
<td>Publish scoping plan</td>
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<tr>
<td>2010</td>
<td>Adopt enforceable early action regulations</td>
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<tr>
<td>2011</td>
<td>GHG reduction measures adopted</td>
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<tr>
<td>2012</td>
<td>GHG reduction measures operative</td>
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<tr>
<td>2020</td>
<td>Reduce GHG emissions to 1990 levels</td>
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<tr>
<td>Beyond</td>
<td>Continue to identify and implement further emission reduction strategies</td>
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<td>2007</td>
<td>University of California completes LCFS study with CEC &amp; ARB</td>
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<td>2007-2008</td>
<td>Conduct LCFS workshops</td>
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<tr>
<td>Early 2008</td>
<td>Initiate draft regulatory language</td>
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<td>Fall 2008</td>
<td>Regulatory package completed</td>
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<td>End of 2008</td>
<td>LCFS regulation submitted to the Board for consideration</td>
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<td>2009</td>
<td>Regulation submitted to Office of Administrative Law</td>
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<tr>
<td>2010-2020</td>
<td>Implementation</td>
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Next Steps

- Begin working group meetings
- Next workshop in the 2nd half of October
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To Join Working Group(s)

Email **Christina Zhang-Tillman** at
[czhangti@arb.ca.gov](mailto:czhangti@arb.ca.gov)

– Subject line “LCFS WG Signup”
– Indicate the group number(s) and topic(s) to join

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