



Biodiesel Basics

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National Biodiesel Board

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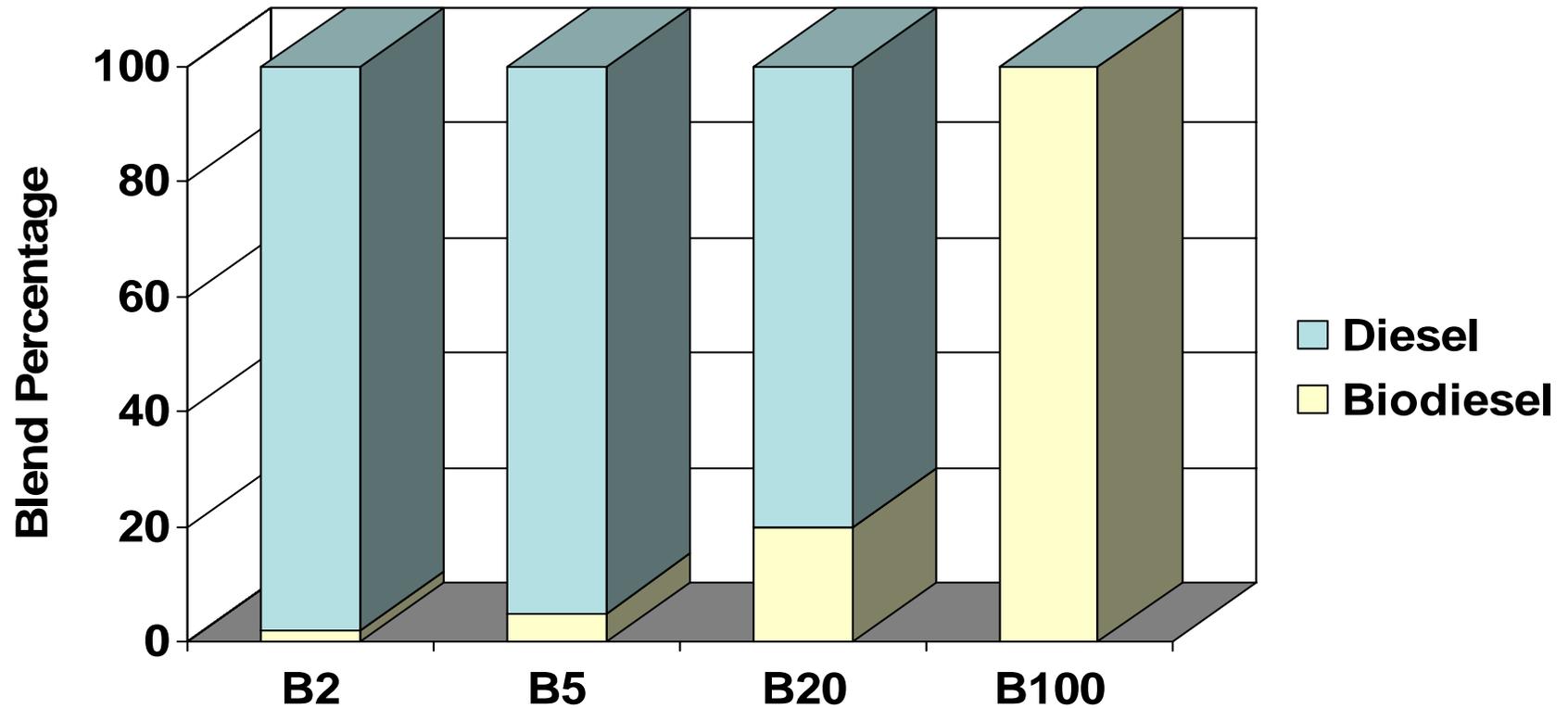


Biodiesel Defined

- ◆ Biodiesel, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100, and meeting the requirements of ASTM D 6751.
- ◆ Biodiesel blend, n. -- a blend of biodiesel fuel meeting ASTM D 6751 with petroleum-based diesel fuel designated BXX, where XX is the volume percent of biodiesel.



Biodiesel Blends



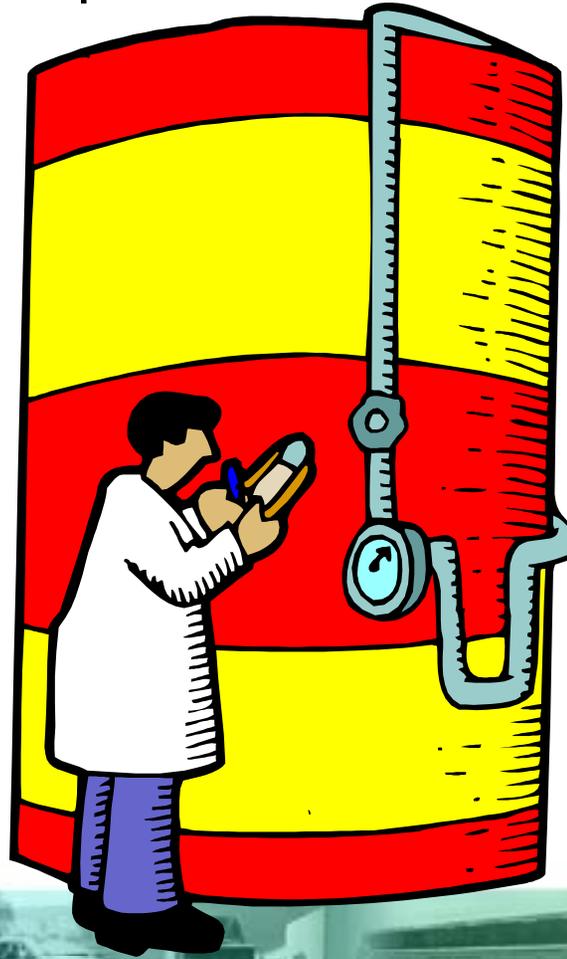
Example: B20 is 20% biodiesel & 80% diesel fuel



The Biodiesel Reaction

In the presence of a catalyst

Combining
Vegetable Oil
or
Animal Fat
(100 lbs.)
+
Methanol or
Ethanol
(10 lbs.)



Yields
Biodiesel
(100 lbs.)
+
Glycerine
(10 lbs.)



EPAct Economics

- ◆ Biodiesel is the most economical way to meet EPAct AFV requirements
- ◆ If B20 blends cost \$.20 per gallon more than #2 Diesel, it will cost approximately \$450 per EPAct credit

2,250 gallons of B20 required per AFV credit
X \$.20 per gallon B20 incremental cost
\$450.00 per AFV credit

- ◆ Medium and Heavy Duty vehicles can earn multiple credits
- ◆ Biodiesel usage also counts toward your Executive Order 13149 goals



EPAct Cost Sensitivity to Incremental B20 Cost

B20 Incremental Cost (\$/Gallon)	EPAct Credit Cost (\$/Credit)
\$.01	\$22.50
\$.10	\$225
\$.20	\$450
\$.30	\$675
\$.40	\$900
\$.50	\$1,125

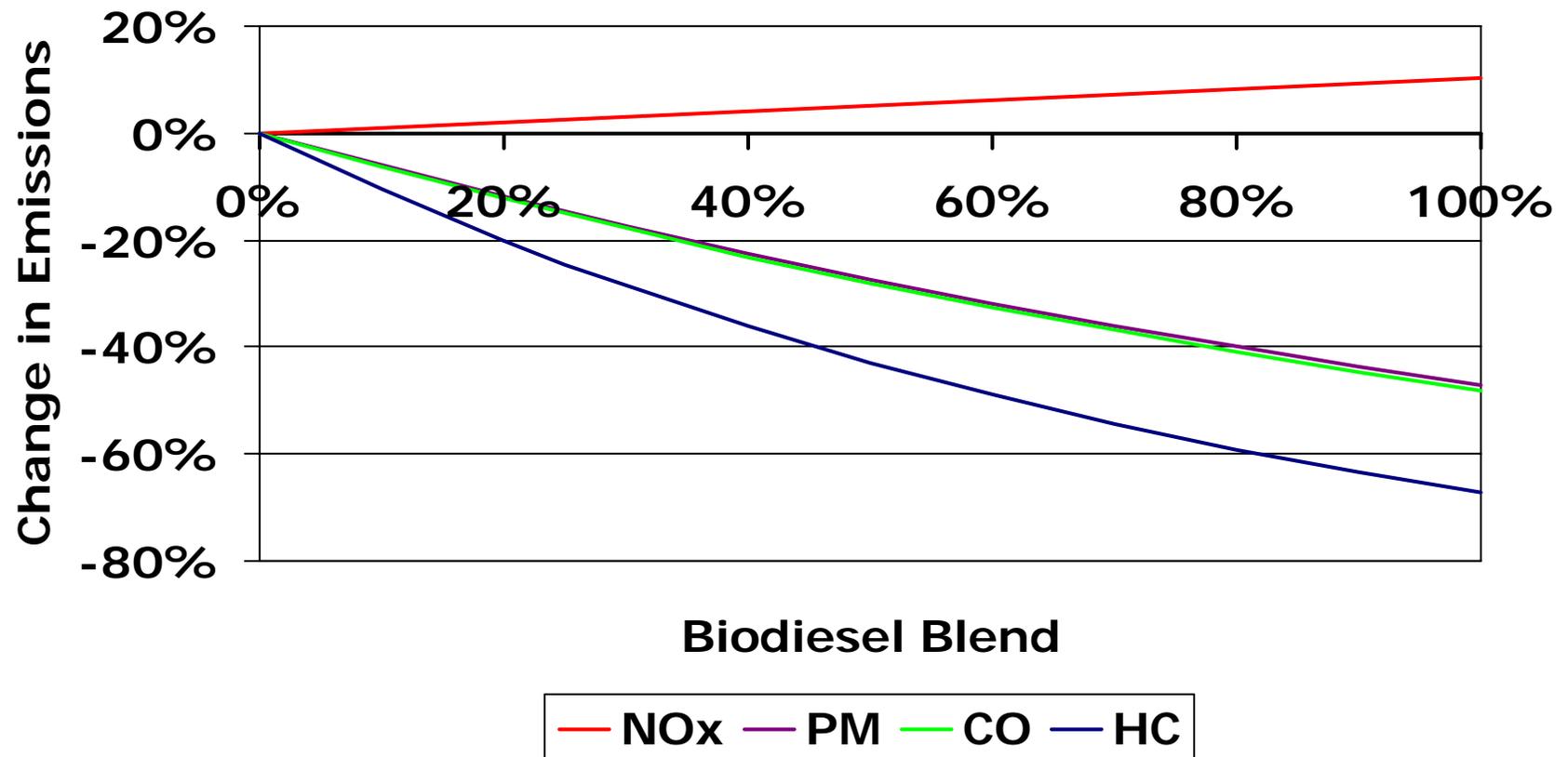


Environmental Attributes

- ◆ Energy Balance - for every one unit of energy needed to produce biodiesel, 3.2 units of energy are gained.
- ◆ Biodegradable and Non-Toxic - Tests sponsored by the United States Department of Agriculture confirm that biodiesel is safer than diesel and biodegrades as fast as dextrose, a test sugar.
- ◆ Greenhouse Gases – A 78% life cycle decrease in CO₂ according to a USDA and DOE study.



Cleaner Emissions



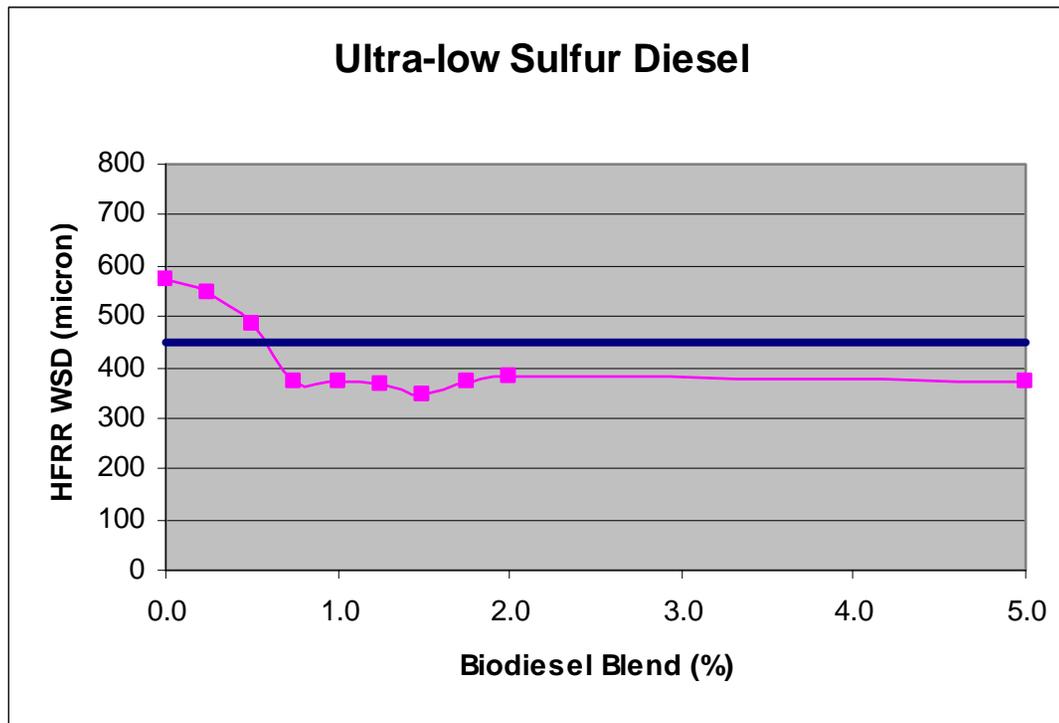
Cleaner Emissions

Emission Type	B100	B20
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
Oxides of Nitrogen (NO _x)	+10%	+2%

Emissions data taken from EPA Draft Document, **A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions**. Oct. 2002. EPA420-P-02-001



Enhanced Lubricity



- ◆ Equipment benefits
 - Superior lubricity
 - B2 has up to 66% more lubricity than #2 Diesel
- ◆ EPA requires sulfur reduction in 2006
- ◆ No overdosing concerns



Biodiesel Performance Properties



BIODIESEL RETURNS ENVIRONMENTAL BENEFITS WITHOUT SACRIFICING OPERATING PERFORMANCE

- ◆ B20 has Similar Performance to Petrodiesel:
 - Torque
 - Horsepower
 - Mileage
 - Range
- ◆ BTU Content
 - (1 – 2% less than #2 diesel)
- ◆ Cold Flow
 - (3-5 °F > for soy-based B20)



Keys to a Smooth Transition

- ◆ Purchase biodiesel from a reputable supplier meeting ASTM D6751
- ◆ Make sure storage tanks are clean
- ◆ Biodiesel may clean sediments and accumulated materials existing on fuel system surfaces
- ◆ B20 filter changes happen in 2% of cases when first starting up, B2 no changes realized
- ◆ Once sediments are cleaned from the system, filter changes will return to normal

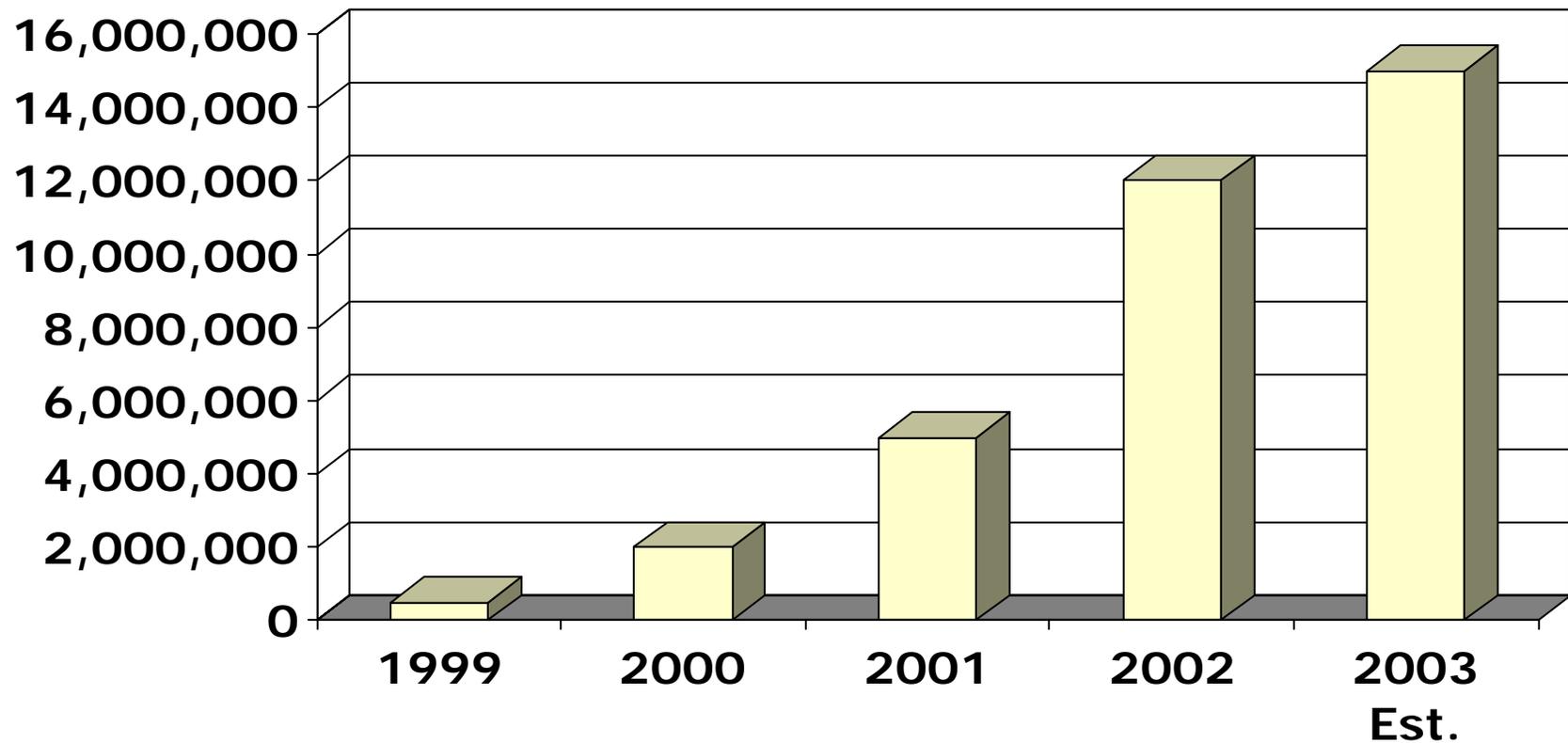


Industry Trends

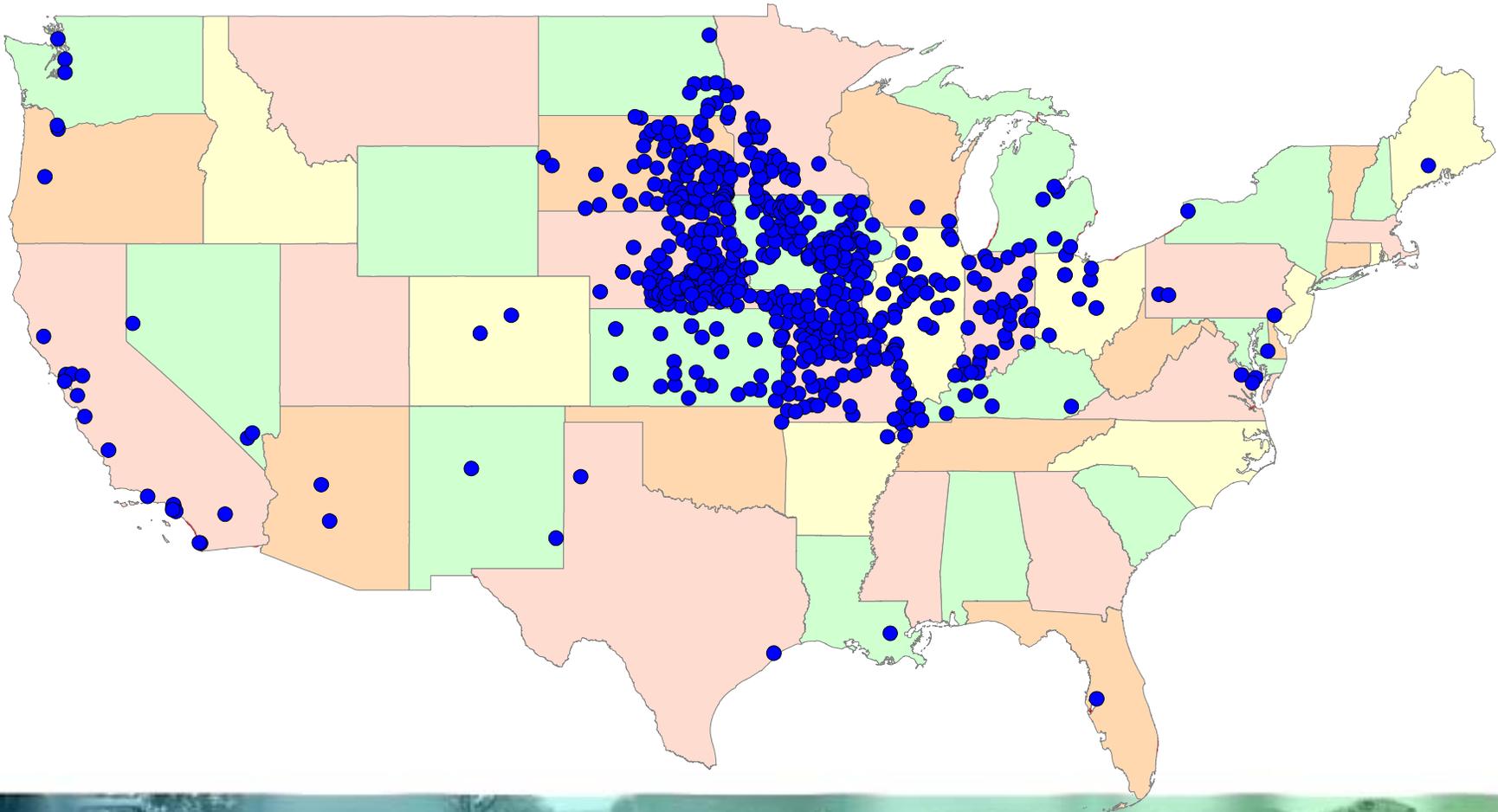
- ◆ Fuel suppliers are expanding
- ◆ Demand continues to grow
- ◆ Legislative efforts to make biodiesel cost competitive are ongoing
- ◆ Relationships with OEMs continue to be built
- ◆ ASTM D6751 specification is complete
- ◆ BQ-9000 Quality Program is being launched



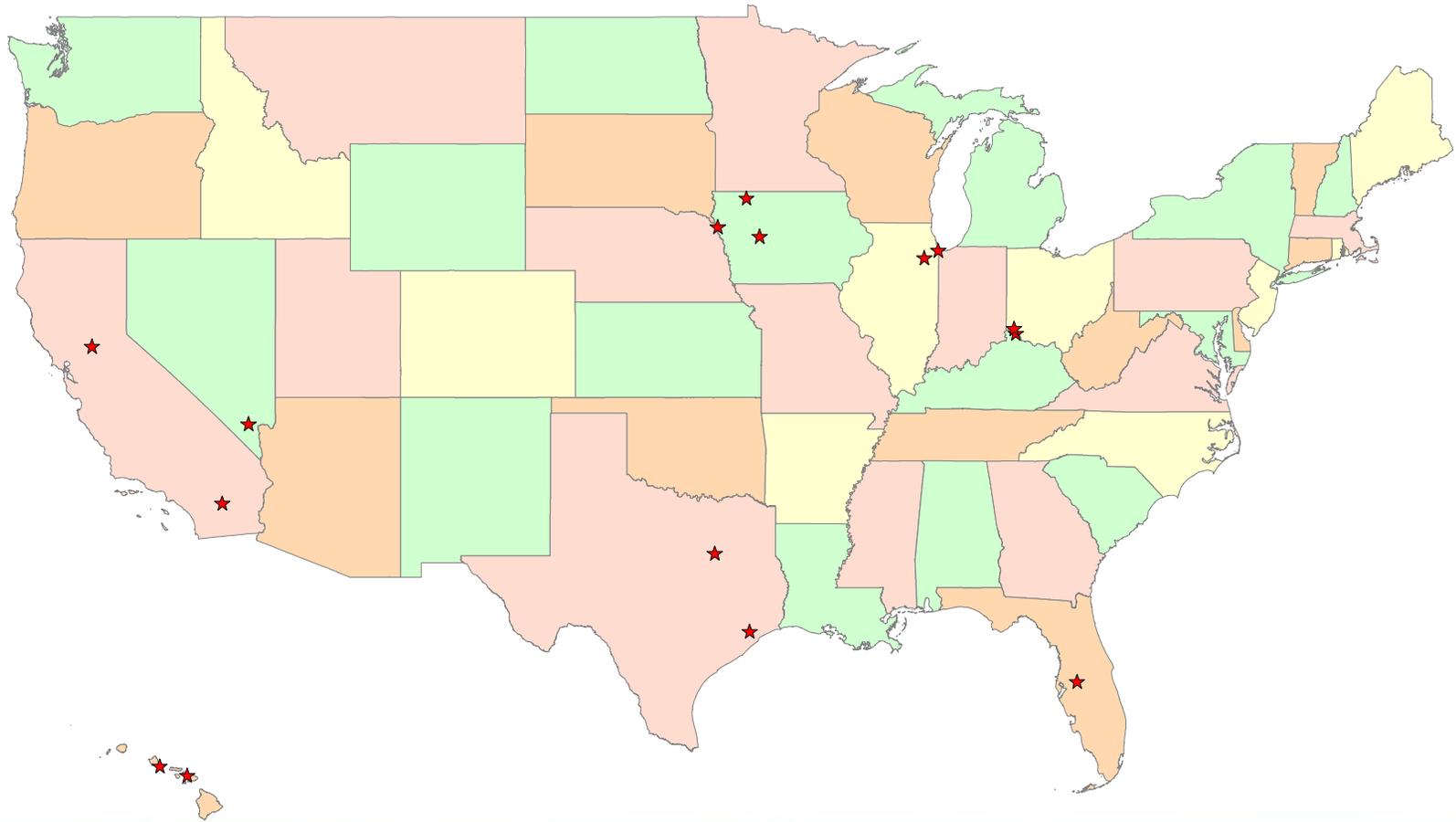
Biodiesel Demand



Bulk Distribution Locations



Production Locations



Additional Information

- ◆ National Biodiesel Board
 - 888-BIODIESEL
 - www.biodiesel.org

