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# Renewable Energy Group, Inc.

**CEC Transportation Committee Workshop**

Transportation Fuel Infrastructure Issues

Biodiesel Fuel Quality & Storage Issues

May 11, 2011

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Renewable Energy Group, Inc.

# California Biodiesel Alliance

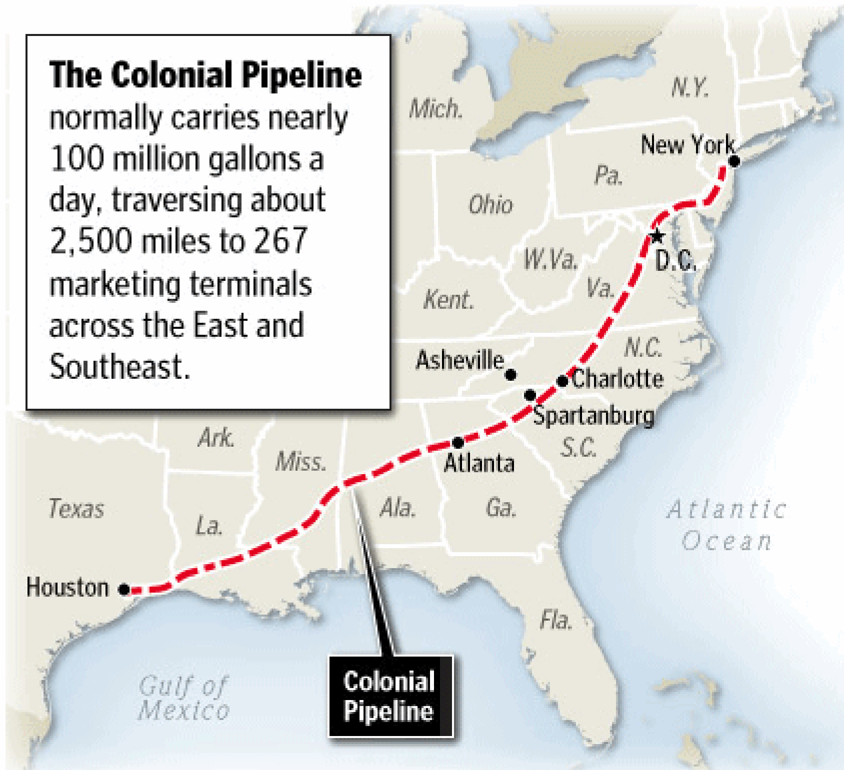
- Founded in 2006 by California biodiesel pioneers and industry leaders
- To represent the California biodiesel industry in Sacramento and Washington, D.C.
- Work closely with legislature, CARB, CEC, California EPA, Water Board, DMS and others to promote biodiesel industry

# Biodiesel Fuel Quality & Storage Issues

- Fuel quality has never been higher
- US biodiesel industry bouncing back with RFS2
- California lags the nation due to lack of infrastructure and regulatory uncertainly
- Comparatively inexpensive to fix these problems

# Biodiesel Is Now A "Drop-in" Fuel

- ASTM D 975 includes up to 5% biodiesel
- Biodiesel blends shipped in pipelines without jet
- Engine manufactures all okay with B5, many okay with B20 and a few okay with higher blends



SOURCE: | The Washington Post - September 26, 2008

# RFS2

- Biomass-based diesel requirement
  - 800 million gallons 2011
  - 1B gallons 2012
  - Min of 1B gallons 2013 – 2022
- Generic advanced biofuel requirement
  - 300 million gallons in 2011
  - 500 million gallons in 2012
  - 4B gallons in 2022
- What role imports?
  - BD, RD, Sugarcane Ethanol

# California LCFS

- Opportunity for obligated parties to “double dip”
  - Should drive demand in California
- Unlike RFS2, LCFS is market based so less clear which fuels will be used*
- B5 from waste = 4% CI reduction
  - Represents 160 mmgpy opportunity
- B20 from waste = 15-18% CI reduction
  - Represents a 640 mmgpy opportunity
- What role imports?


* Furthermore, no separate diesel – gas requirements

# What Is Holding Back The Market?

- Lack of infrastructure
  - Rail offloading for imports from mid-west
  - Terminal storage
  - Rack blending
  - USTs
- Regulatory uncertainty
  - NOx
  - LCFS
- For renewable diesel - cost

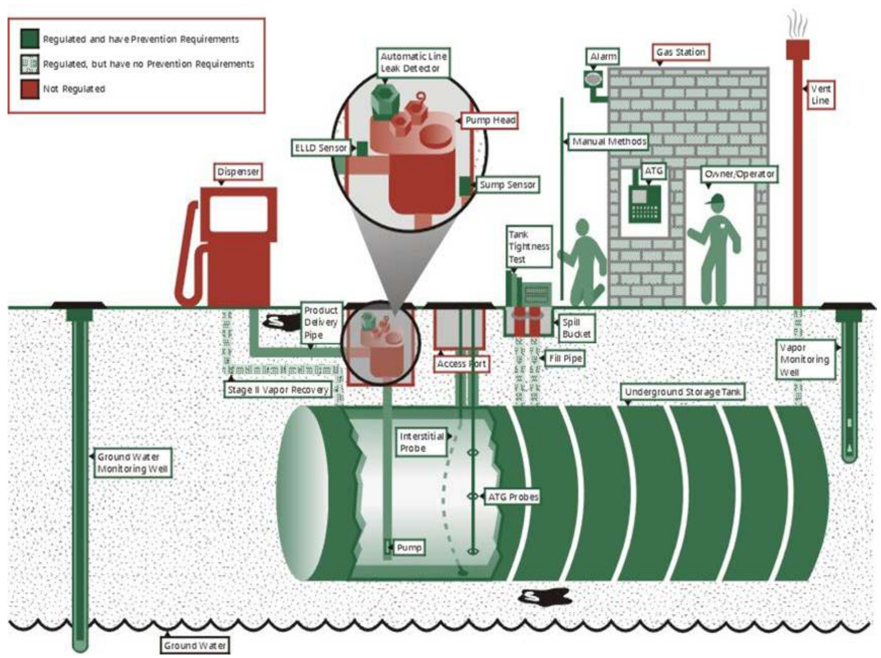

# Terminal Opportunity

- Biodiesel/renewable diesel need terminal access to enter fuel supply
- California has approx 50 terminals, not one has biodiesel/renewable diesel storage or blending capabilities
- Lack of terminal infrastructure increases costs 10 – 25 cents per blended gallon for extra “logistics” costs
  - 5-10 cent storage cost
  - 3-15 cent blending cost, includes cost to make a second stop
- If biodiesel/renewable diesel were available at the terminal rack, cost should fall to 2-4 cents per blended gallon
- Each terminal requires a $1-3mm capital improvement to enable biodiesel/renewable diesel storage and blending
- Total investment of $50-150mm is paid back quickly by reduced costs
- All required infrastructure is multi-fuel compatible (RD,BD,ULSD,etc.)

# Underground Storage Tanks

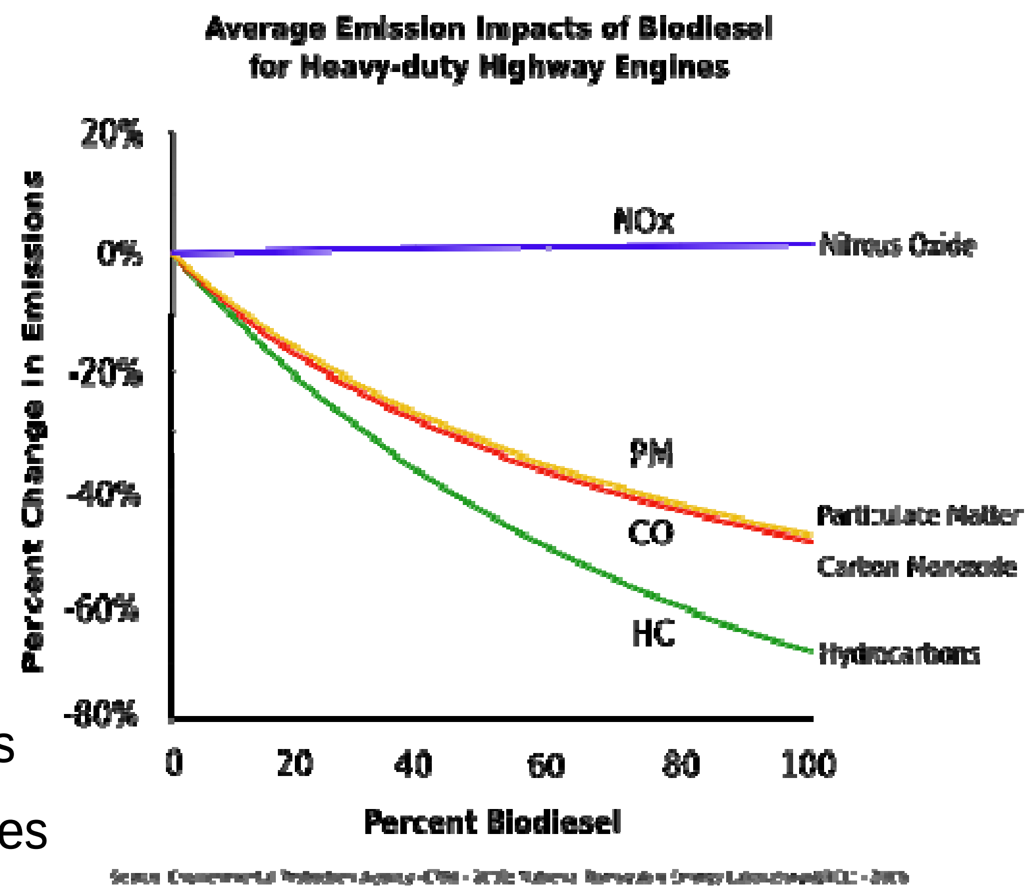
- MTBE debacle leads to tightening of UST regulations
- Lack of UL approval for biodiesel impacted sales of biodiesel blends & created regulatory uncertainty
- 3 year regulatory grace period
- Solutions in progress for biodiesel
  - UL protocols and eventual certification
  - Newly proposed EPA process
  - SB 336
- Renewable diesel
  - Unknown compounds
  - Have not begun UST testing
  - Maybe prohibited

Underground Storage Tank Release Detection



# California Biodiesel Specification

- Industry focus
  - Good science
  - Workable solutions
- Likely framework
  - B1 – B5
  - B6 – B20
  - >B20
  - Performance based
  - When?
  - Mitigated by new engines
- Where NOx increase, additives are available



# Future State

- Biodiesel with low CI available in large quantities from US producers
  - Billion gallon, low carbon, “drop-in” fuel opportunity
- Renewable diesel not likely to happen soon
  - High costs
  - Fuel quality/characteristics not defined by ASTM, regulators, etc.
    - Hydrotreated (Neste, UOP) vs. non-hyrdrotreated (Amyris)
  - Higher value use of same feedstocks with non-hydrotreated RD
- Virgin oils like soy and palm will play a role, but have higher price and higher CI
- Lack of infrastructure for foreign biodiesel/renewable diesel imports
- Algae may develop in 5-10 years; fuel will need to “win” the oil

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