# Fuels & Lubricants R&D

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Team Lead


# The Federal Role



- Undertake High-Risk Mid- to Long-Term Research
- Utilize Unique National Lab Expertise and Facilities
- Help Create a National Consensus
- Work Cooperatively with Industry
- Reduce/Displace Petroleum Use

# Fuel & Lubricants Mission



## Why do we have a fuels and lubricants activity in VTP?

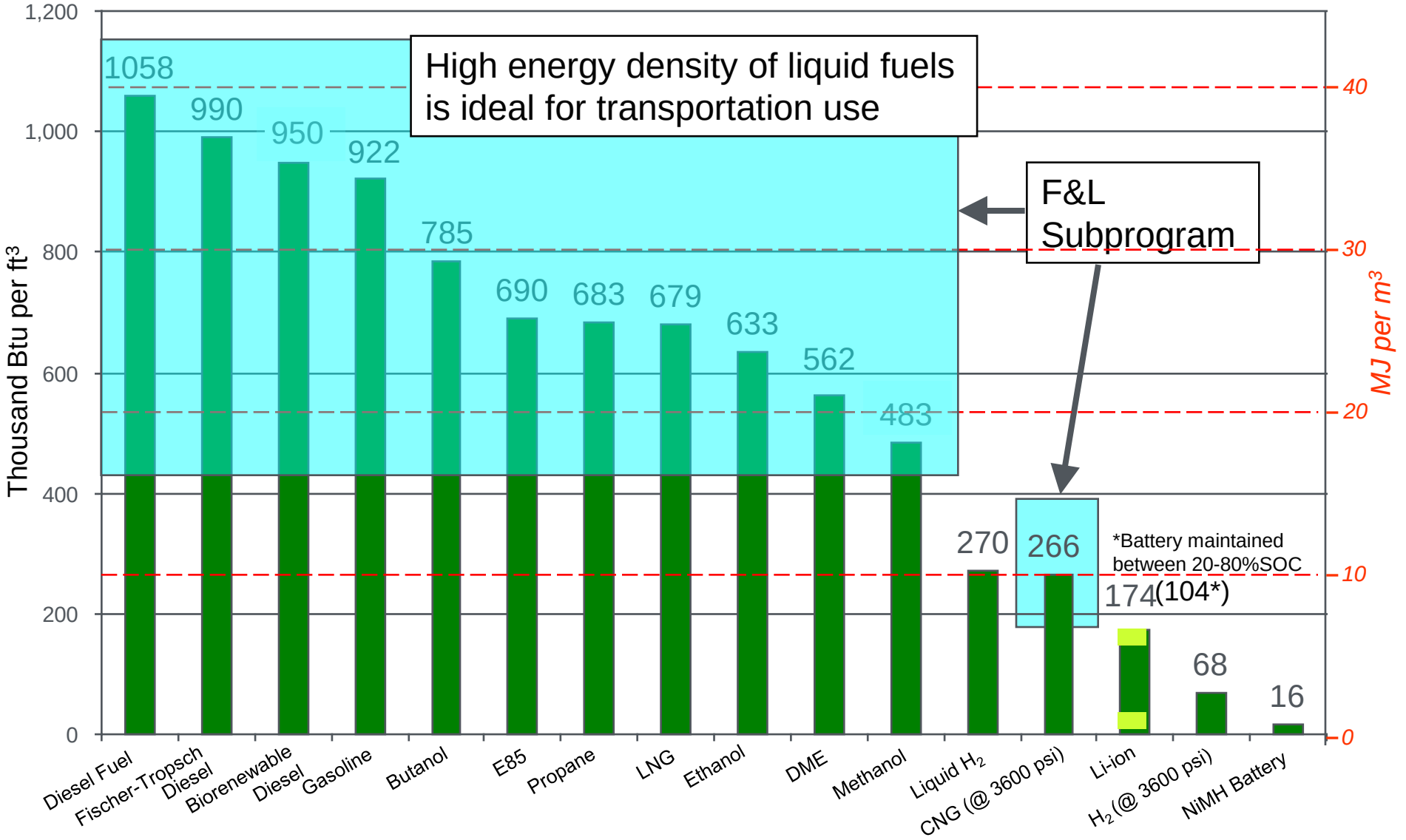
- Enable advanced combustion through elucidation of fuel effects in such regimes
- Evaluate suitability of new fuels and fuel components for use in developing and legacy engines, with particular emphasis on biofuels

## Who are our customers?

- Internal: Advanced Combustion Engine Team, Biomass Office
- External: Engine companies, autos, suppliers, energy companies (traditional and alternative), additive companies, academic research community

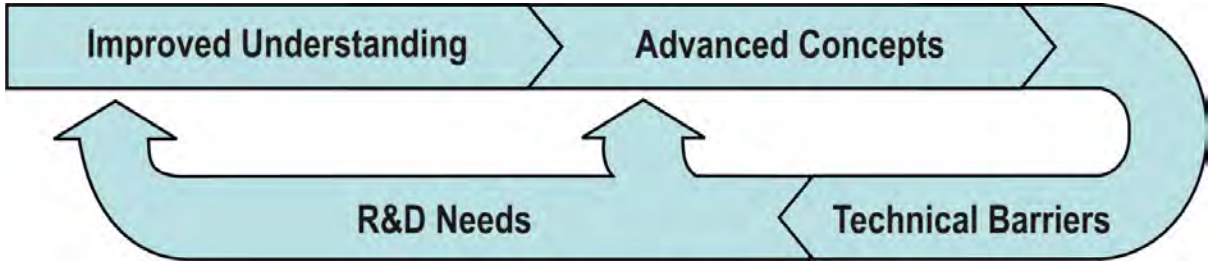
# Fuels Purview





# Overall R&D Approach: Pre-FY 11




Products, Standards, data to support policy

<u>Primary Technical Targets</u>

2015 Fuel Target: Expand operational range of low-temperature combustion to 75% of Federal Test Procedure

2015 Lubricant Target: Demonstrate cost effective lubricant with 2% fuel economy improvement

# Subprogram Activities



## Fuel Effects:

- Correlate chemical/physical properties to bulk fuel properties, combustion characteristics
- Supply open-source/public, reliable data on fuels and fuel effects on combustion
- Develop information to enable design of advanced combustion engines

## Renewables & Synthetics:

- Evaluate advanced biofuels and other alternatives to petroleum
- Supply feedback on end-use suitability of new fuel/lubricant candidates to producers
- Allows fuel producers to make fit-for-service fuels

## Analysis:

- Objective analyses of transportation energy pathways
- Help set R&D priorities

# Subprogram Activities
## Increased Emphasis

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

### Natural Gas:

- U.S. reserves increased dramatically
- Currently far cheaper than petroleum
- Reserves suggest it will remain cheap for a long time

*What to do with all this natural gas?*

- Transportation – one of several potential uses; displace petroleum

### Lubricants:

- 2-3% potential fuel economy improvement
- Retrofittable to legacy fleet in near-term
- Advanced engines may require different lubes

*How to influence huge industry with small investment?*

- Precompetitive research – advanced additives and base oils; reduce petroleum

# Budget & Accomplishments 2002-2011



Years: 1998-2003

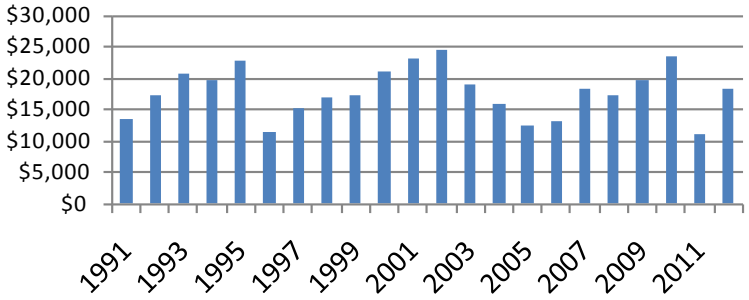
Diesel fuel sulfur effects on exhaust emission control testing program – resulted in diesel sulfur reduction to 15PPM – enables diesel engines to meet current emissions regulation

Years: 2008-2010

Critical research led to improved biodiesel ASTM standards – enables B20 approved engines

| 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| $24,650 | $19,164 | $15,887 | $12,419 | $13,356 | $18,413 | $17,376 | $19,560 | $23,421 | $11,000 | $18,503 Request |

## Fuels Budget at a Glance




Years: 2007-2011

Developed and implemented DOE Intermediate Ethanol Blends Test Program – E15 approved for use in 2001 and newer vehicles – enables additional 7 bgy of ethanol potential (displace 3% of light-duty petroleum use)

# Contact Information

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