

Biofuels Quality Surveys



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Project ID #FT013

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Overview

Timeline

Start date: Oct 2011

End date: Sept 2012

Percent complete: 66%

Program funded one year at a time

Budget

Total project funding

FY11: \$1.1 M

FY12: \$1.3 M – estimated

NBB cooperative research and development agreement provides around \$500K to cost-share biodiesel research

Barriers

VTP MYPP Fuels & Lubricants Technologies

Goals

- By 2013 identify light-duty (LD) non-petroleum-based fuels that can achieve 10% petroleum displacement by 2025
- By 2015 identify heavy-duty (HD) non-petroleum-based fuels that can achieve 15% petroleum displacement by 2030

Partners

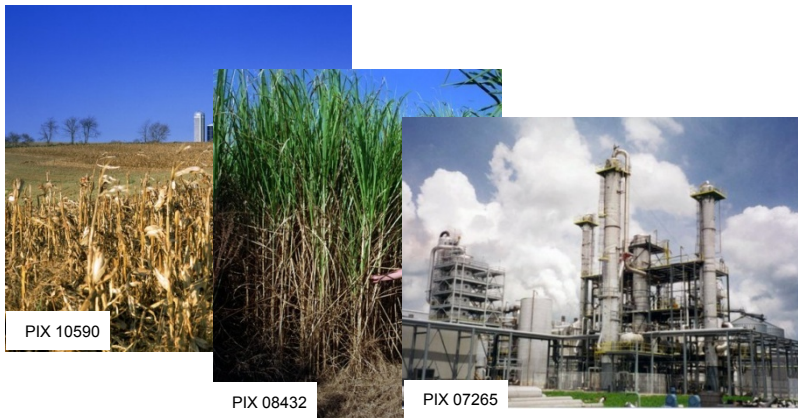
- National Biodiesel Board (NBB) and member companies
- Coordinating Research Council (CRC) and member companies
- Renewable Fuels Association

Relevance

Objective: Solve technical problems that are preventing expanded markets for current and future biofuels and biofuel blends

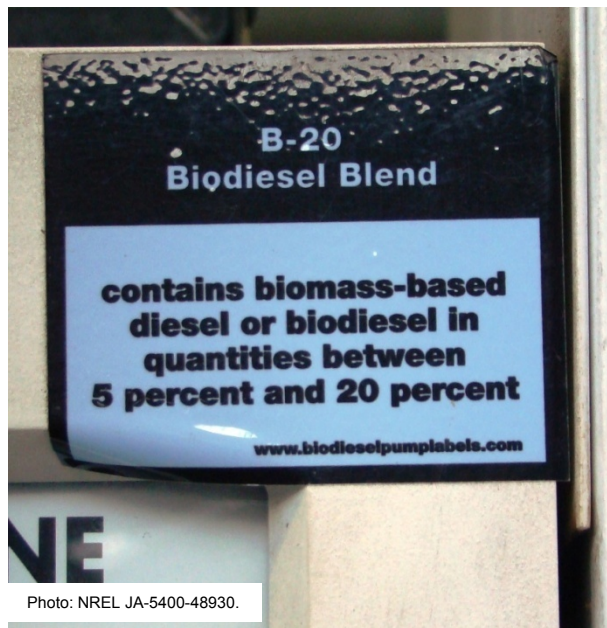
Necessary to achieve MYPP petroleum displacement goals and renewable fuel standards requirements

Research at the interface of fuel production and engines and infrastructure



Approach

- Broad scope of biofuels, including ethanol and biodiesel, currently in the marketplace in significant quantities
- Measurement of quality and performance properties to guide specification efforts
- Collaboration with industry guides our work and ensures relevancy

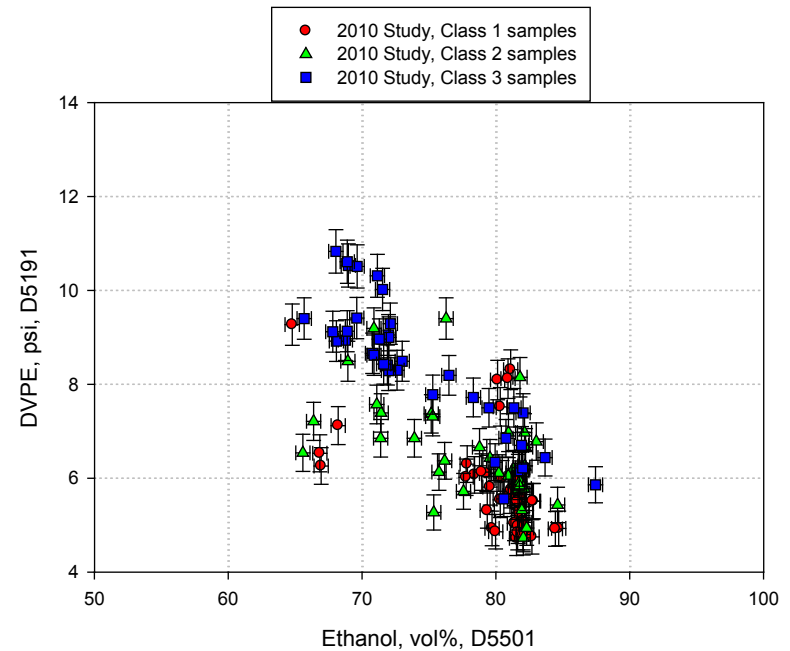


Milestones

Date	Milestone or Go/No-Go Decision	Status
	NONE	

Ethanol Fuel Blends Quality Survey

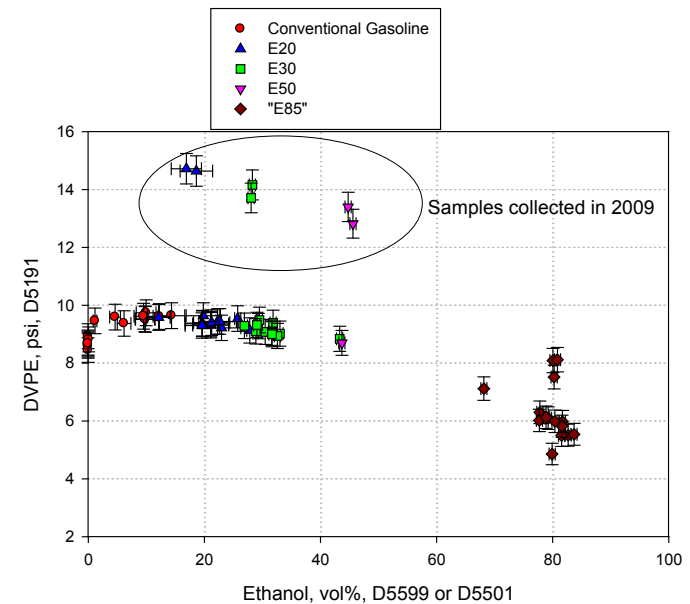
- NREL and CRC sampled Ethanol Fuel Blends (D5798 compliant fuels) from across the United States over a 12-month period
 - Name changed from E85 to Ethanol Fuel Blends in D5798 in 2011 (more accurate and robust)
 - Marketing term is Flex Fuel
- Significant change in D5798 specification in 2010, reducing minimum allowable ethanol content to 68 vol% (increase amount of gasoline in blend)
 - The change should result in increasing compliance with vapor pressure specification
- Results showed increased compliance with D5798
 - Should result in better driveability for Flex Fuel Vehicles



	Class	Below Specification	On Specification	Above Specification
Ethanol Content	1	7.1%	88.1%	4.8%
	2	5.4%	91.9%	2.7%
	3	2.7%	94.6%	2.7%
Vapor Pressure	1	31%	67%	2.4%
	2	56.8%	43.2%	0%
	3	70.3%	29.7%	0%

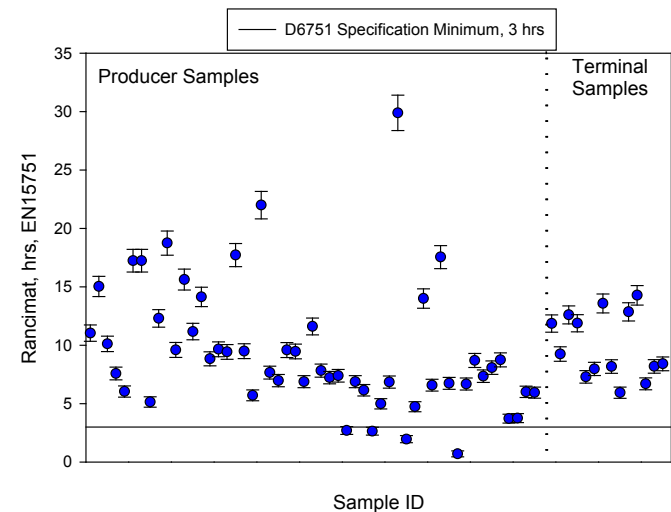
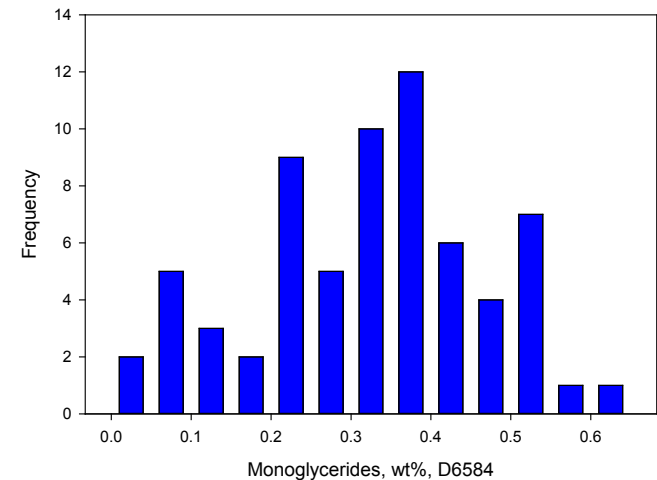
Blender Pump Quality Survey

- NREL and CRC collaborated to study fuels from ethanol blender pumps
- At time of survey:
 - Pumps were predominantly in rural Midwestern US
 - No specification or standard guide for these fuels
- Samples collected from 15 stations in this survey
 - Gasoline, Exx blends, and Ethanol Fuel Blends
- Samples generally contained labeled ethanol content
- Study showed no increase in vapor pressure at E20 compared to E10
- Since survey has been completed, ASTM Standard Practice for Blending Mid Level Ethanol Fuel Blends has been published



Wintertime B100 Survey

- B100 production in United States was highest on record: 1B gallons
- Completed B100 survey, 53 samples from producers and 14 terminal samples obtained
- Samples almost always met quality specifications
- 3% failure rate on oxidation stability
- Less than 2% failure on cold soak filtration test, metals, flashpoint
- No failures on glycerin or acid value



Collaboration and Coordination

E85 and Blender Pump Survey

- Coordinating Research Council (CRC)

Wintertime B100 Survey

- National Biodiesel Board (NBB)

Proposed Future Work

- Follow-on Blender Pump Quality Survey
 - Sample larger geographic area as pumps are being installed beyond the midwestern United States
 - Determine the impact of Ethanol Fuel Blend properties on mid-level ethanol blends (MLEBs)
 - Sample across D5798 volatility classes (should relate to measurable differences in MLEB quality)
 - Obtain high-quality photographs of every pump sampled to see station and pump configuration, including labeling

Summary

- Biofuels quality surveys have provided key technical data for industry trade groups to self-police and improve quality
- Data from surveys have been used by ASTM to assist in writing and improving specifications for biofuels