



Co-Chair Edward Meyer
Co-Chair Richard Roy
Senator John McKinney
Representative Clark Chapin

Members of Environment Committee:

I am submitting testimony in **support of S.B. 382, AN ACT REQUIRING BIODIESEL BLENDED HEATING OIL AND LOWERING THE SULFUR CONTENT OF HEATING OIL SOLD IN THE STATE.**

The Independent Connecticut Petroleum Association (ICPA) represents 564 petroleum marketers and their associated business in Connecticut. ICPA members employ over 13,000 people in our state and provide 682,000 Connecticut residences with 500 million gallons of heating oil each year.

In 2006 we came before this committee in opposition to a bill that would require a low sulfur heating oil mandate. We supported a cleaner fuel, but at that time the 600 family owned retail heating oil dealers were not assured that the traditional points of supply (New York, Massachusetts and Rhode Island), where they pick up fuel, would have the Connecticut-mandated fuel that was being proposed in the bill. At that time, ICPA proposed an amendment that was passed in to law (PA 06-143) that protected heating oil dealers and the consumers that they serve by requiring that fuel specification changes made in Connecticut had to be similarly done in our neighboring states. Additionally, ICPA committed to Chairman Roy and the members of the committee at that time, that we would return if circumstances were to change that would allow a switch to a lower sulfur heating oil.

Today we return to propose the changes to the specification of heating oil that we began discussing in 2006.

More than a decade ago under federal mandate, the sulfur content in diesel fuel was slated for substantial reduction. The reductions fall into two categories; on-road diesel fuel reduced to 15ppm sulfur and that was substantially accomplished in 2005, and then off-road diesel and that category of reductions also reaches 15 ppm sulfur by 2014, as the attached chart lays out.

The only part of the distillate stream not slated for sulfur reduction by federal mandate is heating oil, and heating oil is slightly less than 2% of the distillate demand in the country today - a very small amount.

There are two key questions, which we have dealt with for more than a decade here, to be answered in consideration of our proposal before you today.

1. Is there sufficient supply of the ultra-low sulfur product, 50ppm sulfur product from July of 2011 through July of 2014, and then 15ppm sulfur product from July 2014 forward; and
2. What are the price implications for consumers of the change in specification that we recommend.

On the matter of the first question, with us here today is Mr. Kevin Lindemer, an energy expert and consultant who has performed an in-depth study for the National Oilheat Research Alliance, who will provide expert and independent testimony addressing the question of the availability of the ultra-low sulfur diesel supply issue.

We are pleased to report that in 2009, 220,000 barrels per day (bpd) or over 80 million barrels per year of ULSD was produced here in the United States and then exported overseas, principally to Europe and South America. Connecticut needs a very tiny percentage of those exports to remain here in the United States for our use as a heating fuel. To anyone coming before you today or while this legislation is being considered and suggests some harm will come from this mandate - remind them that the United States is a net exporter of ULSD and we're only asking for a small quantity to be left here in Connecticut as it is being shipped out of the country.

If Connecticut were renamed Mexico or Germany we could get this fuel. S.B. 382 keeps a small portion of U.S. exports of ULSD in Connecticut, so that we can enjoy the same benefits that many South American and European nations enjoy.

On the matter of the second question, price impacts, Mr. Lindemer will present that the net effect of this switch in ULSD will result in a savings to consumers.

This legislation in NO WAY affects the fuel supply that the trucking industry relies on. All this bill does is use a small amount of the ULSD that we send to other countries for our use in our state. If ULSD is good enough for South America and Europe it is good enough for Connecticut!

The refining industry has been gearing up for nearly a decade to meet federal requirements for ULSD (*see attached Clean Diesel Fuel Alliance*). In fact, federal law already requires all refiners to produce 15ppm fuel for off road use by 2014. S.B. 382 takes a similar approach for Connecticut and leaves no doubt that this proposal is attainable without any difficulty for the refining industry.

Examine that chart carefully. Understand that the entire on-road diesel demand has already been switched to ULSD/15ppm fuel. The remaining off-road diesel demand, a far smaller share than on-road, completes its transition to ULSD/15ppm in 2014.

In 1981 America had over 350 domestic oil refineries. Today it has 149. Refineries have been closing in this country for thirty years and production consolidated into larger, more efficient refineries. The world has been moving, gradually, away from gasoline and toward the ultra-low sulfur diesel product we are discussing here today. Refineries where the investment to produce ULSD, given the cost of production each marginal barrel results in a sensible return on investment, have been expanded to produce more ULSD. Those older, less efficient refineries where marginal production doesn't merit investment, are closed. Given the 220,000 barrel per day exports of ULSD, nothing we do here today is going to effect the life of a refinery in America, other than send an important market signal that the last remaining part of the middle distillate pool that was forgotten by Washington, heating oil, gets to be cleaned up too.

Every environmental improvement in fuels has resulted from legislative mandate. Our industry seeks to have clear market signals from a marketplace so that producers know what to produce and in what quantities - switching fuel specifications doesn't just happen - it needs to be led. We came here today to lead. Connecticut mandating ULSD for heating plugs our state into a world-wide production of this same product and adds to our energy security as a result.

Another component of this bill would require the use biodiesel in heating oil - a renewable fuel content that begins at 2 percent and scales up to 20 percent by the year 2020. As we move through this transition we will eventually be taking 100 million gallons of traditional, ULSD petroleum out of our market and replacing it with clean, renewable agricultural fuels that are domestically produced and strongly supported by mandates found within the 2005 and 2007 federal Energy Policy Acts and reaffirmed by Congress just this week.

Joining us here today is Mr. Michael Devine on behalf of the National Biodiesel Board to discuss the nation's available bio supply, its price and competitiveness, as well as the recently announced federal EPA Renewable Fuel Standard/2 that deals with issues such as lifecycle analysis and biodiesel's use in our economy. We also are pleased to have the Connecticut Biofuels Association here to discuss our own state's biofuel production that is important to this legislation.

The language in this bill takes a similar approach to a renewable fuel mandate as the original multi-state sulfur law we discussed in 2006 and earlier today.

Protecting heating oil retailers and their customers needs to remain a priority. S.B. 382 mandates the use of biodiesel when we can obtain it in New York, Massachusetts and Rhode Island. There is already a mandate for biodiesel in Massachusetts.

Ultimately, this bill will produce the cleanest fossil fuel-based heating fuel in America. A ULSD/20% biodiesel combination reduces the sulfur content of heating oil by 99.93% - from 3000ppm to 15ppm. We begin with a reduction from 3000ppm to 50ppm sulfur in July of 2011 through July of 2014, and then reduce further to 15ppm sulfur in July of 2014, exactly when the rest of the middle distillate pool subject to the ULSD standard needs to also reach 15ppm sulfur.

This reduction in sulfur would leave heating oil with a sulfur content that is 75% less than natural gas. When ULSD and biodiesel are used together heating oils carbon footprint is reduced an additional 30%.

The environmental benefits of a ULSD biodiesel used for heating purposes are undeniable (*see attached CT Full Fuel Efficiency & Carbon Emission*). Supply is good, prices are competitive and the Connecticut-based independent petroleum industry is ready to keep their customers warm with this new, clean renewable fuel.

We ask that the Environment Committee lead the nation by bringing the cleanest heating fuel in America to Connecticut by **supporting S.B. 382, AN ACT REQUIRING BIODIESEL BLENDED HEATING OIL AND LOWERING THE SULFUR CONTENT OF HEATING OIL SOLD IN THE STATE.**

Respectfully,

Eugene A. Guilford Jr.
President

Connecticut Full Fuel Cycle Efficiency and Carbon Emissions

Residential Hydronic Heating and Domestic Hot Water Systems

Energy Efficiency and Life Cycle Carbon Emissions

A Consortium of State Oilheat Associations commissioned a Greenhouse Gas Project to study¹ the full fuel cycle efficiency to determine the energy efficiency and GHG emissions impact for hydronic heating systems which also provide domestic hot water. The research concluded that focusing on sustainability in the built environment requires life cycle assessments of operational building energy systems. Sustainable energy production and consumption should also require life cycle assessments from wellhead to burner tip.

Fuel Mix

Connecticut is projected to experience significant changes in its natural gas supply mix by 2020. Connecticut will see a significant decrease in gas from Western Canada and the Gulf Coast, increase in gas from the Rocky Mountains, Midcontinent and the Southwest, increase of Gulf Coast LNG and LNG shipments into regional terminals.

Fuel Cycle Emissions

Figure 1 shows the fuel cycle emissions in pounds of CO_{2e} per MMBtu of fuel delivered (not including end-use equipment efficiency) for each fuel type in 2006 and 2020. This graph provides CO_{2e} emission up to the burner tip and gives an emissions impact understanding of potential changes in fuel mix between 2006 and 2020. Marginal comparisons between heating oil and biofuel blends should be made versus the marginal LNG supply. Figure 1 shows that delivered bio-blends can provide less CO_{2e} emissions than marginal LNG without taking into account system efficiencies.

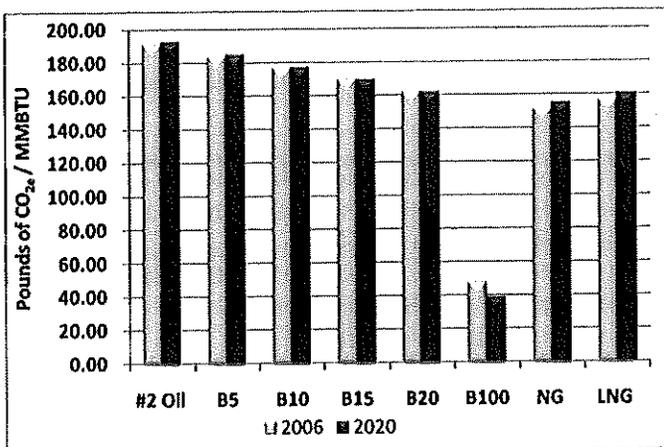


Figure 1 - Connecticut Fuel Cycle Emissions

System Energy Efficiency (Resource Conservation)

Brookhaven National Laboratory² (BNL) developed an accurate method to determine system efficiency for integrated heating and domestic hot water residential systems³. The BNL model is more accurate in predicting actual building heating and DHW performance and the commonly used AFUE methodology. Three boiler configurations were examined: an average boiler currently sold, a high efficiency boiler and a condensing boiler. The comparison was performed on a 2,500 ft² ranch home with a basement with typical "code" construction. Figures 2 and 3 provide the total annual resource energy requirements to provide heating and hot water services to the modeled 2,500 square foot house (including energy use along the fuel cycle and end use equipment efficiency). Total energy requirements to provide the annual heating and hot water services is higher for natural gas for both the average, high efficiency non-condensing units in 2006 (Figure 2), reflecting two important factors: 1) large amount of Gulf Coast and Western Canadian gas supply, and 2) the appliance and system efficiency advantage oil and biofuel blends have versus natural gas and LNG through less water content⁴.

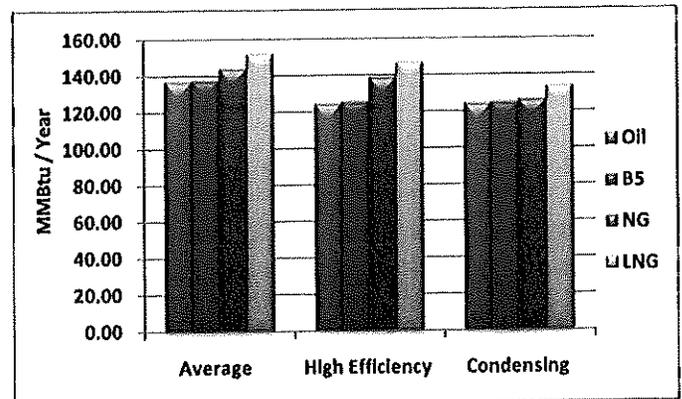


Figure 2 - 2006 Fuel Cycle Energy

Figure 3 shows that ultra low sulfur diesel (ULSD) and B20 have higher source energy efficiency than the natural gas supply and marginal LNG across the board in 2020.

² Performance of Integrated Hydronic Systems, Project Report, May 1, 2007, Thomas A. Butcher, Brookhaven National Laboratory.

³ AFUE leads to low estimates of the energy savings potential of modern, integrated systems, particularly where advanced controls are used.

⁴ With respect to current non-condensing appliances - natural gas maximum boiler AFUE efficiency is 83% and oil maximum boiler AFUE efficiency is 88% with the reason for this differential being the water content in the fuel and resultant combustion gas dewpoint affecting performance.

¹ "Final Report Resource Analysis of Energy Use and Greenhouse Gas Emissions from Residential Boilers for Space Heating and Hot Water", Bruce Hedman and Anne Hampson, ICF International, August 2008.

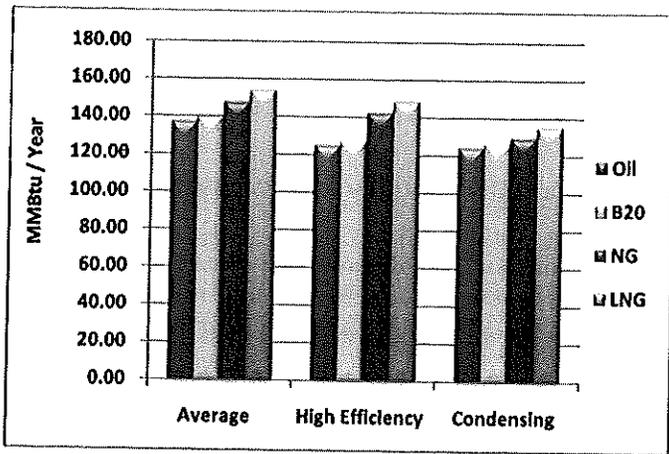


Figure 3 - 2020 Fuel Cycle Energy

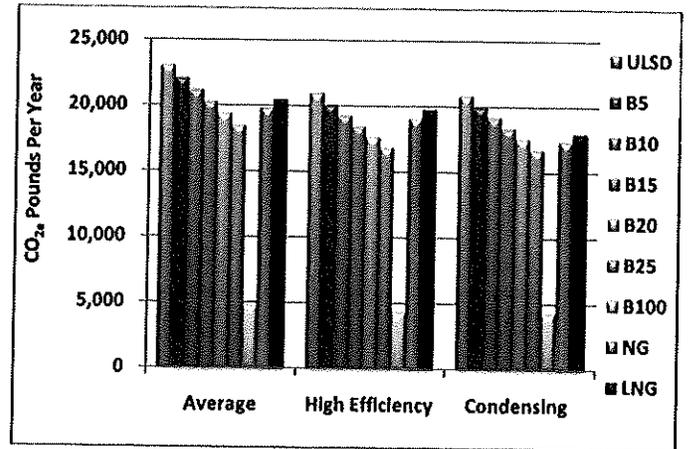


Figure 5 - 2020 Annual CO_{2e} Emissions In Pounds per Year

Life Cycle Emissions Comparison

Figures 4 and 5 show a condensing boiler using marginal LNG supply produces 8% less CO_{2e} per year than heating oil in 2006 and only 6% less CO_{2e} emissions than ULSD in 2020. Remarkably, if you compare a high efficiency non-condensing boiler using LNG supply you find it produces 4% less CO_{2e} per year than heating oil in 2006 and 2% more CO_{2e} emissions than ULSD in 2020. In 2006, a high efficiency B10 boiler produces the same CO_{2e} emissions per year as a high efficiency boiler using LNG and in 2020 a condensing B20 (ULSD) boiler produces 2% less CO_{2e} emissions per year than a condensing boiler using LNG.

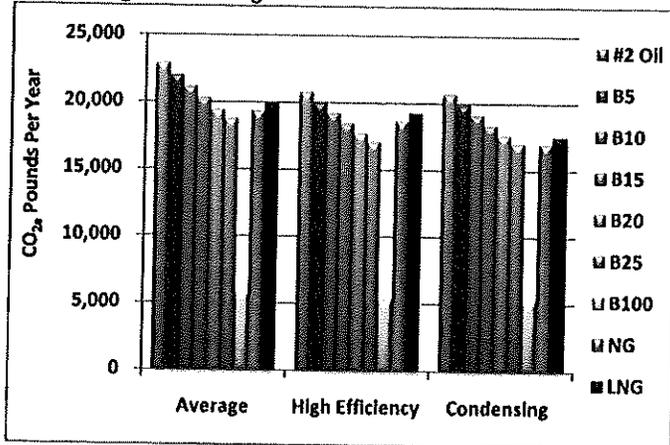


Figure 4 - 2006 Annual CO_{2e} Emissions In Pounds per Year

Life Cycle Emissions Planning

Fuel delivery characteristics will vary dramatically over time, as supply sources vary and sustainable alternatives enter the market, creating complexity regarding fuel switching policy designed to reduce carbon emissions. Figure 6 assumes a linear shift in emissions from 2006 to 2020. The liquid fuel bio-blend (between B10 and B15) is projected to emit less CO_{2e} emissions than LNG going forward from around 2015 based upon this projection.

Clearly, today's policies and regulations must take future fuel diversity into account to prevent unintended consequences and to deliver the lowest potential emissions solutions.

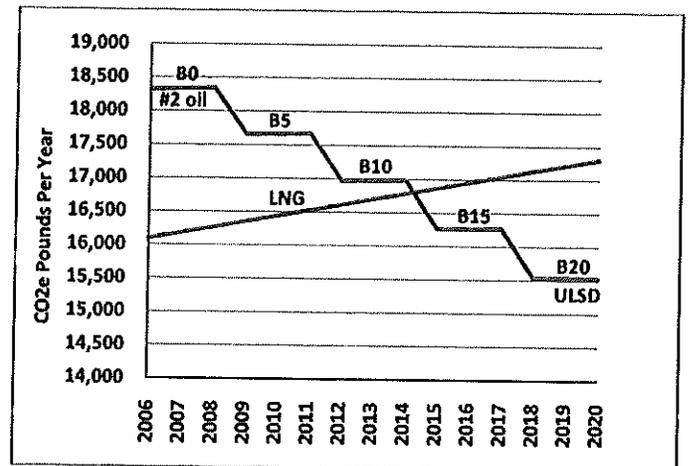


Figure 6 - Emissions for a High Efficiency Boiler over Time

Conclusions

Resource energy analysis and full fuel cycle emissions analysis are more comprehensive and accurate methods to assess the total energy and emissions impacts of residential energy consumption. Site energy analysis only takes into consideration the ultimate consumption stage. Significant energy is consumed, with resulting CO_{2e} emissions, during all stages of energy use.

There are strong energy and environmental reasons, for combined hydronic heating and DHW systems, to encourage the development and/or use of:

- Sustainable biofuels – B5 today, B10 in the near future and B20 as supply and technology permit
- ULS Diesel as it becomes available
- High efficiency non-condensing oil-fired boilers
- Condensing gas and oil-fired boilers

Care should be taken selecting policy approaches that provide either regulatory mandate or consumer incentive to change behavior that may foreclose future innovation. Eliminating oilheat dealers of today will also eliminate the B20 dealers of tomorrow.

<http://www.clean-diesel.org/nonroad.html>



Locomotive, marine and non-road diesel fuel standards begin at later dates (except in California).

EPA fuel standards for locomotive, marine and non-road diesel fuel engines and equipment, such as farm or construction equipment, become effective at dates later than those for highway vehicles:

- Diesel fuel intended for locomotive, marine and non-road engines and equipment is required to meet the Low Sulfur Diesel fuel maximum specification of 500 ppm sulfur in 2007.
- By June 2010, the ULSD fuel standard of 15 ppm sulfur will apply to non-road diesel fuel production.
- Beginning in 2012, locomotive and marine diesel fuel must meet the ULSD fuel standard of 15 ppm sulfur.

[Click here for EPA Winterization Standards Letter 11-30-07 \(PDF\).](#)

[Click here for Non-road ULSD Use Fact Sheet \(PDF\).](#)

[Click here for Non-road Diesel Pump Labels \(PDF\).](#)

Non-road Diesel Fuel Standards										
Who	Covered Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014
Large Refiners & Importers	NON-ROAD	500+ ppm	500 ppm	500 ppm	500 ppm	15 ppm				
Large Refiners & Importers	LOCOMOTIVE & MARINE	500+ ppm	500 ppm	500 ppm	500 ppm	500 ppm	500 ppm	15 ppm	15 ppm	15 ppm
Small Refiners & Other Exceptions	NON-ROAD, LOCOMOTIVE & MARINE	500+ ppm	500+ ppm	500+ ppm	500+ ppm	500 ppm	500 ppm	500 ppm	500 ppm	15 ppm
<p><u>Except in California</u>, compliance dates for Non-Road, Locomotive and Marine fuels in the years indicated are: June 1 for refiners and importers, August 1 downstream from refineries through fuel terminals, October 1 for retail outlets, and December 1 for in-use.</p>										
<p><u>In California</u>, all diesel fuel transitioned to ULSD in 2006. Locomotive and Marine diesel fuels were required to transition to 15 ppm ULSD effective January 1, 2007.</p>										

