

# **Air Sustainability**

California Air Resources Board

LCFS Sustainability Workgroup

Cal/EPA Headquarters

Sacramento, California

January 20, 2011

# LCFS and Air Quality

- GHG Emission Reductions
  - Built into structure of LCFS
  - “Guaranteed”
- March 2009 Staff Report, Chapter VII
  - Criteria air pollutants
  - Toxic air pollutants
  - Potential pollution to other media
- Biorefinery Siting Guidelines

# **Air Quality Guidance for Siting Biorefineries in California**

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# Presentation Overview

- Board directive
- Background on CA regulatory structure
- Scope and use of guidance report
- Guidance development process
- Overview of report recommendations
- Report status, update process, and future considerations
- Where to get more information
- Questions and discussion

# Board Directive

LCFS Resolution 09-31 directed the ARB Executive Officer to work with local air districts, regulated parties, environmental and public health groups, and other stakeholders to develop a best practices guidance document for use by stakeholders when they are assessing and mitigating the air emissions associated with biofuel production facilities in California.

# Background on CA Regulatory Structure

- Regulation of stationary sources done at local level, with air permits issued by 35 air districts
- ARB has primary authority to regulate mobile sources
- Projects must comply with CEQA before district can issue air permit
  - Multimedia EIR prepared by lead agency for projects with significant impact
  - Analysis extends beyond district authority (e.g., indirect emissions from mobile activity, cumulative impacts of other projects in vicinity)

# Scope of Guidance

- Identifies lowest permitted emission limits for stationary source process equipment used at biorefineries
- Identifies strategies for mitigating mobile source emissions associated with biorefineries
- Informational, non-regulatory document
- Not a substitute for local case-by-case permitting decisions

# How Should Report Be Used?

- Intended audience
  - Air districts
  - Land use planners
  - Environmental and public health groups
  - Project proponents
  - General public
- Use as information resource during site selection, air quality permitting, and identification of CEQA mitigation measures

# Guidance Development Process

- Conducted a nationwide call for information about existing or planned biorefineries
- Reviewed control technologies and corresponding emission levels contained in:
  - Adopted and proposed air district rules
  - Air quality permitting guidance
  - CAPCOA BACT Clearinghouse
  - District BACT Clearinghouses (South Coast, San Joaquin Valley, Bay Area)
  - USEPA RACT/BACT/LAER Clearinghouse

# Guidance Development Process (cont.)

Reviewed options available to mitigate mobile source emissions associated with biorefineries contained in:

- Planning documents
- State and local CEQA guidelines
- Draft and final EIRs for various industrial facilities

# Guidance Review and Public Outreach

- Vetted emission limits and mobile mitigation measures through multi-stakeholder Working Group
  - Air districts
  - Industry (biorefinery and waste management)
  - Environmental and community health groups
- Numerous Working Group meetings and public workshops

# Description of Biorefinery

Evaluated process equipment and mobile sources associated with commercially available conversion technologies to produce the following biofuels:

- Ethanol from grains, sugarcane, and cellulose
- Biodiesel and renewable diesel
- Biogas
- Hydrogen
- Biogasoline

# Overview of Guidance Recommendations for Stationary Sources

# Stationary Source Technical Review

- Used evaluation process similar to district top-down BACT analysis to identify the lowest permitted emission limits
- Process generally resulted in selection of lowest permitted emission limit from the following:
  - Adopted CA air district rules
  - Air quality agency BACT guidance
  - Control techniques required as BACT (achieved in practice and technologically feasible)\*
  - Permitted emission limits, as verified by test results

\*In CA, BACT definitions are more akin to federal LAER

# Stationary Source Technical Review (cont.)

- Pollutants addressed
  - NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, SO<sub>x</sub> (specific limits)
  - GHGs (qualitative)
- Major equipment categories identified through air permits
  - Evaporative loss sources (9 categories)
  - Combustion sources (14 categories)
  - Miscellaneous sources (5 categories)

# Emission Limits for Boilers\*

Category	NOx	CO	VOC	SOx	PM10
Natural gas-fired boiler ≥20 MMBtu/hr	5 ppmvd @ 3% O <sub>2</sub> (0.0062 lb/MMBtu)	<i>Firetube:</i> 50 ppmvd @ 3% O <sub>2</sub>  <i>Watertube:</i> 100 ppmvd @ 3% O <sub>2</sub>  <i>For units 250 MMBtu/hr:</i> 10 ppmvd @ 3% O <sub>2</sub>	Emission limit corresponding to use of natural gas w/ fuel S content no more than 1 gr/100 scf		
Biomass-fired boiler	0.012 lb/MMBtu (9 ppmvd @ 3% O <sub>2</sub> )	0.046 lb/MMBtu (59 ppmvd @ 3% O <sub>2</sub> )  <i>Alternate Limit:</i> 0.01 lb/MMBtu (22 ppmvd @ 3% O <sub>2</sub> )	0.005 lb/MMBtu (11 ppmvd @ 3% O <sub>2</sub> )	0.012 lb/MMBtu (7 ppmvd @ 3% O <sub>2</sub> )	0.024 lb/MMBtu (0.01 gr/scf @ 12% CO <sub>2</sub> )

\* Partial list for this category. See limits for all categories in meeting handout or Report Executive Summary, along with supporting data in Appendix D.

# Emission Limits for Electrical Generating Units\*

Category	NOx	CO	VOC	SOx	PM10
Biogas-fired IC engine	11 ppmvd @ 15% O <sub>2</sub> (or 0.15 g/bhp-hr) in conjunction w/ biogas treatment system  <i>Alternate limit for dairy digester gas, rich-burn engines:</i> 9 ppmvd @ 15% O <sub>2</sub> (or 0.15 g/bhp-hr)	250 ppmvd @ 15% O <sub>2</sub>	20 ppmvd @ 15% O <sub>2</sub>	Emission limit corresponding to use of fuel gas pretreatment system for S removal along w/ maximum fuel S content limit	0.1 g/bhp-hr
Biogas fuel cell	0.5 lb/MWh  <i>Alternate Limit:</i> 0.07 lb/MWh	6.0 lb/MWh  <i>Alternate Limit:</i> 0.10 lb/MWh	1.0 lb/MWh  <i>Alternate Limit:</i> 0.02 lb/MWh	N/A	N/A

\* Partial list for this category. See limits for all categories in meeting handout or Report Executive Summary, along with supporting data in Appendix D.

# Overview of Guidance Recommendations for Mobile Sources

# General Guidance for Mobile Sources

- Sources addressed
  - On-road vehicles
  - Off-road vehicles
  - Portable engines and equipment
- Exceeding requirements of in-use diesel mobile source regulations
  - Repower
  - Retrofit
  - New purchases
  - Fleet modernization
  - Alternative fuel use

# Additional Mitigation Strategies for Mobile Sources\*

- Reduce diesel PM
  - Use of low emission locomotives for rail transport of feedstocks and fuel product
- Reduce fugitive PM
  - Cover, wet material, or maintain  $\geq 2$  feet vertical space between top of load and top of trailer for trucks hauling loose materials
  - Dust suppressants to control PM
- Reduce product (raw and finished) VMT
  - Provide incentives for on-site fueling to minimize fuel export traffic

\* See meeting handout or Report Chapter IX for details and complete list of mitigation measures.

# Additional Mitigation Strategies for Mobile Sources (cont.)\*

- Reduce passenger VMT and SOVs
  - Provide incentives for carpool, vanpool, or zero emission vehicles to discourage single occupancy commuters
- Reduce exposure to sensitive receptors
  - Develop routes for truck traffic that discourage use of roads in sensitive receptor neighborhoods
  - Reduce VMT through adjacent residential property

\* See meeting handout or Report Chapter IX for details and complete list of mitigation measures.

# Current Status of Guidance

- Report public review and comment period closed December 1, 2010
- Staff currently addressing all comments received
  - No comments challenging recommendations
  - Amendments to add clarity re: use of report
- Target issuance of final report by end of February 2011

# Update Process for Guidance

- Web-based clearinghouse on ARB site
  - BACT determinations
  - Source test results
  - New technologies
  - Newly adopted regulations
  - List of existing biorefineries in CA
- Notify stakeholders of updates via list serve (quarterly or as project activity dictates)

# Future Considerations

- As needed, integrate additional mitigation measures to reduce air quality impacts from concentration or co-location of multiple biorefineries
- For biomass-fired boilers:
  - Identify source test methods required to show compliance with PM10 permit limits
  - Incorporate upcoming PM2.5 permit limits and corresponding source test methods
- Address any newly-adopted regulations (e.g., USEPA boiler MACT)

# For More Information

- Draft report available at:  
[http://www.arb.ca.gov/fuels/lcfs/lcfs\\_meetings/lcfs\\_meetings.htm](http://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm) (see October 14, 2010, meeting materials)
- Questions:
  - Stephanie Kato (stationary sources)
    - E-mail: [skato@arb.ca.gov](mailto:skato@arb.ca.gov)
    - Phone: 916-324-1840
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# Open Discussion

# **Air Sustainability**

# Greenhouse Gas Principles

- Biofuels should contribute to climate change mitigation by significantly reducing lifecycle GHG emissions as compared to fossil fuels

# Greenhouse Gas Criteria

- Follow policies in place
- Calculate lifecycle emissions
- Have lower lifecycle emissions than the fossil fuel baseline

# Pollution Principle

- Air pollution from biofuel operations should be minimized along the supply chain

# Pollution Criteria

- Identify, quantify, and minimize emissions
- Avoid or eliminate open-air burning of waste and residues
- Manage waste appropriately and according to local laws

# Open Discussion

Thank you!