

# MID-LEVEL ETHANOL BLENDERS AND THE RFES

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March 20, 2009

# RFS STATUS

## Renewable Fuel Standard and 2008

- Std was 9.0 billion gallons
- Domestic ethanol production was 9.24 billion gallons
- Ethanol imports were 0.52 billion gallons
- Biodiesel use in U.S. was a few hundred million gallons

# RFS2 (billion gallons)

	Implicit Corn	Total <u>RFS</u>
2009	10.60	11.10
2010	12.00	12.95
2011	12.60	13.95
2012	13.20	15.20
2013	13.80	16.55
2014	14.40	18.15
2015	15.00	20.50
2016	15.00	22.25
2017	15.00	24.00
2018	15.00	26.00
2019	15.00	28.00
2020	15.00	30.00
2021	15.00	33.00
2022	15.00	36.00

# RFS2 RULEMAKING

- Congress passed EISA in December 2007.
- EPA has not yet proposed regulations.
- Not known if these will be promulgated in 2009 and effective on Jan. 1, 2010.

# WHAT IS THE “BLENDWALL”?

- EPA: Gasoline may contain no more than 10 vol% ethanol.
- Refiners and gasoline importers cannot comply in all years by only adding 10% ethanol to gasoline.
- Gasoline demand in 2008 was 135 billion gallons. If ethanol was at 10%, then the maximum level of ethanol use in gasoline would be 13.5 billion gallons. However, the RFS gets much higher than 13.5 billion gallons.
- About 80% of U.S. gasoline today includes ethanol.
- The other RFS compliance options are E-85 (not gasoline) and biodiesel.

# NPRA CONCERNS WITH MID-LEVEL BLENDS

- Engine performance and durability
- Potential misfueling
- Air quality
  - ozone impacts from hydrocarbon emissions
  - GHG impacts from lifecycle indirect effects  
(existing plants grandfathered)
- Consumer safety and potential liability

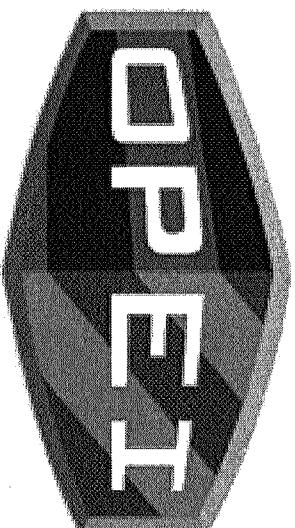
# Program Summary

Mid-Level Ethanol Blends  
Research Coordination Group  
Jan. 28, 2009

Topics of Interest	7	8	9	10
Durability				
Testing (DT)				
Base Engine				
Fuel System, Damper, LM sen, Matl Compat.				
Catalyst Durability Aging				
Powertrain Systems Cold Operation (MSAT NHHC & SULEV)				
Vehicle Emissions, Late Models				
Vehicle Emissions, Older Models				
Emissions - DOE will monitor				
Web Perf & Emissions - DOT sponsored				
Evaporative Emissions (EV)				
Durability (DR)				
Powertrain Systems Cold Operation (MSAT NHHC & SULEV)				
Vehicle Emissions, Late Models				
Durability of 20 FFVs & non-FFVs				
Durability of 80 vehicles - DOE will monitor				
Web Perf & Emissions - DOT sponsored				
Base Engine				
Permeation of Fuel System				
Fuel System, Damper, LM sen, Matl Compat.				
Elastomer, Plastic & Metals - DOE will monitor				
Emissions/MT Quality Monitoring				
On-Board Diagnostics				
Key:				
Comprehensive				
Comprehensive in development				
Preliminary, partial or screening				
Cap				

★ Cited by Growth Energy Petition, notation added by Auto Alliance





**OUTDOOR POWER EQUIPMENT  
INSTITUTE**

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**The International  
Association of Forestry,  
Utility, Landscape and  
Lawn & Garden Equipment  
Manufacturers.**

**Kris Kiser**

**Executive Vice President**



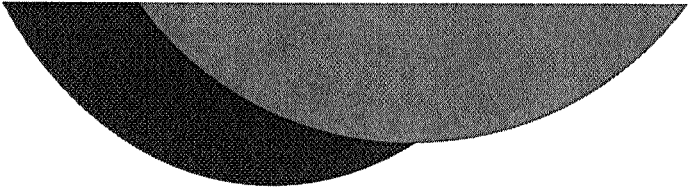
# Legacy Equipment

## 200-300 Million Pieces

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### Commercial & Consumer

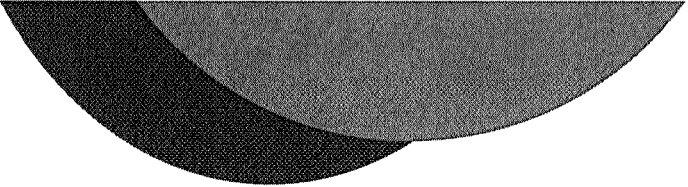
- Utility Vehicles
- Garden Tractors
- Mowers
- Chippers
- Shredders
- Chainsaws
- Engines
- Generators
- Tillers
- Trimmers
- Snow Throwers
- Leaf Blowers



# Current Power Sources

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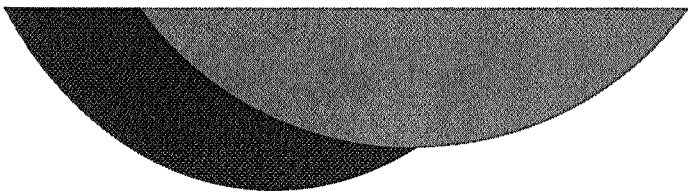
- Gasoline
- Propane
- CNG
- Diesel
- Battery
- Electric
- Solar
- Flex Fuel



# **Environmental Protection Agency**

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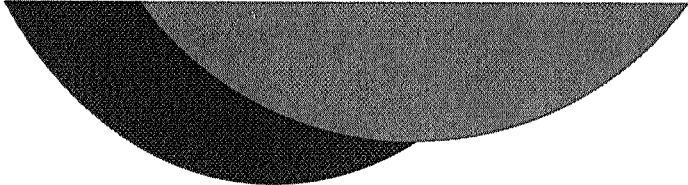
- Emissions and Evaporative  
Regulatory Scheme
- 900 Engine Families
- 2008 Phase III
- Industry Request for E-10  
Certification Fuel



# **DOE Tests Document the Following Major Adverse Impacts from Fuels Greater than 10% Ethanol**

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- Engine Exhaust Temperatures Rose Significantly
- Risk to Operators Dramatically Increased  
Report recognizes that unintentional clutch engagement resulted on several tested products because of high idle speeds.
- Damage to Engines
- Operational Problems



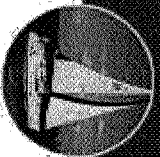
# **Consumer Products Companies**

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- Safety
- Economic Loss
- Warranty Protection
- Lawsuit Exposure



National Marine  
Manufacturers Association

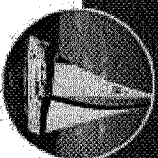


# Marine Population

- 18 million boats currently in operation in the U.S.
- 275,500 outboard units sold in 2007 @ average cost of \$9,761 – relatively high dollar.
- Spark-ignited marine systems include: Outboards, Personal Watercraft, Stern drive/Inboard, & Marine generators
- HP range from single digits to 1100hp – different, diverse engine configurations and fuel systems for marine.



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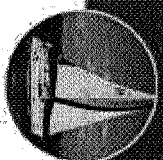


# Marine Products Pose Unique Challenges

- Spans from single small engines to 1100 HP multi-engine applications
- Operate at high power settings - High fuel consumption
- No gravity or pressure feed fuel systems
- Long periods of storage
- Open vented fuel systems
- Just starting feedback loop engine controls
- Challenging marine environment – products must be durable and performance must be reliable



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Manufacturers Association

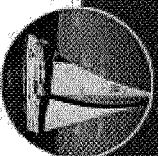


# Fuel Tank Materials Degradation

- Leaks develop in fiberglass
- Corrosion to steel tanks
- Corrosion to zinc parts
- Carbon build-up on valves and rods from breakdown of the resin in fiberglass fuel tanks
- Scouring of resins inside fuel tank which are then passed through filter into the fuel – clogs fuel system and leads to engine performance failures



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# Additional Fuel Tank Concerns

## *Operation at high power settings*

- Lower range on same amount of fuel
- Higher fuel flow capability components may be needed (bigger filters, larger diameter fuel lines, bigger anti-siphon valves)

## *No gravity or pressure feed fuel systems*

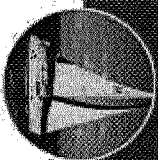
- Increased vapor due to fuel lift and higher RVP of E20
- Poor hot restart, vapor lock

## *Long periods of storage*

- Increased water in boat tanks
- Possible phase separation if fuel is stored over a wide temperature range



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Manufacturers Association

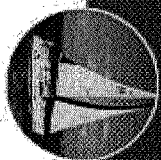


## Emissions Problems

- Ethanol increases the oxygen content in fuel. Close to 100% of the marine engines in use today do not have closed loop controls.
- The carburetors and fuel injection systems on marine engines are calibrated at the factory to operate efficiently within a narrow fuel and air ratio. If you increase or decrease f/a ratio in the combustion chamber, engine damage, performance problems and increased emissions will result.
- Increase the oxygen level in the combustion chamber elevates the engine temperature, causing increased NOx emissions.
- Increased stress on components such as valves, head gaskets and head bolts that are only designed to withstand certain temperatures.
- Increase in permeation and diurnal emissions.



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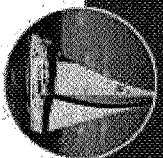


# Performance Problems

- E20 requires resizing/recalibration of existing open loop engines (i.e., changed A/F ratio) to prevent
  - enleanment, resulting in temperature increase, and engine malfunctions
  - detrimental impacts on safety
- Detrimental impacts of phase-separation due to presence of water in E-20 – potential engine stall – esp. at cold temperatures
- Poor (Cold) Start performance (esp. important for hand-start engines)
- Hot and Cold performance degraded
- Corrosion – galvanic corrosion in aluminum fuel tanks / aluminum oxide formation.



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## **No Tests on Marine**

- To date, DOE and EPA have tested no marine engines or equipment with higher blends of ethanol.
- In Growth Energy's 2111(F)4 waiver petition, no study on marine equipment impacts is referenced.
- In our sector and others, we believe that consumer safety, environmental concerns, product liability, and compliance with federal air laws merit robust and thorough testing before allowing higher blends for general sale.

# American Lung Association Perspectives on Mid-Level Ethanol

A Blakeman Early  
Environmental Consultant  
American Lung Association

[bearyl@lungusa.org](mailto:bearyl@lungusa.org)  
202-715-3437

# **New Research Shows current ozone and particulate standards do not protect public health**

- **A March, nationwide study found chronic exposure to ozone increases premature death.**
- **We need to lower emissions further, not increase them.**
- **We need to “look before we leap” to mid-level ethanol.**

# Only One Scientifically-based Study on Emissions from E-15, E- 20 used in Today's Cars – None for

## Small Engines

- DOE Study raises many questions
- Statistical analysis required 13 of 16 to “count”
  - 9 of 16 NOX increase at E-20 not “significant”?
  - 5 of 16 NOX increase at E-15?
  - 7 of 16 increase temperature up to 90+F in Wide Open Throttle.
  - Emissions averaged across all cars- low emitters off-set high – We don't breathe “on average”
- No durability testing (125,00 mi warranty)
- Increases in small engine emissions “buried” in report

**We need more scientific-based testing of midlevel ethanol(E-12or higher) to assure protection of public health**

- **Studies Cited by Growth Energy**
  - Lacked proper test protocol & fuel control**
  - Not peer reviewed**
  - Not designed primarily to measure emissions.**

**No state or federal environmental agency has endorsed general sale of E-15 or E-20.**

## **THE WALL STREET JOURNAL**

- [WSJ.com](http://WSJ.com)
- REVIEW & OUTLOOK
- MARCH 16, 2009, 5:51 A.M. ET

### Everyone Hates Ethanol

These days, it's routine for businesses to fail, get rescued by the government, and then continue to fail. But ethanol, which survives only because of its iron lung of subsidies and mandates, is a special case. Naturally, the industry is demanding even more government life support.

Corn ethanol producers -- led by Wesley Clark, the retired general turned chairman of a new biofuels lobbying outfit called Growth Energy -- want the Obama Administration to make their guaranteed market even larger. Recall that the 2007 energy bill requires refiners to mix 36 billion gallons into the gasoline supply by 2022. The quotas, which ratchet up each year, are arbitrary, but evidently no one in Congress wondered what might happen if the economy didn't cooperate.

Now the recession is hammering demand for gas. The Energy Information Administration notes that U.S. consumption fell nearly 7% in 2008 and expects another 2.2% drop this year. That comes as great news for President Obama, who is achieving his carbon-reduction goals even without a new carbon tax, but the irony is that the ethanol industry is part of the wider collateral damage.

Americans are unlikely to use enough gas next year to absorb the 13 billion gallons of ethanol that Congress mandated, because current regulations limit the ethanol content in each gallon of gas at 10%. The industry is asking that this cap be lifted to 15% or even 20%. That way, more ethanol can be mixed with less gas, and producers won't end up with a glut that the government does not require anyone to buy.

The ethanol boosters aren't troubled that only a fraction of the 240 million cars and trucks on the road today can run with ethanol blends higher than 10%. It can damage engines and corrode automotive pipes, as well as impair some safety features, especially in older vehicles. It can also overwhelm pollution control systems like catalytic converters. The malfunctions multiply in other products that use gas, such as boats, snowmobiles, lawnmowers, chainsaws, etc.

That possible policy train wreck is uniting almost every other Washington lobby -- and talk about strange bedfellows. The Alliance of Automobile Manufacturers, the Motorcycle Industry Council and the Outdoor Power Equipment Institute, among others, are opposed, since raising the blend limit will ruin their products. The left-leaning American Lung Association and the Union of Concerned Scientists are opposed too, since it will increase auto emissions. The Natural Resources Defense Council and the Sierra Club agree, on top of growing scientific evidence that corn ethanol provides little or no net reduction in CO<sub>2</sub> over the gasoline it displaces.

The biggest losers in this scheme are U.S. oil refiners. Liability for any problems arising from ethanol blending rests with them, because Congress refused to grant legal immunity for selling a product that complies with the mandates that it ordered. The refiners are also set to pay stiff fines for not fulfilling Congress's mandates for second-generation cellulosic ethanol. But the cellulosic ethanol makers themselves already concede that they won't be able to churn out enough of the stuff -- 100 million gallons next year, 250 million gallons in 2011 -- to meet the targets that Congress wrote two years ago.

So successful but politically unpopular businesses will be punished for not buying a product that does not exist -- from companies that haven't yet found a way to succeed despite generous political and taxpayer advantages. The next step is to use cap and trade to make green alternatives look artificially good by comparison. Even then they'll probably still be bottomless money pits.

To recap: Congress and the ethanol lobby argue that if some outcome would be politically nice, it should be mandated (details to follow). Then a new round of market interventions is necessary to fix the economic harm resulting from the previous requirements, while creating more damage in the process. Ethanol is one of the most shameless energy rackets going, in a field with no shortage of competitors.

Please add your comments to the Opinion Journal forum.

Printed in The Wall Street Journal, page A18

February 5, 2009

The Honorable Harry Reid  
Majority Leader  
United States Senate  
Washington, D.C. 20510

The Honorable Mitch McConnell  
Minority Leader  
United States Senate  
Washington, D.C. 20510

**Re: Opposition to Efforts to Expose Consumers to Increased Air Emissions and Decreased Safety Through an Increase in the Ethanol Blending Cap in Senate Stimulus Package**

The undersigned diverse group of business, environmental and public health groups strongly urge the United States Senate to reject efforts to increase the ethanol blending cap in the Senate version of the 2009 economic stimulus package (H.R. 1). The adoption of such a provision would short-circuit the established and time-tested Clean Air Act regulatory structure for approving the introduction of new fuels or fuel blends into commerce, lead to increased air emissions from gasoline-powered engines, and potentially endanger consumers using these engines.

The Environmental Protection Agency (“EPA”) and the Department of Energy (“DOE”) currently are involved in extensive testing to determine whether increased levels of ethanol may be safely blended into gasoline – intended both for use in motor vehicles and in nonroad equipment such as boats, lawnmowers and snowmobiles -- without increasing air emissions or endangering consumers. In our collective opinion, a decision on whether to permit the use of ethanol concentrations in excess of 10 percent in gasoline (so called “mid-level ethanol blends”) in motor vehicle and equipment engines must be guided solely by sound, unbiased and comprehensive science and must hold true to the fundamental purposes of protecting the environment and consumers. Our groups are united and committed to maintaining a fact-based mid-level ethanol blend approval process.

Clean Air Act Section 211(f) provides detailed and clear statutory guidance on EPA’s obligations and responsibilities for reviewing applications for approval of a new fuel or fuel additive, or a new fuel and additive mixture, such as a mid-level blend. These procedures must be followed rigorously, without analytical short-cuts, to prevent degradation of air quality and potential economic injury and personal safety risks for consumers.

There has not been sufficient testing of motor vehicle and nonroad equipment engines to justify a determination that any mid-level ethanol blend would meet the requirements of Section 211(f). Some have asserted that preliminary or incomplete studies suggest that mid-level ethanol blends may be compatible with some engines. However, other test results suggest that mid-level ethanol blends: (1) may be incompatible with some of today’s motor vehicle and nonroad equipment engines; (2) may cause a failure of emission control devices or systems; (3) may defeat these engines’ safety features; and, (4) may lead to a significant increase in emissions from these engines over their useful life.

Collectively, our organizations strongly believe that this issue should not be part of the economic stimulus package currently under consideration by the United States Senate. The EPA/DOE testing process must be permitted to continue -- and the results of this testing must indicate that mid-level ethanol blends do not pose an air quality or consumer protection danger in all gasoline-powered engines -- before a decision is made on allowing such blends to be introduced into commerce. The Senate must not by-pass the consumer and environmental protections of the Clean Air Act on this important issue.

Sincerely,

Alliance of Automobile Manufacturers  
American Lung Association  
Association of International Automobile Manufacturers  
Clean Air Task Force  
Council for Citizens Against Government Waste  
Earthjustice  
Engine Manufacturers Association  
Environment America  
Environmental Working Group  
FarmEcon LLC  
Friends of the Earth  
International Snowmobile Manufacturers Association  
Motorcycle Industry Council  
National Marine Manufacturers Association  
National Petrochemical and Refiners Association  
Natural Resources Defense Council  
Outdoor Power Equipment Institute  
Tortilla Industry Association  
Union of Concerned Scientists

cc: Membership of United States Senate