

# Department of Energy Biomass 2013

## Current trends in the Advanced Bioindustry

July 31<sup>st</sup>, 2013

**Michael J. McAdams**

President



ALGENOL  
BIOFUELS  
*Harnessing the sun to fuel the world*

ENSYN

# Who We Are

gevo™

CTC  
CENTRO DE TECNOLOGIA CANAVIEIRA

AMYRIS

GranBio

AMERICAN  
PROCESS

Syntroleum

DU PONT

REPREVE  
RENEWABLES

solazyme

DDCE  
DuPont Danisco Cellulosic Ethanol LLC

UOP  
A Honeywell Company

EMERSON

SundropFuels

coskata

DynamicFuels™

SynGest

Sapphire  
Energy™

EndicottBiofuels

BETASEED

CH2MHILL

Tyson

NESTE OIL

Canergy™

CIA  
*Green*

SGC  
GRUPO

MUSKET

VELOCYS

WASHAKIE  
RENEWABLE ENERGY

Intertek

Elevance™  
RENEWABLE SCIENCES

MUSKET

TRITON  
ENERGY

CoolPlanet  
ENERGY SYSTEMS

GENX  
ENERGY GROUP

CHEMTEX

PRAXAIR

MUREX  
N.A. LTD.

LanzaTech

VIESEL  
MADE IN THE USA

VIRENT

KIOR

SWEETWATER

weaver

Butamax™  
A joint venture between BP and Cargill

# Demand will continue to grow: China's desire to reach 'energy parity' will alone have a massive effect, not including other developing nations



## U.S.

Population: 308 MM  
GDP per capita: \$47,100  
Oil use: 19.2 MBD  
Oil use (per 1,000): 62 bpd



## Poland

Population: 38 MM  
GDP per capita: \$18,800  
Oil use: 0.55 MBD  
Oil use (per 1,000): 15 bpd



## China

Population: 1,330 MM  
GDP per capita: \$7,500  
Oil use: 8.3 MBD  
Oil use (per 1,000): 6.2 bpd

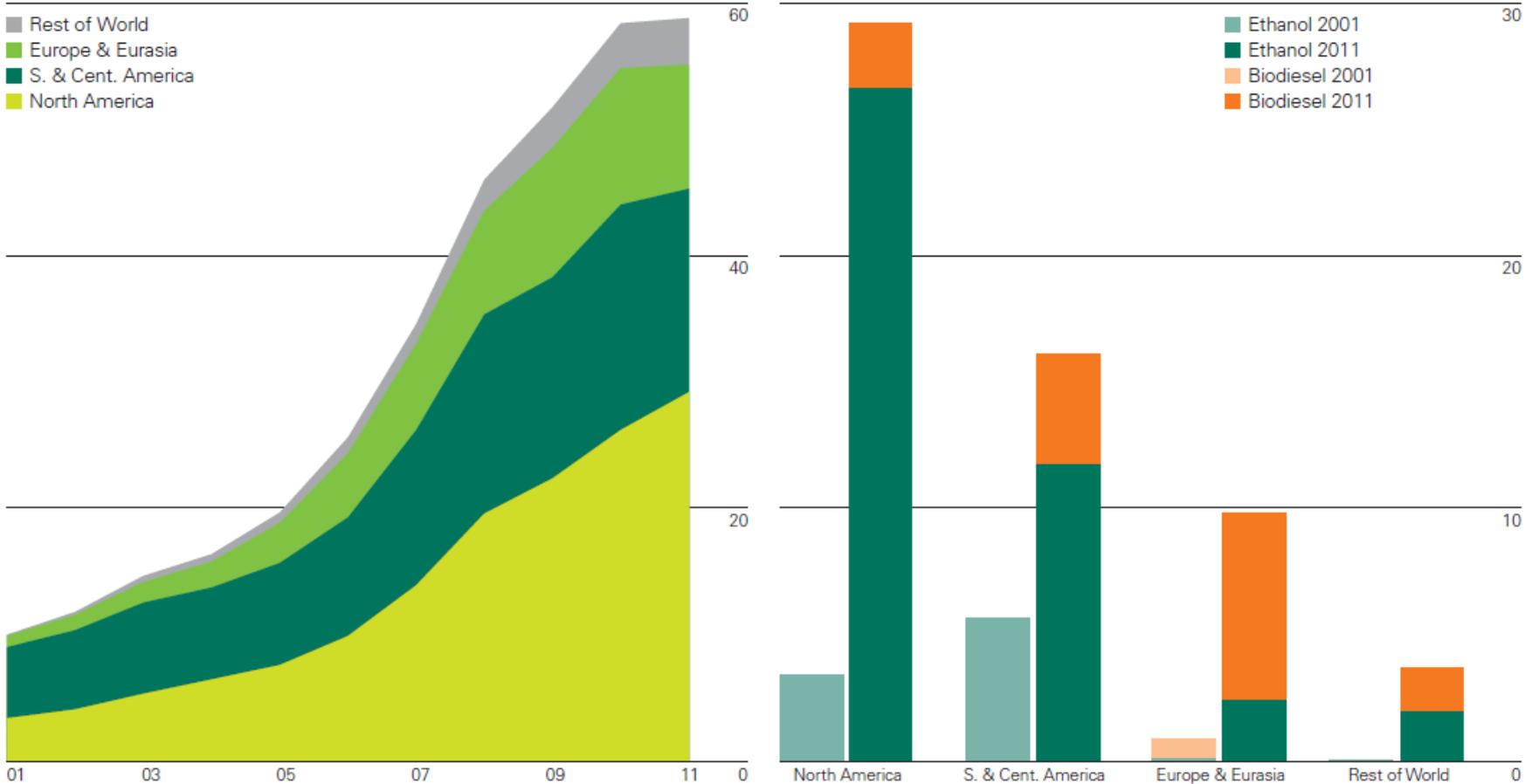
- If China aspires to be as "energy rich" as the U.S. by 2030, it will add **78.5 MBD**
- If China aspires to be half as "energy rich" as the U.S. by 2030, it will add **35.1 MBD**
- If China *only* aspires to be as "energy rich" as Poland\* by 2030, it will still need to add **12.7 MBD** (and still be the largest consumer of oil in the world)
- *When you factor in the significant demand growth from India, Russia, Brazil, and the Middle East, the effect will be highly disruptive to the world oil markets*

\* Poland has the lowest energy use per capita of any country with a GDP per capita greater than \$10,000

Note: Assumes population of China only grows to 1.4 billion by 2030

## World biofuels production

Million tonnes oil equivalent



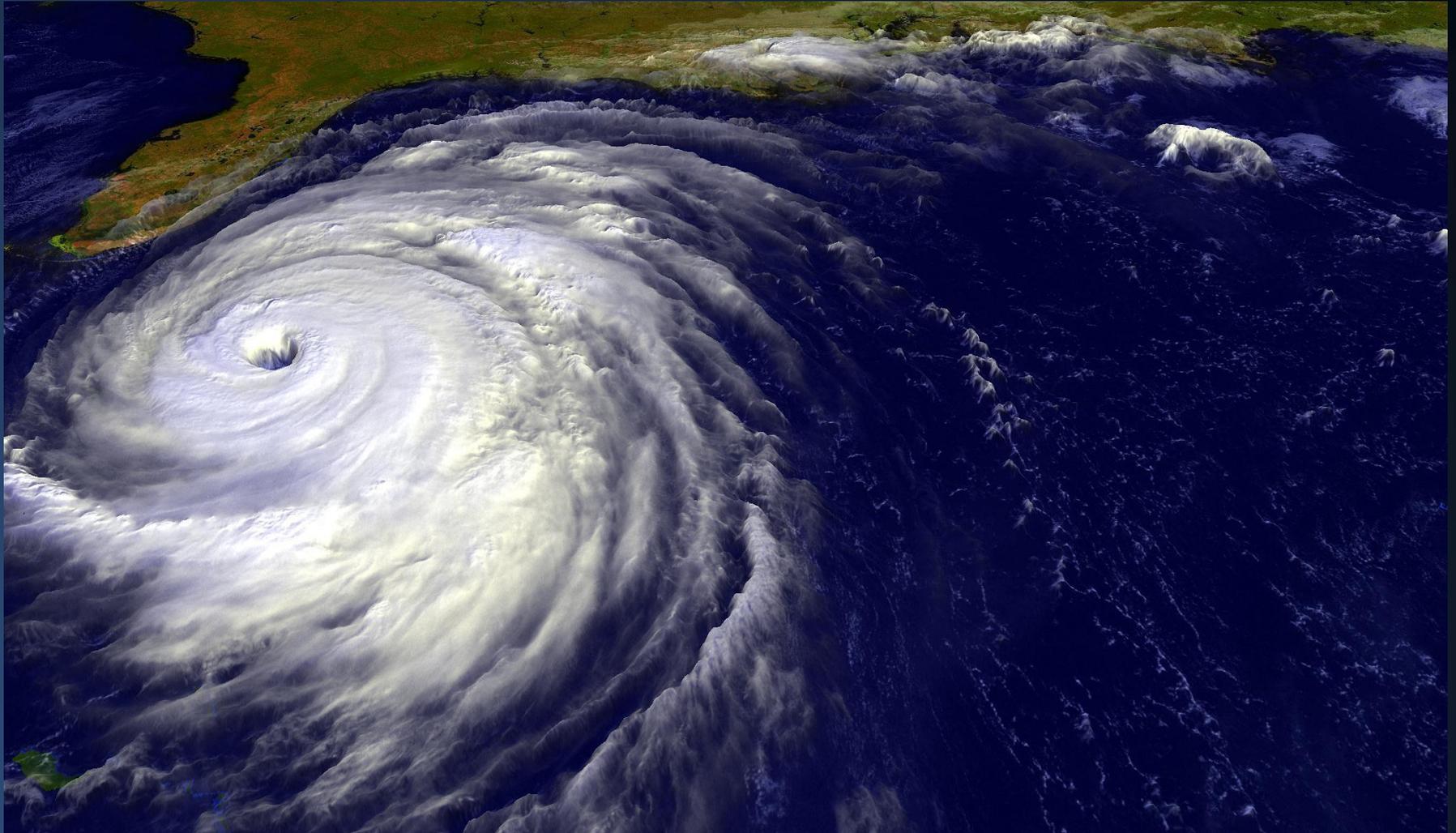
World biofuels production grew by 0.7% in 2011, the smallest increase since 2000. Increased output in North America was offset by declines in South & Central America and Europe. Biodiesel accounts for just 27.5% of global biofuels output, but accounted for all of the growth in global biofuels output. Global ethanol output declined by 1.4%.

Source: BP Statistical Review of World Energy, June 2012



Advanced  
Biofuels  
Association

# Climate Change



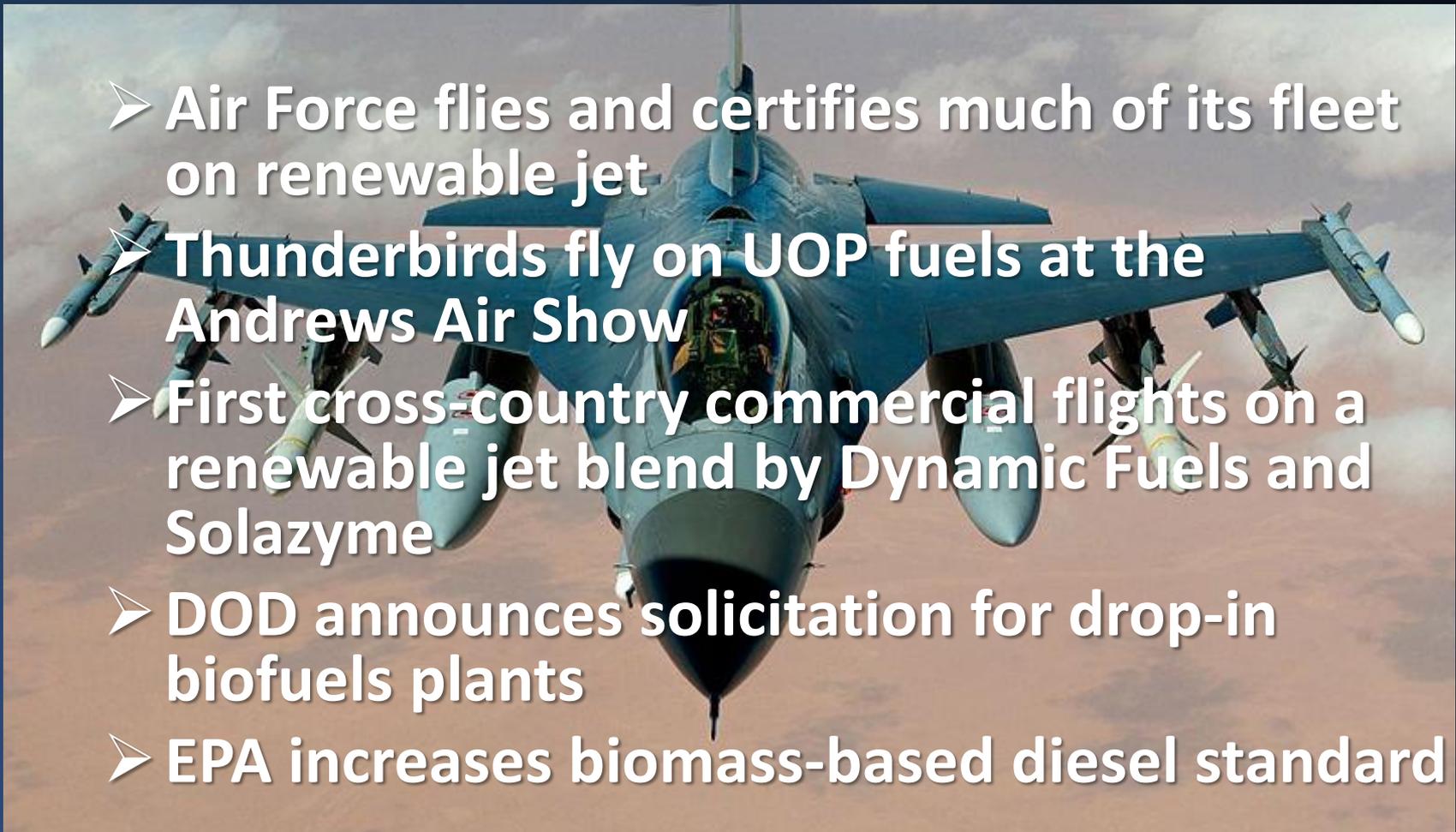
Advanced  
Biofuels  
Association

# Advanced Biofuels at work: Great Green Fleet



Advanced  
Biofuels  
Association

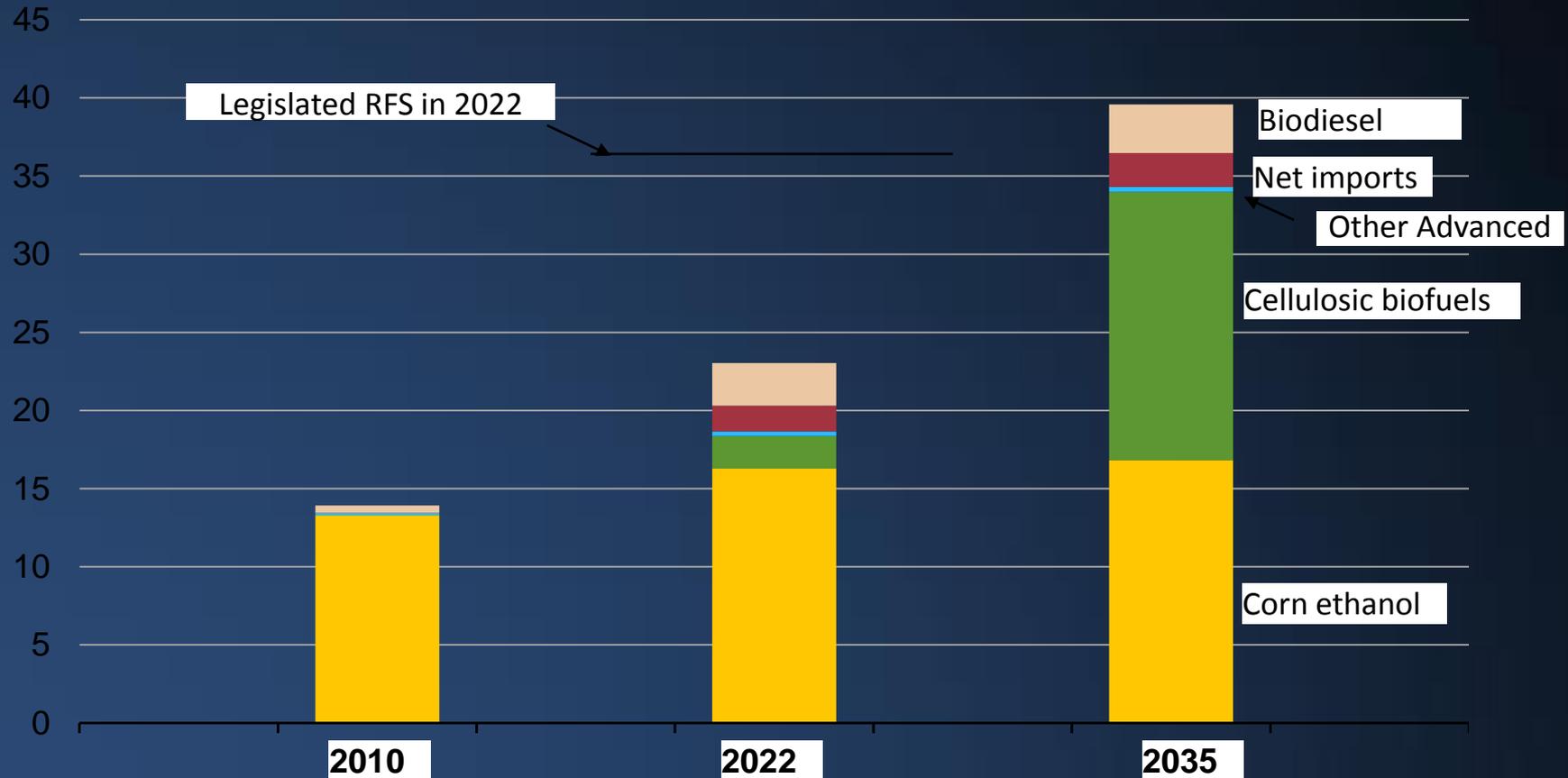
# Major Events in Advanced Biofuels

- 
- Air Force flies and certifies much of its fleet on renewable jet
  - Thunderbirds fly on UOP fuels at the Andrews Air Show
  - First cross-country commercial flights on a renewable jet blend by Dynamic Fuels and Solazyme
  - DOD announces solicitation for drop-in biofuels plants
  - EPA increases biomass-based diesel standard



# RFS encourages the production of cellulosic biofuels

billions ethanol-equivalent gallons



Source: EIA, Annual Energy Outlook 2012

*Chemtex*



*Gevo, MN*



*Kior, MS*



*LanzaTech, GA*



*Sapphire, NM*



*Dynamic Fuels, LA*



# Advanced Biofuels Market Vision

- Build a number of new plants to deliver a wide variety of advanced biofuels
- Quickly bring volume to the market
- Meet the targets set for the RFS2



# Thank you Let's Work Together



[WWW.ADVANCEDBIOFUELSASSOCIATION.COM](http://WWW.ADVANCEDBIOFUELSASSOCIATION.COM)



Advanced  
Biofuels  
Association