

---

**New England Railroad Club  
Mechanical & Purchasing Night  
January 26, 2006**

Fuels for Locomotives

Steven J. Levy  
Sprague Energy

---

# What is driving fuel choice?

- 
- Environmentalists
  - Federal regulations
  - State legislation
  - Local legislation
  - Consent Decrees
  - Energy dependence

---

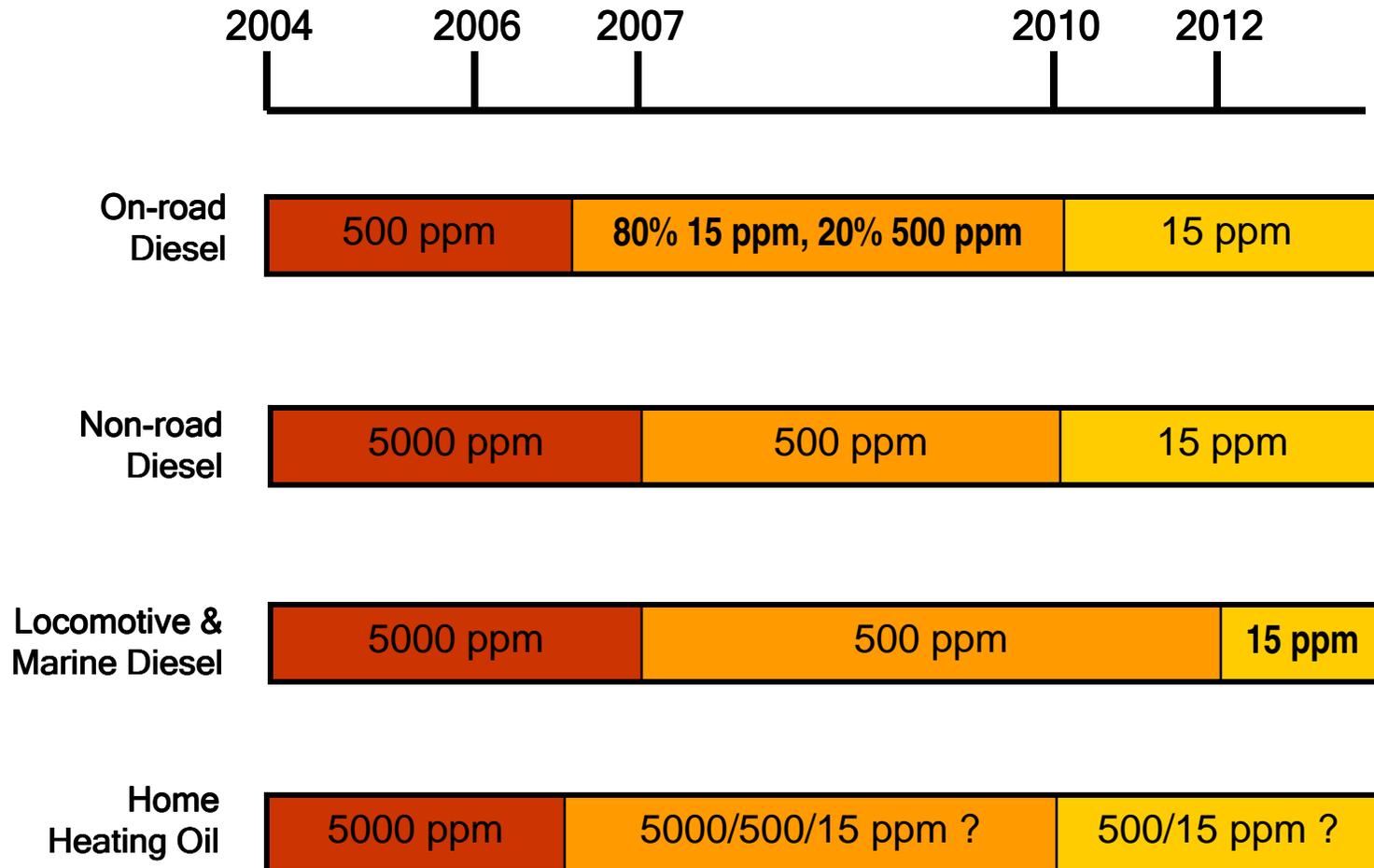
Countries throughout the world are moving to lower sulfur fuels to reduce worldwide emissions

# What is Currently Happening?

---

Sulfur Level
50,000 ppm
5,000 ppm
2,000 ppm
500 ppm
<b>15 ppm</b>

# Low Sulfur Diesel Regulations





**Sprague**   
DEMAND MORE THAN SUPPLY

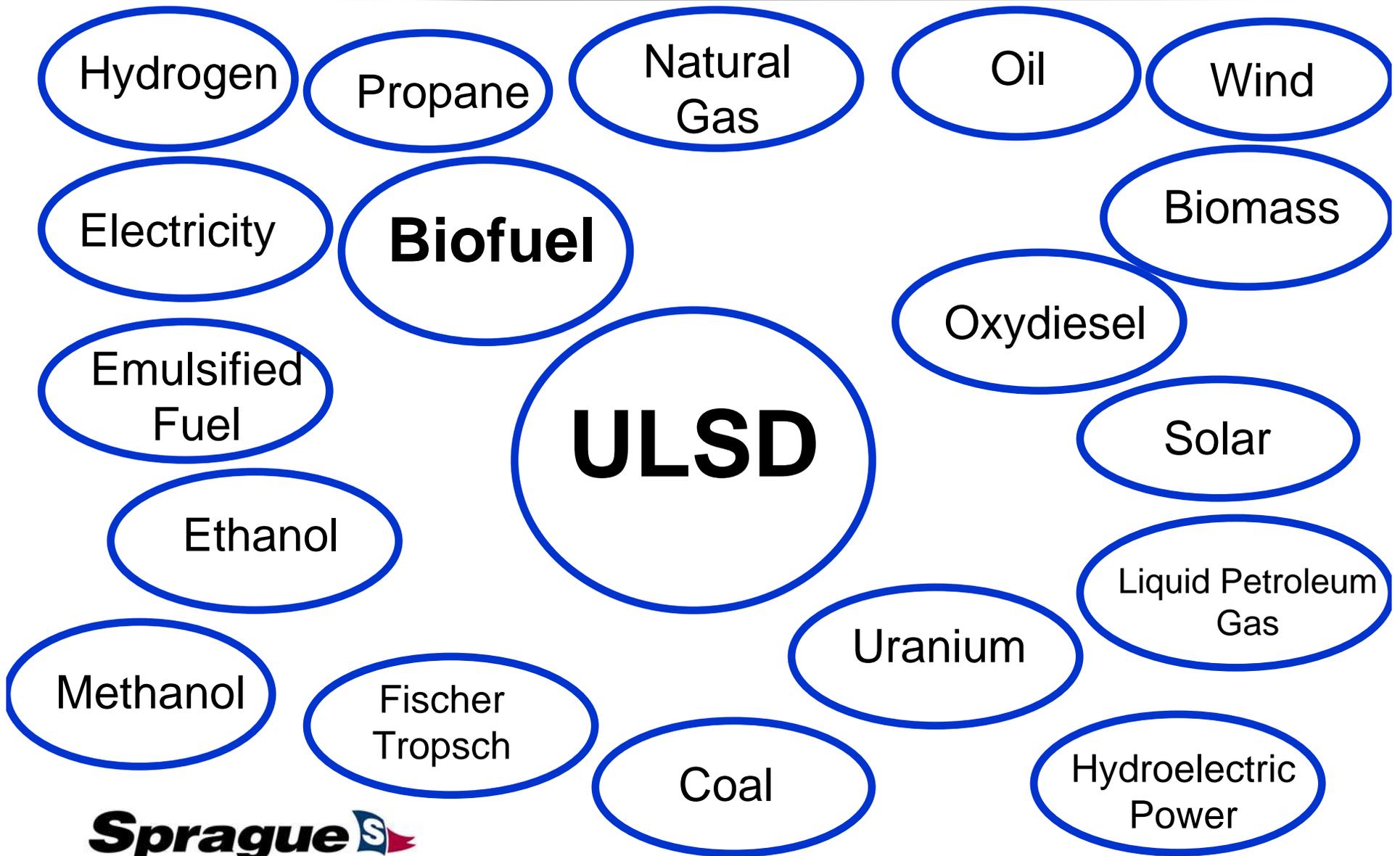
# Obstacles to Alternative Fuels

---



- Availability of supply
- Lack of a fueling infrastructure
  - Infrastructure cost
  - Cost to supply fuel
  - Lack of demand
- Equipment range limitations
- New equipment cost and availability
- Equipment cost of conversion
- Fuel Cost
- Lack of experience, education, training, etc.

# Fuel Alternatives



# Why ULSD

---

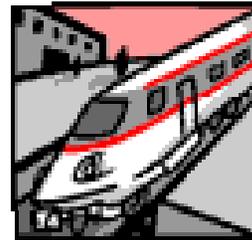
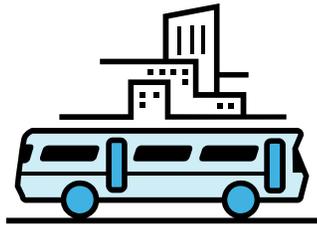
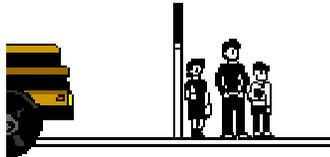
- Environmental acceptance
- Meets EPA regulations
- Immediate emission reductions
- Enabler to new emission reduction technology
- Supply readily available
- Unlike other alternative fuel options, ULSD has no infrastructure or fleet changes/modifications
- Least costly alternative fuel option
- Meets/exceeds OEM fuel specifications
- Most ULSD, we know Sprague's does, exceeds ASTM and engine manufacturers' lubricity specifications

# ULSD Applications

---



ULSD Typical  
Applications



# ULSD Proven Emission Reductions\*

	ULSD Base Fuel Only	ULSD with DPF Retrofit **
THC	76%	92%
CO	29%	94%
PM	23%	88%

**KEY:**

PM = Particulate Matter  
CO = Carbon Monoxide  
THC= Total Hydrocarbons

\*Society of Automotive Engineers, Inc. 2001-01-0511:

“Performance and Durability Evaluation of Continuously Regenerating Particulate Filters on Diesel Powered Urban Buses at New York City Transit”

\*\* 99% reduction in PM particle counts across all size ranges, including the smallest particles.

# Lubricity Standards

---

	Standard
American Society for Testing and Materials D6079 High Frequency Reciprocating Rig ASTM HFRR D6709	520 microns
Engine Manufacturers' Recommendation	460 microns
Sprague	<420 microns Typical 360

# User Experience with ULSD

---

## Operability

- No measurable difference in equipment performance
- Easy to switch from engine perspective
- May be used in older equipment – no need to store two fuels

## Fuel Performance

- Current refinery production of ULSD does not meet engine manufacturers lubricity specifications
- Fuel meets/exceeds engine manufacturers' specifications and warranty using lubricity additive
- Utilize a unique synthetic additive for all temperature variations

## Supply & Distribution

- Although the use of these fuels is transparent to the end user, transporting fuel to end user with minimal or no contamination is a challenge
- Requires segregated product at fuel terminals, pipelines, racks and delivery trucks
- At this time cannot use pipeline for transportation

# Why Biofuel

---

- Energy Dependence
- Emission benefit with higher sulfur fuels
- Economical in conjunction with tax incentives and high conventional fuel costs
- Renewable
- Stimulates economy

# What to Look for in a Supplier?

---

- Supply agreement which provides ULSD from a minimum of two refineries producing the product to ensure finished product availability
- To be actively engaged in the supply and delivery of ULSD or some other specialty product for a minimum of two years
- Multiple storage terminals for storage backup and delivery
- Minimum of thirty days inventory
- Segregated delivery transports with back-up segregated transports to insure quality product delivery in case of transport downtime and emergency
- Quality Control Program to insure product integrity and immediately provide on request test results for lubricity and other product specifications
- Product specifications for lubricity and calculation methodology
- Confirmation process to ensure product meets sulfur and lubricity standards

## Others Who Have Switched to ULSD

---

- MTA New York City Transit Authority
- Massachusetts Bay Transportation Authority
- City of Boston Public Schools
- Massport
- New Jersey Transit
- Rhode Island Public Transit Authority
- Connecticut Transit
- Southeastern Pennsylvania Transportation Authority
- City of New York
- City of Philadelphia
- City of New Haven
- Con Edison
- Wyeth
- City of Medford
- State of New York

## What Action Can You Initiate Now?

---

- Move to a lower sulfur fuel, preferably ULSD
- Blend with biofuel
- Install emission control devices
- Re-address bid procurements
  - Contract preferences
  - Contract allowances
  - Port lease specification
- Adopt an Environmental Management System (EMS)
  - Improved community relations and public image
  - Cost savings
  - Improved environmental compliance
  - Improved internal communication
  - Integration of environmental and security risk management
  - Increased competitive and market opportunities

## Want More Involvement?

---

- U.S. Environmental Protection Agency
- NESCAUM
- Department of Environmental Protection
- Environmental Defense
- Greater Boston Breathes Better
- Philadelphia Diesel Difference
- Federated Conservationists of Westchester County
- Sprague

# A Cleaner Future Starts Today



## Contact Information

---

### Steven J. Levy

Sprague Energy

4 New King Street

White Plains, NY 10604

Phone: 914.328.6770

Toll Free: 877.723.3425

Fax: 914.328.6701

Email: [slevy@spragueenergy.com](mailto:slevy@spragueenergy.com)

[www.spragueenergy.com](http://www.spragueenergy.com)