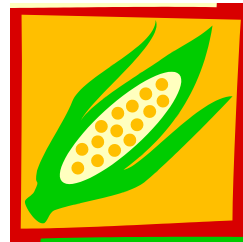


# The New World of Renewable and Alternative Fuels

Energy, Economics and Environment



March, 2007

Paul Argyropoulos, Senior Policy Advisor  
EPA's Office of Transportation and Air Quality

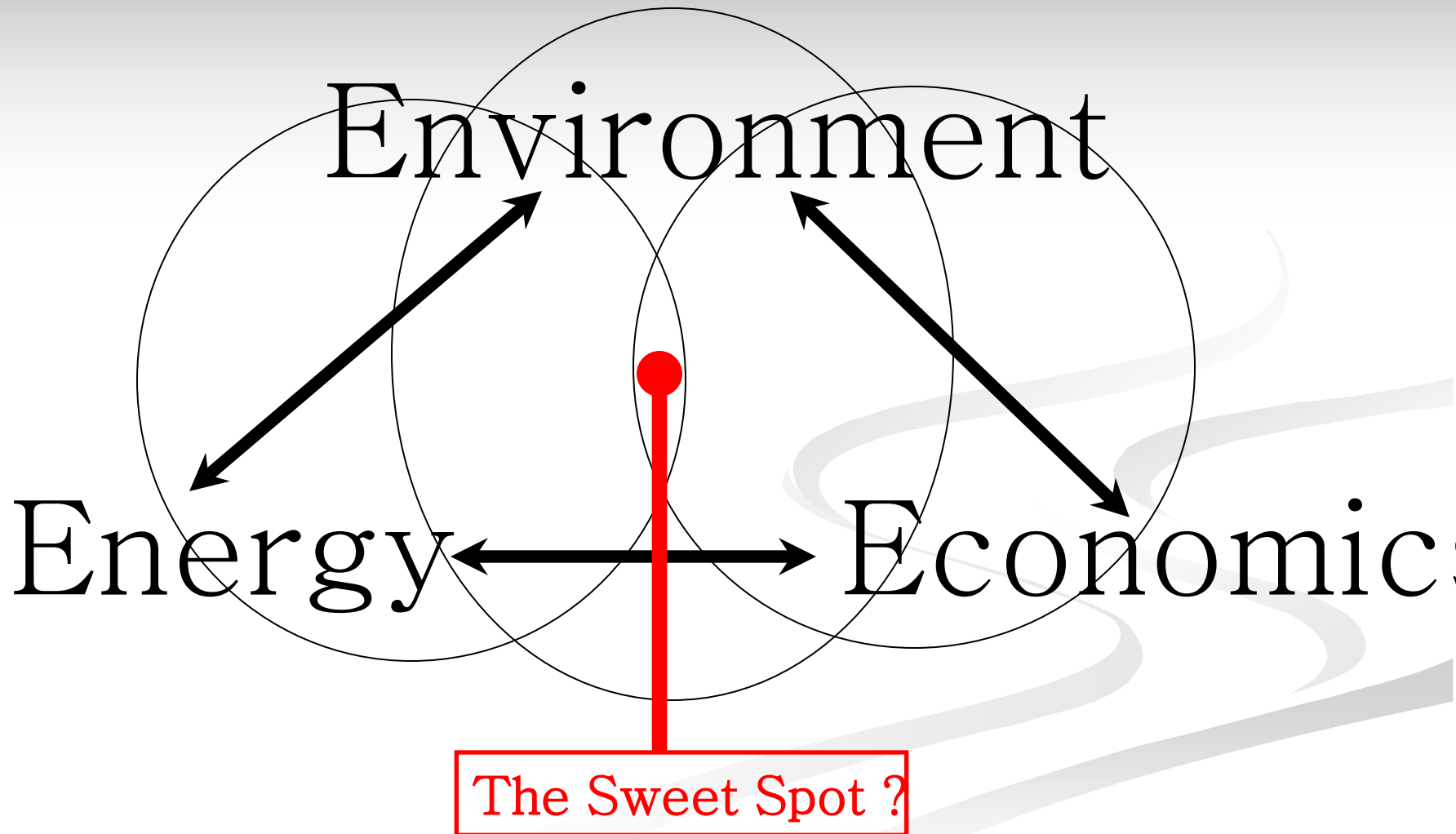


# Key Federal Players

- EPA
- DOE
- USDA
- USDOT
- USDOC
- NIST
- Others

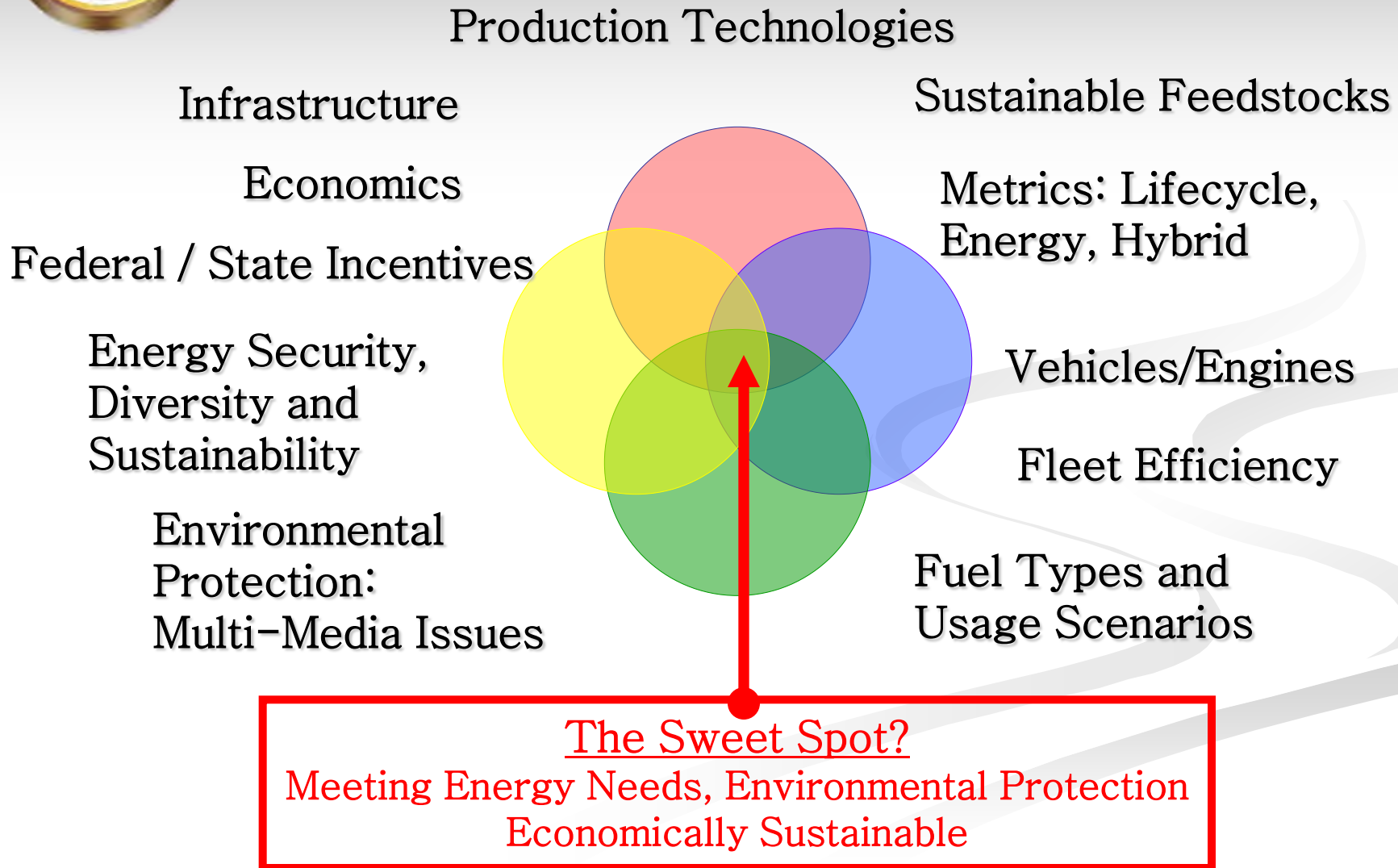
# Meeting in the Middle?

- Currently, More Questions than Answers-



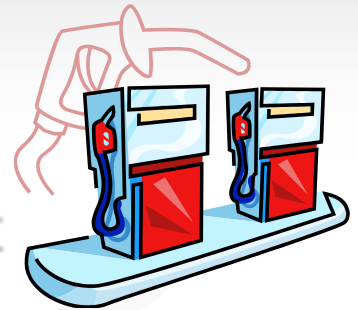


# Drivers and Decisions

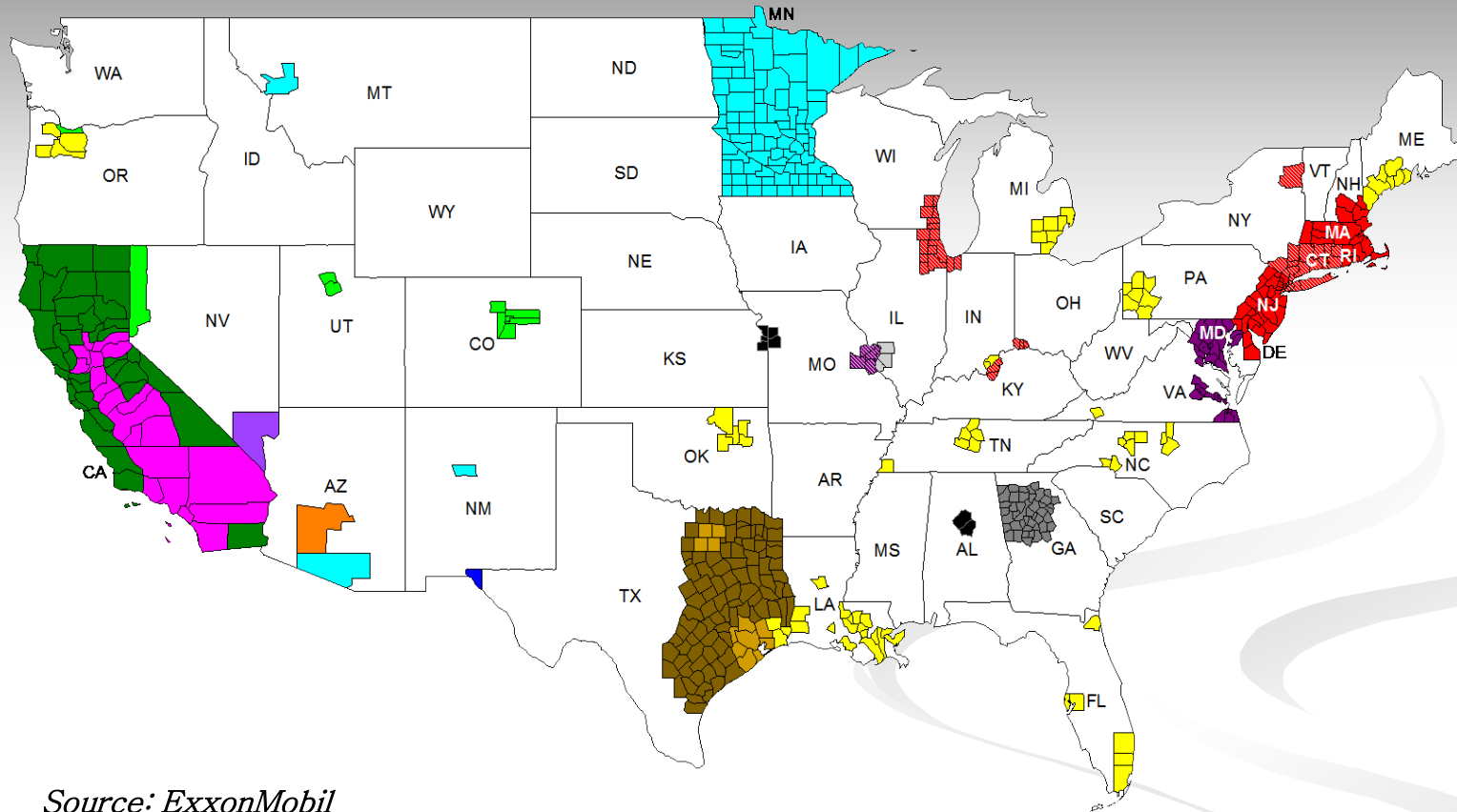


# Where Are We Now?

- Federal Fuels – Systems / Integrated Approach
  - National RFS
  - Reformulated Fuel
    - Impact of Removal of Oxy Requirement
  - Conventional Fuels
  - The Re-emergence of “Alternative Fuels”?
- State Fuels
  - State Air Quality Fuels (SIP Fuels)
  - State Renewable and Alternative Fuels



# Overview of 2006 U.S. Fuel Requirements

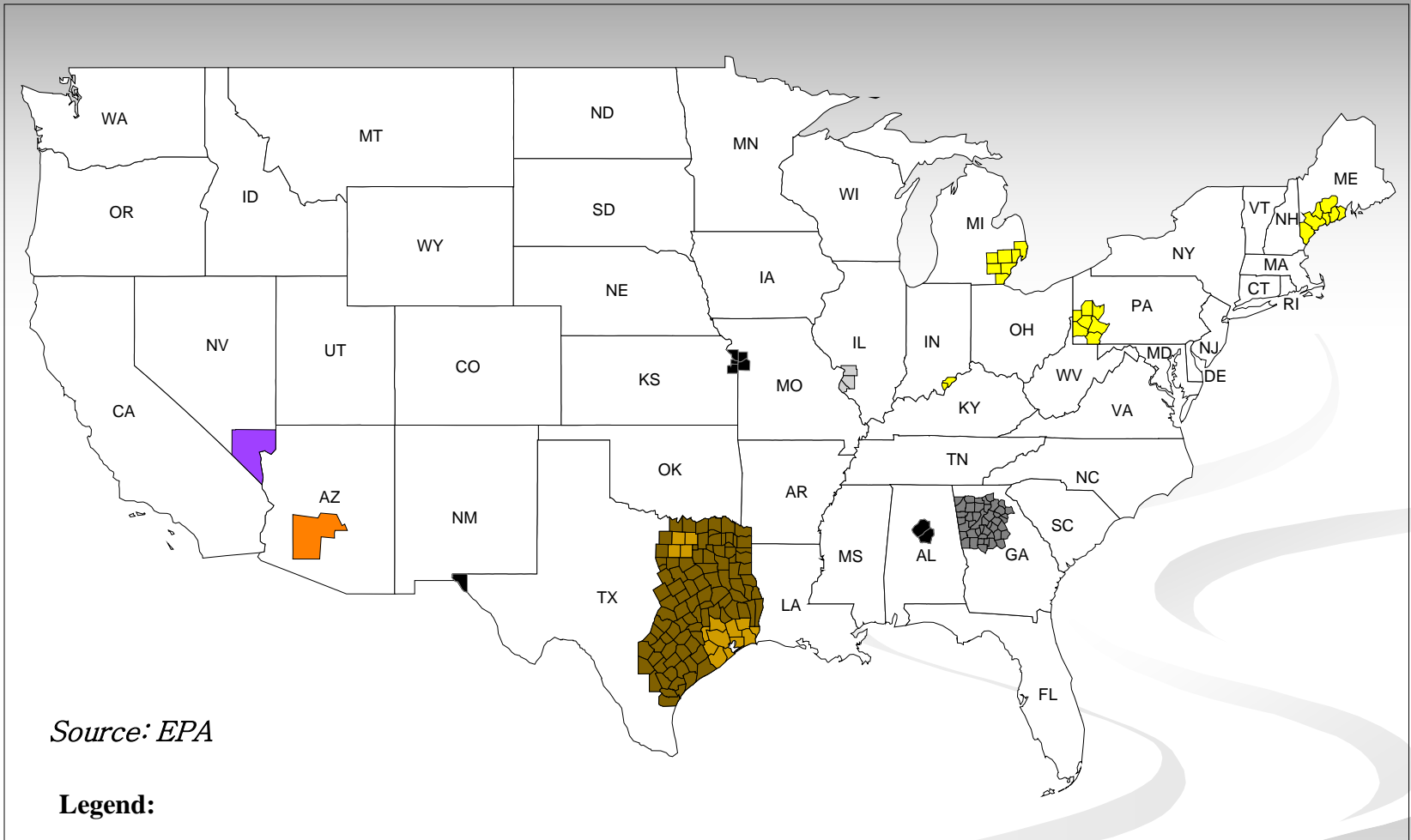


Source: ExxonMobil

## Legend:

- |                             |                                |   |
|-----------------------------|--------------------------------|---|
| Conventional                | RVP of 7.0psi w/Sulfur Content | AZ Cleaner Burning Gasoline                                   |
| Northern RFG                | RVP of 7.0psi                  | NV Cleaner Burning Gasoline Winter Gasoline                   |
| Southern RFG                | RVP of 7.2psi                  | Texas Low Emission Diesel Fuel & State RVP Controls of 7.8psi |
| CA Cleaner Burning Gasoline | RVP of 7.8psi                  | Texas Low Emission Diesel and Federal RFG or RVP Control      |
| Fed/CA RFG                  | Oxy Fuel/Ethanol Mandate       |   |
| Northern RFG w/Ethanol      | Oxy Fuel/7.0 RVP               |   |
| Southern RFG w/Ethanol      | Oxy Fuel/7.8 RVP               |   |

# Boutique Fuels from State SIPs



Source: EPA

**Legend:**

- RVP of 7.0psi w/Sulfur Content
- RVP of 7.0psi
- RVP of 7.2psi
- RVP of 7.8psi
- Cleaner Burning Gasoline
- Winter Gasoline
- Texas Low Emission Diesel Fuel & State RVP Controls of 7.8psi
- Texas Low Emission Diesel and Federal RFG or RVP Control

# State Mandates, Incentives, Production and Use

Source: ACE

## Renewable Fuels Mandates



## Ethanol Production Incentives



## Retail Pump Incentives



## Ethanol Volume Potential

(In millions of gallons/year, based on 10% blend of 2004 volume)

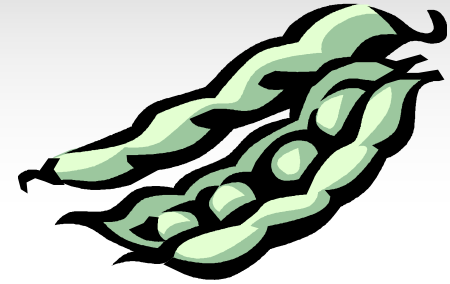
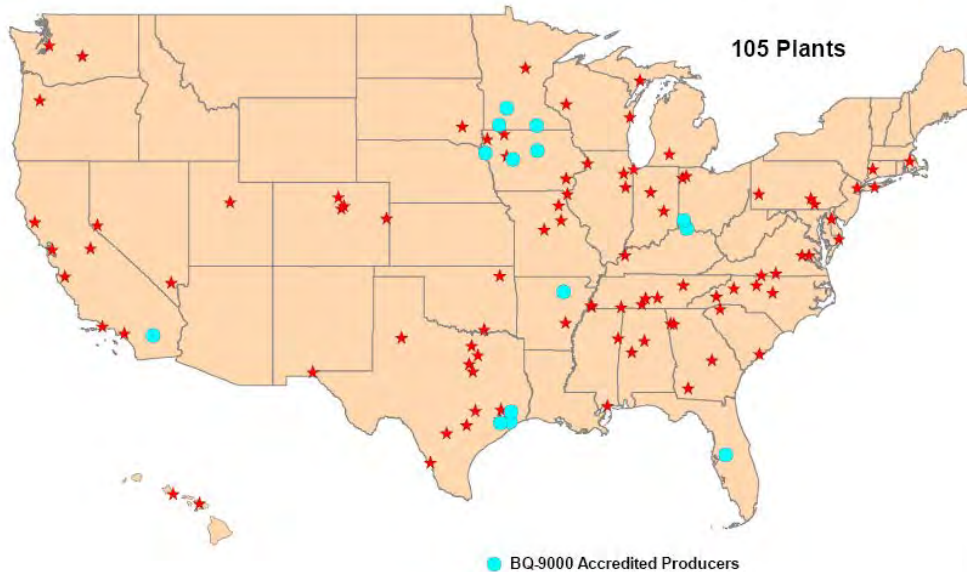




# Biodiesel Production and Sales

-Source: National Biodiesel Board-

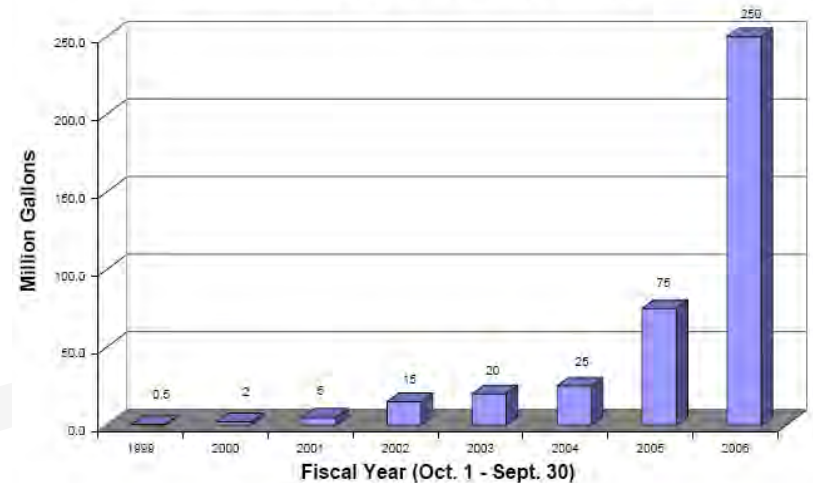
Commercial Biodiesel Production Plants (January 31, 2007)



## ■ Discussions Continue on:

- Emissions – Collaborative Testing Program
- Market Potential
- Fuel Quality

Estimated US Biodiesel Sales





# Federal Roles

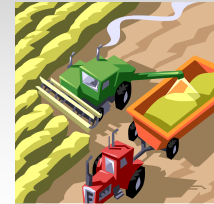
- Research and Development
- Regulatory
  - The Clean Air Act and EPA
  - The Energy Policy Act and EPA
- New Policies – Mandatory and Voluntary Approaches
  - Incentives, credits, flexibilities, grants, other
- Communication



# Office of Transportation and Air Quality and Biofuels

## ■ Regulatory

- The Clean Air Act gives EPA authority in a number of areas:
  - Fuel quality and registration
  - Vehicle certification – Conventional, FFVs and AFV's
- Under the Energy Policy Act EPA has authority to:
  - Implement the Renewable Fuel Standard (RFS)
  - Perform studies on the emissions impact of renewable fuels



## ■ Voluntary Programs

- SMART WAY Transportation Partnerships, National Clean Diesel Campaign and Grow and Go Programs



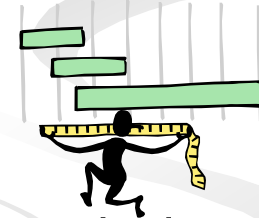
## ■ Research, Development & Analysis

- Authorization for Grants for R & D and demonstration programs for production of cellulosic ethanol
- Advanced Technology Development and Review (National Motor Vehicle and **Fuel Lab** in Ann Arbor Michigan)
- Analysis – Including life cycle assessment of renewable fuel and environmental and economic impacts of increased biofuel production



# The RFS: Flexible, Adaptable Program Design

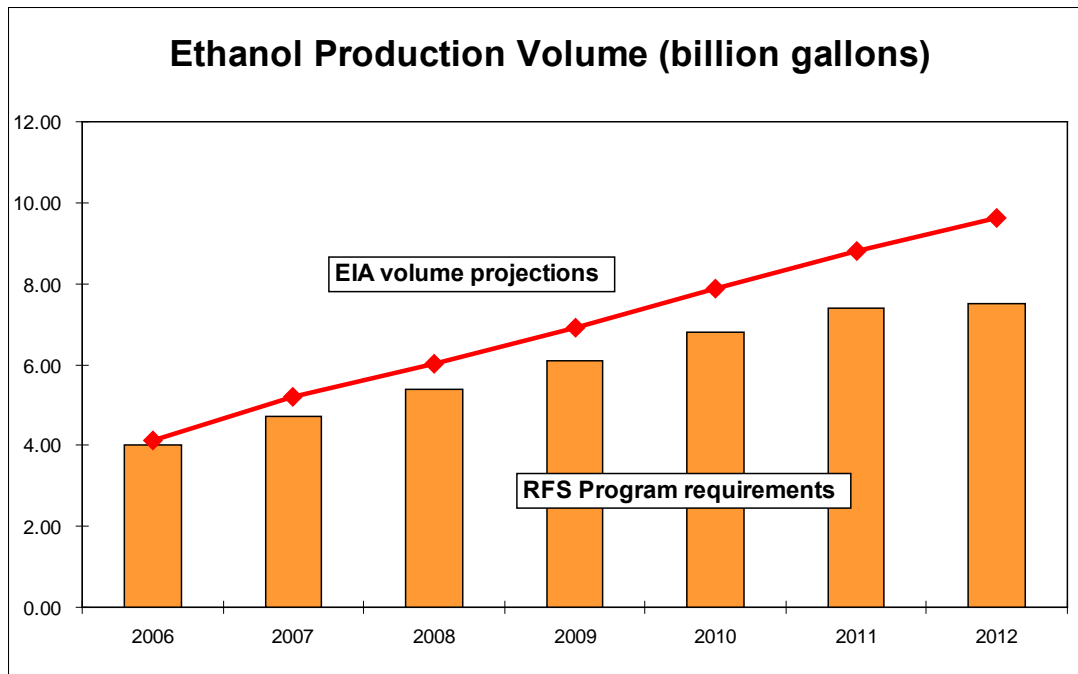
- Program Requires Growing Renewable Use to 7.5 BG Year by 2012
- Major Compliance Element - Trading and Banking Provisions
- Renewable values based on volumetric energy content in comparison to corn ethanol (adjusted for renewable content)
  - Corn-ethanol: 1.0
  - Cellulosic biomass ethanol: 2.5
    - As specified in EPCRA
  - Biodiesel (alkyl esters): 1.5
  - Renewable diesel: 1.7
  - Biobutanol: 1.3
- Sought comment on life cycle energy, petroleum, GHG emissions
- If finalized in current form, program is slated to start July 1, 2007



# Projected Renewable Use



- RFS program standard provides important foundation for ongoing investments
- Demand for renewable fuels are projected to outpace the RFS requirements
- Unclear what impacts new policies may have on altering national fuels landscape



Source: AEO 2006

\* Plus ~300M gallons of biodiesel

- Analyzed impacts of increases in renewable fuels, not impacts of the program per se
- Analyzed range from required to projected (2006 EIA projections in 2012)



# The RFS - Energy & Environment

## - A Snapshot -

	Nationwide
<b>CO</b>	↓
<b>Benzene</b>	↓
<b>NOx + VOC</b>	↑
<b>Ozone</b>	<b>Slight Increases on National Average Basis</b>

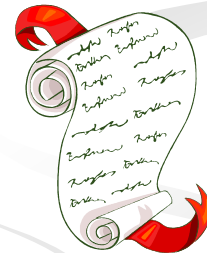
- **NOTE: Impacts will vary by region since renewable fuel use varies**
- **Petroleum consumption in the transportation sector will be reduced .08 - 1.6 %**
- **Transportation sector greenhouse gases (CO2 equivalent) will be reduced by 0.4 - 0.6 %**

2004 Base Reference Year

Incremental Impacts From Base Reference Year to 2012 Cases

# State of the Union 2007

- The President called for a commitment to reduce petroleum-based gasoline consumption by 15% by 2017 through renewable plus alternative fuels
- 15% reduction in 2017 translates into a target of 35B gallons of renewable plus alternative fuel use in transportation system
- To reach goal, must consider several issues:
  - Available fuel feedstock sources
  - Production and Fueling infrastructure
  - Appropriate fuels and fuel blends
  - Other
- **NEW POLICY**
  - Alternative Fuels Standard – President Sent New Legislation to Congress Last Week





# Next Steps



- Completion of Final RFS Rule is expected shortly
  - Program Implementation in mid-2007
  - Desire to design a system that accomplishes two goals: energy security and climate change
  
- NEW POLICIES → New Regulations?
  - Alternative Fuels Standard and Beyond
  
- Evolve AFS program from foundation set by current RFS
  
- EPA to continue technical and regulatory expertise to assist policy makers to implement goals while protecting the environment



Web page and Links: <http://www.epa.gov/otaq/>

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