

Senate Committee on Environment and Public Works  
Subcommittee on Clean Air and Nuclear Safety

Hearing on Oversight - The Environmental Protection  
Agency's Renewable Fuel Standard

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Written Testimony

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Chairman Carper, Members of the Committee, it is a privilege, an honor and a responsibility to appear before you this morning. My name is Michael McAdams and I am the President of the Advanced Biofuels Association. The Association represents sixteen second generation companies that hold the promise to deliver significant scalable volumes of high-performance, environmentally advantageous fuels to America. The companies represent a diverse array of technologies that plan to produce a range of fuels: from jet and diesel fuel, to substitute gasoline or gasoline additives. In some instances these companies may be able to make an entirely neat fuel as 100% substitute to diesel, while in other cases they would ultimately be able to replace up to 100% of an existing hydrocarbon fuels at the existing performance standard.

In my limited remarks, I will focus on four points: 1) not all fuels are created equal; 2) not all advanced technologies are cellulosic; 3) not all advanced fuels are ethanol; and 4) this country needs to transition and balance its feedstocks over time. It is because of our belief in these four principles that the members of the Association supported the Senate version of the advanced biofuels program in the last Congress. However, we pledge to work with the existing program as passed.

Our Association strongly urges the Congress to continue to support a technology-neutral approach and to not advantage one type of fuel or technology over another. There is too much at stake and the effects on performance and the environment are too great to mistakenly lock-in a potentially inferior fuel or technology choice simply because they have a head start. I would submit that we might not have the iPod today if we had chosen to lock-in the 8-Track tape back in the 1980s.

Let me turn to my first point. I have attached several slides to my presentation. The first slide is a depiction of the current RFS. As you can see, there are four distinct categories of fuels mandated under the law. If you do the simple math, you will see that the current law allows for four billion gallons of advanced biofuels other than biomass-based diesel and cellulosic fuels. The law was drafted to specifically designate Brazilian ethanol with its significant greenhouse gas reductions as an advanced biofuel so as not to take gallons away from first generation ethanol.

The second and third slides represent two distinct advanced biofuel technologies of different types of fuels other than ethanol. As you can see from the charts, these fuels have dramatically different volatility ranges. The volatility of a particular fuel is significant for two important reasons. First, it affects the components a refinery must remove from the base blend fuel, which then impacts the fuel cost to the consumer now and in the future. Second, the higher the volatility parameter it has, the greater the potential for a particular renewable fuel to negatively impact environmental performance and backslide under the Clean Air Act on ground level ozone. As we move forward, advanced biofuels other than ethanol can address these concerns. Not only are they on a short developmental time frame, they can also be made in existing ethanol plants. In sum, all fuels are not created equal and the types and amounts of the particular fuels that may move forward could have a dramatic impact on our ability to maintain attainment in a number of areas across America.

Second, there are significant advanced biofuels technologies that are not cellulosic. In the attached packet, I have included a slide on renewable types of diesel. As you can see, there are a variety of different manners in which one can make diesel utilizing a diverse range of feedstocks to make what essentially is a totally fungible molecule as if it came from a barrel of oil. For most of these technologies, the renewable diesel will meet the existing standard specification for diesel fuels, ASTM D975. We applaud the Congress for the manner in which it constructed the biomass-based diesel provision contained in EISA 2007 because it is both technology and feedstock neutral, allowing all second generation renewable diesel fuels an opportunity to contribute over time to the market.

Here, I would like to make two additional points on technology. First, there are a number of advanced technologies now being developed to make biodiesel as well as renewable diesel. And second, in addition to the efforts on diesel and jet fuel, I would be remiss not to also mention that on the gasoline side of the equation, a number of diverse technologies using a range of feedstocks are also planning to make a totally fungible substitute gasoline molecule or a range of molecules which would meet the standard specification for gasoline, ASTM 4814.

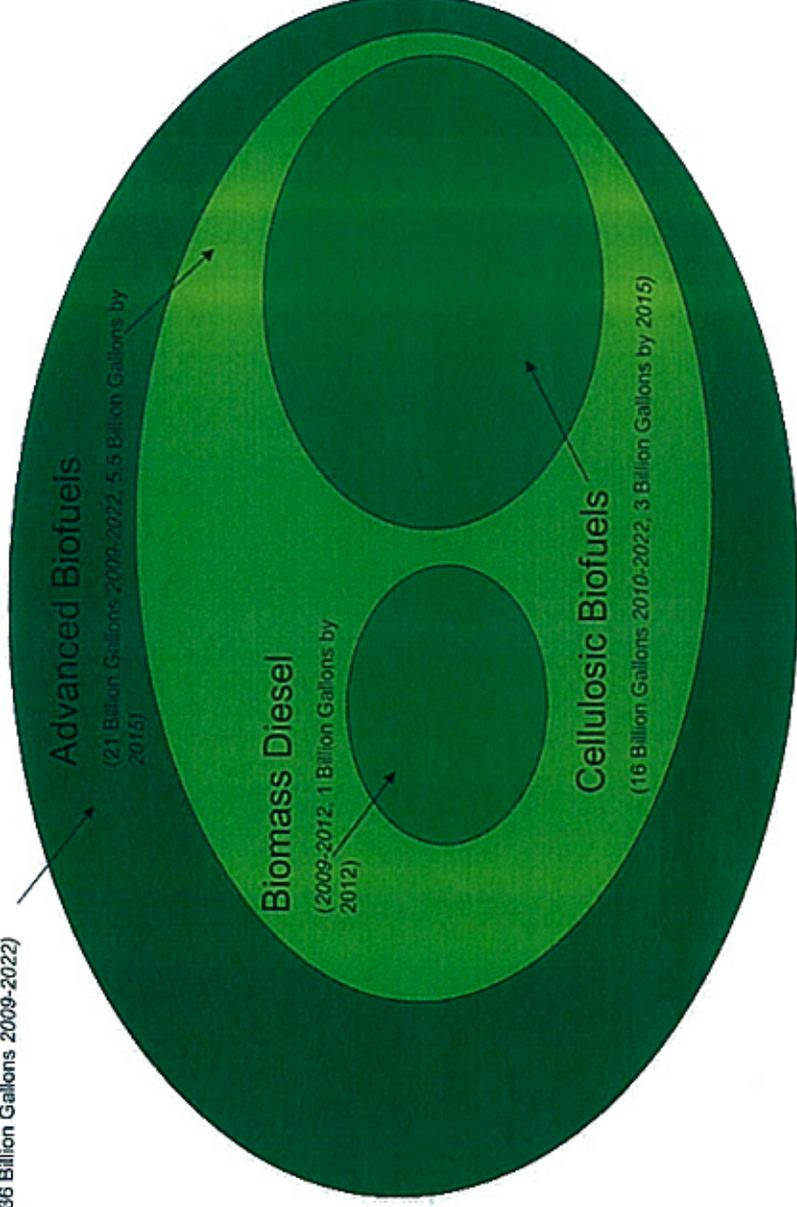
To illustrate the third and fourth points of this testimony, many second generation companies, including a majority of Association members, will make a molecule which is not ethanol and which could be made from existing commercial feedstocks from around the world other than cellulosic material. For many of the cellulosic companies their mission is to turn cellulosic biomass into a sugar feedstock. Should the cellulosic industry be able to convert the large volumes of available material into commercially competitive sugar-based feedstocks, many of these companies would welcome the opportunity to combine their respective technologies to produce advanced fuels. Until such time as those cellulosic companies are able to provide commercially competitive feedstocks, we urge the Committee to allow the continued development of various advanced technologies from today's affordable feedstocks. Given the current economic realities and credit markets, it is crucial for these companies to have flexibility in terms of their ability to utilize all feedstocks and to do so in a manner where they may be eligible for Department of Energy Research and Development funding in the same manner as the cellulosic companies.

Lastly, given that this hearing is an oversight hearing on the RFS rulemaking currently pending, I wanted to make a couple of personal remarks about the division of EPA which has been working on this rule. Over the past 20 years, I have personally had the opportunity to work with the Office of Mobile Sources on a variety of issues ranging from the 1990 Clean Air Act to the low sulfur diesel rule. This is one of the most dedicated and talented group of people we have in our government. They understand these issues and they have a long track record of delivering tough but fair solutions to the challenges of fuels, engines, and air quality. Clearly, there will be much to debate in the upcoming rulemaking, the current proposed lifecycle and indirect land use provisions, how to construct an appropriate methodology to reward more energy dense and environmental friendly fuels, to name just a couple of issues. But it is time to get on with the work, and we would urge the Administration to get on with the open comment period on the rule and to allow the market to respond. The disagreements should be aired in a public process where science, not politics, drives the process!

Thank you for the opportunity to testify before you today, I look forward to answering your questions.

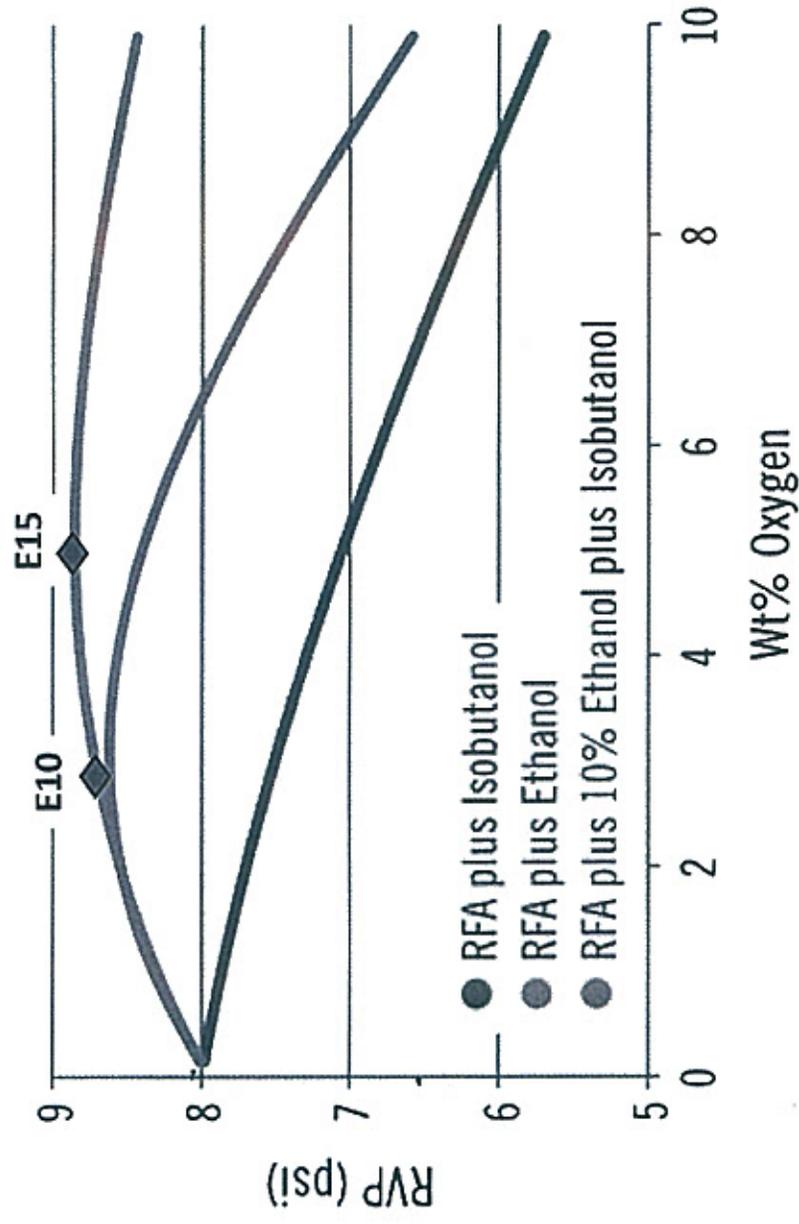
# New Renewable Fuel Standard

The Renewable Fuel Standard  
(36 Billion Gallons 2009-2022)



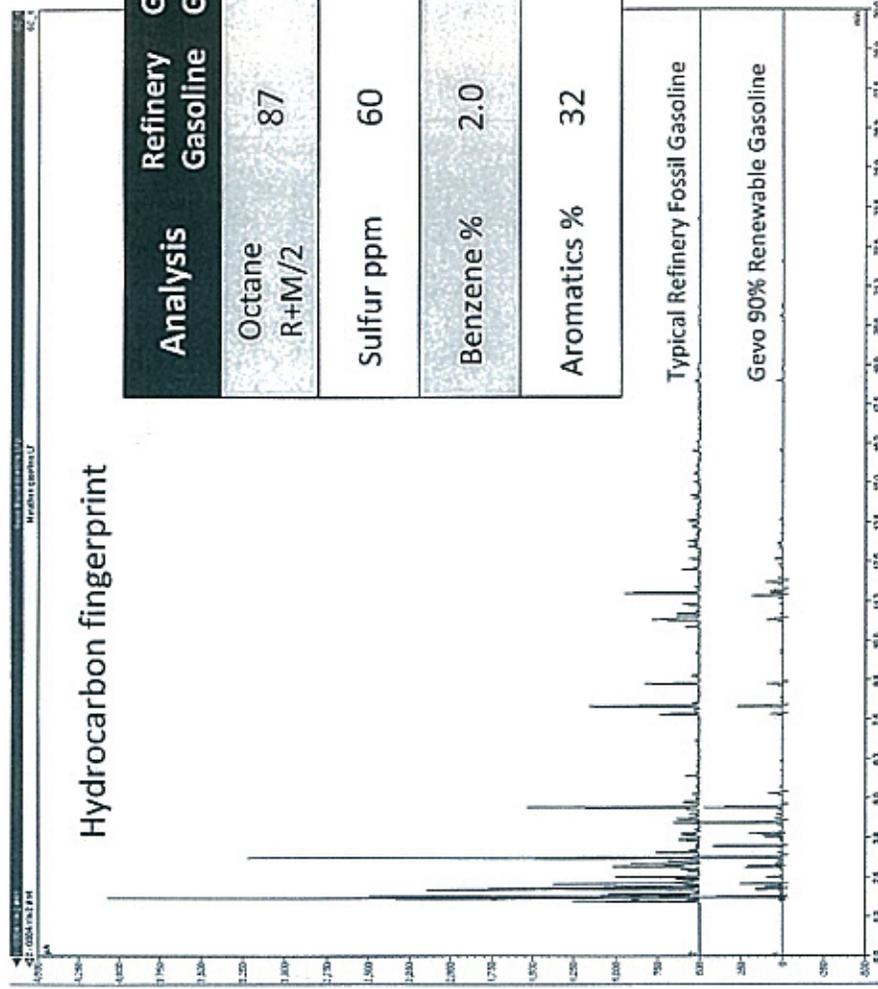
## Isobutanol Lowers RVP in Gasoline

Lower RVP is better for air quality attainment



RFA is a reference gasoline used for blending studies

# Renewable Gasoline that meets ASTM Specs



Analysis	Refinery Gasoline	Gevo Gasoline
Octane R+M/2	87	>100
Sulfur ppm	60	<1.0
Benzene %	2.0	<0.1
Aromatics %	32	20

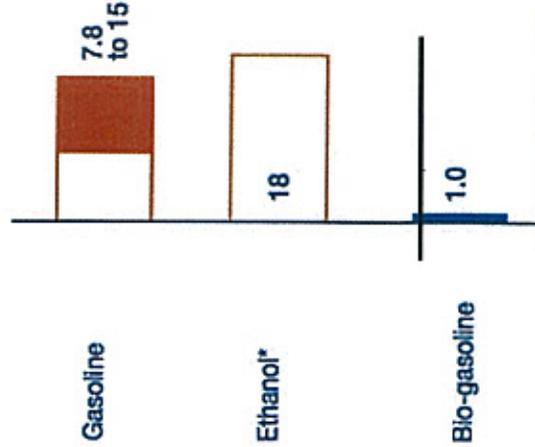
Typical Refinery Fossil Gasoline

Gevo 90% Renewable Gasoline

# Bio-Gasoline Performance Attributes

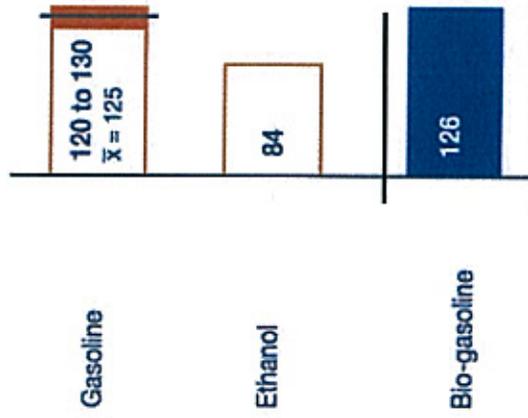
Best in class vapor pressure results in less VOCs and/or enables us of low cost blending components

Vapor Pressure max, psi



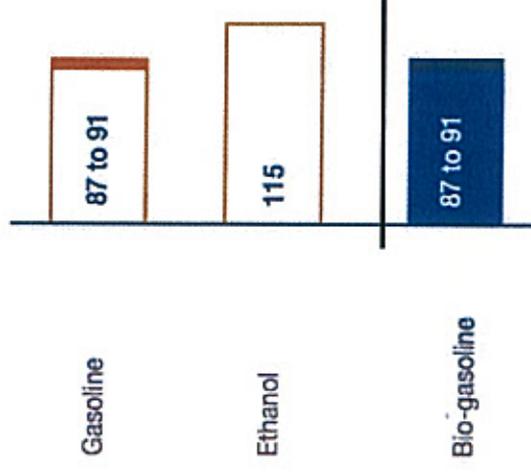
Provides equivalent mileage as gasoline

Energy Density 1000 BTU per gallon



Provides equivalent octane as gasoline

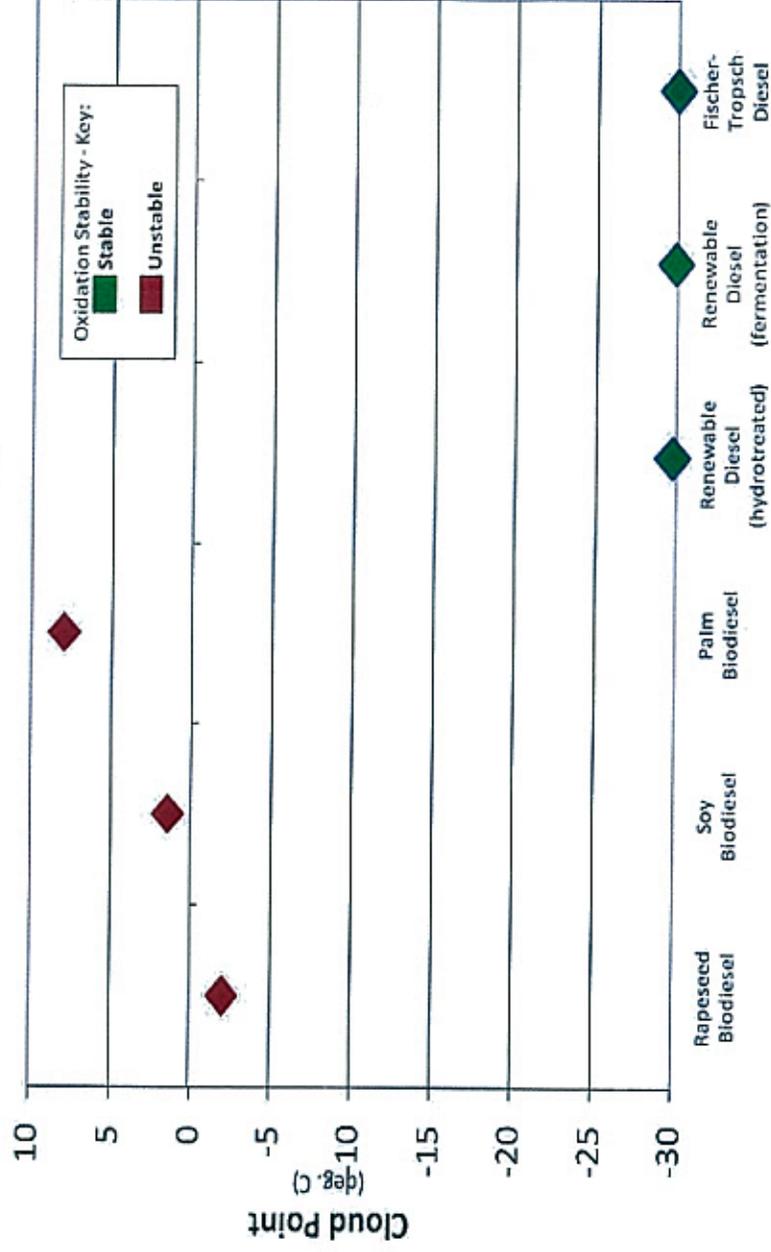
Octane



# Renewable Diesel Alternatives

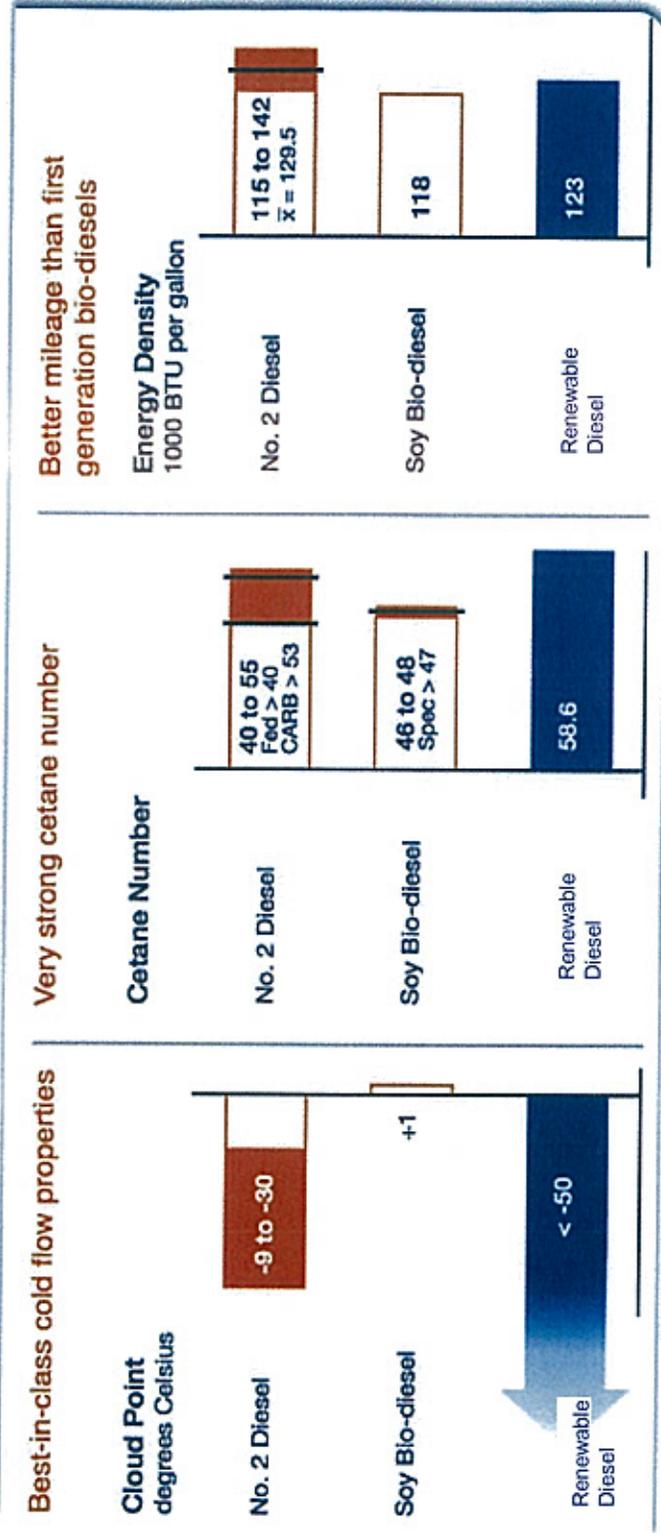
Feedstock Preferred	Product	Application	Timeframe
Vegetable Oil	Biodiesel (methyl-ester)	On-road diesel (splash blend, 2% blend)	Available Today
Animal Fat	Renewable Diesel (uncatalyzed TDP)	Bunker fuel, heating oil	Available Today
Animal Fat	Renewable Diesel (co-processed catalyzed TDP)	On-road premium (pipeline, 10% blend)	Available Today
Animal Fat	Renewable Diesel (stand alone catalyzed TDP)	Jet fuel, DoD, on-road premium (pipeline, 100% bio)	Available Today
Sugar (corn, sugar cane, cellulose)	Renewable Diesel, Blending component (fermentation)	On-Road High Cetane, Jet Fuel (pipeline)	2010
Animal fats and oils	Diesel Substitute (Emulsion)	Heating Oil, Distillate, and Marine Diesel, (100%)	Available Today
Biomass (animal fat, vegetable oil, litter, wood chips, etc.)	Renewable Diesel (BTL)	Jet Fuel, On-Road Highs Cetane (pipeline)	2010

# Next Generation Technologies Have Improved Product Attributes (Diesel – Cold Flow & Stability)



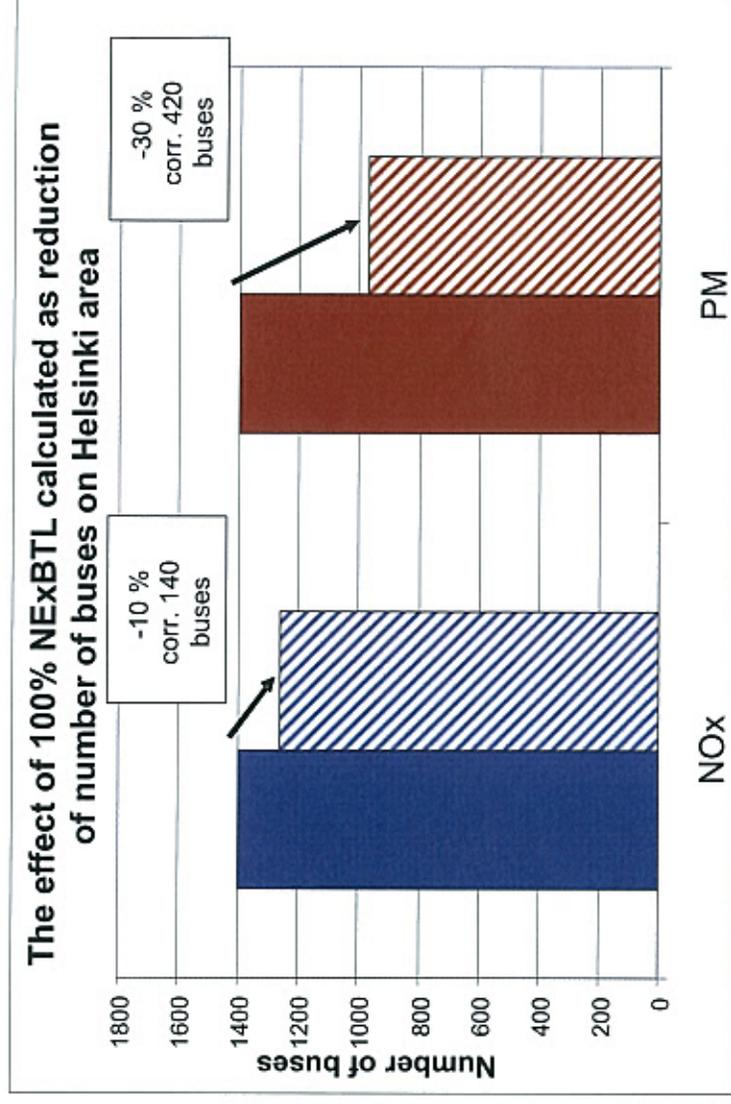
# Biodiesel VS Renewable Diesel

## Performance Attributes



## RESULTS 2007-2008

- Average emission reductions with 100% NExBTL diesel (in comparison to 10 ppm S diesel fuel):
  - NOx-emissions approx. -10 %
  - PM-emissions approx. -30 %
  - CO-emissions approx. -35 %
  - THC-emissions approx. -40 %
  - Energy consumption approx. - 0,5%
  - Volumetric fuel consumption approx. +4% (as a result of lower density with 100 % NExBTL)



The effect of NExBTL diesel on emissions correlates linearly with the concentration

There are approximately 1400 urban buses in the Helsinki metropolitan area