Renewable Fuel Standard -- The Proven Way to Reduce Oil Dependence

hosted by 25x’25 and ACORE
Webinar Program

Introduction: Ernie Shea, 25x’25

Speakers:
Dave Hallberg, PRIME Advisory Solutions, LLC.
Mike McAdams, Advanced Biofuels Association

Panel discussion:
Doug Berven, POET
Nathanael Greene, Natural Resources Defense Council
Matt Erickson, American Farm Bureau Federation

Moderators:
Ernie Shea and Dennis McGinn

Concluding Remarks: VADM Dennis McGinn, ACORE
Dennis McGinn - President, ACORE
For more than a decade Admiral McGinn has been actively engaged in efforts at the national level to highlight the close link between energy, climate and national security. He is a strong advocate for innovative government policy, public and private partnerships, and investments that will promote clean energy growth and innovation. He has testified before the U.S. Congress on the national and economic security implications of climate change and our dependence on fossil fuels, highlighting the need for action on clean energy. He is a widely recognized energy and national security expert, who has interviewed with major news networks and national journalists. He is regularly asked to participate in public forums about energy and national security and has been published in newspaper articles and opinion pages across the country. Admiral McGinn serves as co-chairman of the CNA Military Advisory Board advising policy makers on the nexus of energy and national security, and as an international security senior fellow at the Rocky Mountain Institute. He is also a director of the National Conference on Citizenship.

His continued commitment to bettering the nation follows a 35 year career with the U.S. Navy where he served as a naval aviator, test pilot, aircraft carrier commanding officer, and national security strategist. His capstone assignment with the Navy was Deputy Chief of Naval Operations for Warfare Requirements and Programs at the Pentagon, where he oversaw the development of future U.S. Navy capabilities. He has also served as chairman of the board of directors of the U.S. Naval Institute and as a commissioner on the National Commission on Disabled Veterans’ Benefits in Washington, D.C.

Admiral McGinn earned a B.S. degree in naval engineering from the U.S. Naval Academy, attended the national security program at the Kennedy School of Government, Harvard University, and was a Chief of Naval Operations strategic studies fellow at the U.S. Naval War College. He lives just outside of Washington DC.
Ernest Shea - President of Natural Resource Solutions, LLC

Ernie Shea is the President of Natural Resource Solutions, LLC, a consulting firm with deep contacts and established relationships with federal, state and local government agencies; conservation, environmental and agricultural organizations; opinion leaders and media outlets; university experts; natural resource consultants; non-government organizations and non-profit entities.

With more than 25 years of experience at the national, state and local levels, Ernie has worked in partnership with government agencies, conservation organizations, stakeholders and business interests to help landowners and managers conserve, protect and ensure the orderly development of the nation’s natural resources. He worked for the State of Maryland for 10 years, holding a number of senior leadership positions, including Assistant Secretary of Agriculture for Agricultural Development and Resource Conservation. Among other responsibilities, he served as the senior Department official responsible for soil and water conservation, land preservation, domestic and international marketing and other service-oriented programs designed to strengthen the state’s agricultural industry.

Before starting his own consulting firm, Ernie served as Chief Executive Officer of the National Association of Conservation Districts (NACD). As CEO of NACD, he represented and facilitated the effective functioning of the association, which comprises nearly 3,000 local units of government, 17,000 public officials and 7,000 employees with combined annual budgets exceeding $1 billion.
David Hallberg – Principle, PRIME Advisory Solutions, LLC.

David Hallberg has been involved with public policy and alternative fuels commercialization in the U.S. and worldwide for more than thirty years. He spent time in the Middle East region shortly after the 1973 Arab/Israeli War, after which he graduated from the Johns Hopkins School of Advanced International Studies in Washington, DC, with a Masters in International Relations and Economics. From 1976 - 1981, Hallberg served as a legislative aide in the U.S. Senate and House of Representatives, and was actively involved in the drafting and enactment of the formative legislation that catalyzed the commercialization of the U.S. biofuels industry.

In January 1981, Hallberg left Capitol Hill to form the Renewable Fuels Association, and served as its president/CEO until 1985. During his tenure, the industry increased its domestic production capacity by more than 500%.

Hallberg is the inventor of three US patents dedicated to the cost effective production of low carbon fuels and reduced carbon footprints. In addition to his public policy and business activities, Hallberg has also been active in the global climate change area. In February 2000, he was a member of the U.S. Government delegation to the G8 Forum on Climate Change Best Practices in Shonan Village, Japan, where he was appointed chair of the Working Group on Agriculture, Land Use, and Forestry.
Michael McAdams – President, Advanced Biofuels Association.

Mr. Michael McAdams is President of the Advanced Biofuels Association (ABFA), an organization of over 45 advanced biofuels production and feedstock companies who are developing and commercializing their technologies to provide renewable, lower carbon fuels that will move our nation closer to achieving energy and economic security. Mr. McAdams has previous experience working for a number of advocacy organizations principally focused in the areas of fuels and air policy on behalf of his clients. He spent more than 14 years working for BP, where he was the associate group policy advisor to the then Chief Executive Officer Lord John Browne. Mr. McAdams also served as Legislative Director to Congressman Ralph Hall (R-TX) from 1981-1985, where he was responsible for energy and environmental issues. In 2008 and 2012, Mr. McAdams was invited to and participated in the Clinton Global initiative as an energy advisor and expert in the area of biofuels.
Doug Berven - Vice President of Corporate Affairs, POET

Doug Berven joined POET in March 2003 and has served the organization in several important roles since then. In his current role as Vice President of Corporate Affairs, Berven promotes the corporate objectives of POET, the importance of agriculture, and the benefits of ethanol domestically and internationally.

Berven also sits on 12 of POET’s ethanol plant Boards of Directors, BIO’s Industrial and Environmental Section of Governing Board, and serves on the Board of ACORE. Berven is also involved in 25x25, Midwest Governors Association, and the Roundtable on Sustainable Biofuels. Berven also manages strategic corporate relations for POET, promotes state, regional and national policy objectives for the industry, and is an internationally recognized authority on agriculture, renewable energy and ethanol. Prior to joining POET, Berven held various roles in banking, real estate development and medical consulting. Berven received his Bachelor of Science degree in Business Administration from Augustana College in Sioux Falls, S.D., where he currently resides with his wife and two children.
Nathanael Greene is the director of renewable energy policy and is responsible for coordinating NRDC’s work on renewable fuels and power. NRDC aims to quickly and dramatically expand the use of renewable energy in the most sustainable and cost-effective way. Nathanael joined NRDC in 1992 after receiving his Bachelor of Arts Degree in Public Policy from Brown University. He worked two years before getting a Master of Science Degree in Energy and Resources from University of California Berkeley and returned to NRDC in 1996. He has worked there since. He has particular expertise in clean energy technologies including wind, solar and biomass energy, fuel cells, combined heat and power and energy efficiency and in regulations and policies to promote these technologies. For the last decade he has been focusing on assessing the sustainable potential for biofuels and biopower and developing policies to advance them.
Panelist Bios

Matt Erickson – Economist, American Farm Bureau

Matt Erickson of Brookston, Indiana, joined American Farm Bureau Federation in 2010 as an Economist, analyzing issues to support short term and long term policies that are aligned with the overall mission of the American Farm Bureau Federation. At American Farm Bureau, Matt specializes in domestic policy issues ranging from budget to Farm Bill policy, with a focus in energy markets. Specializing in second-generation cellulosic based biofuels, Matt came to American Farm Bureau from Purdue University where he received his M.S. and B.S. degrees in Agricultural Economics. At Purdue, his research focused on an economic analysis of harvesting corn cobs for energy. In addition to his research during graduate school, Matt served as a consultant with Elanco Animal Health.

Prior to graduate school, Matt was a political appointee under President George W. Bush’s Administration at the United States Department of Agriculture. From this experience, he worked on implementation of Title IX of the 2008 Farm Bill and consulted industry representatives on energy efficiency and renewable energy development. In addition to his experience as a political appointee, Matt has had policy experiences at the White House National Economic Council, on Capitol Hill with Senator Richard G. Lugar, and with Rural Development at the United States Department of Agriculture.
Market-Based Demand Pull: Exploring the Linkage Between Gasoline Aromatics, Particle-Borne PAHs, Black Carbon Emissions, & Carbon/Health Cost Co-Benefits by Improving Gasoline Quality

ACORE RFS Webinar Presentation
David E. Hallberg
September 18, 2012
RFG CLEAN OCTANE PROVISIONS OPENED THE DOOR TO RFS MINIMUM USE REQUIREMENTS

- Daschle – Dole “Clean Octane” provisions (1990) were traded off in wake of MTBE water contamination controversy for Daschle – Lugar RFS program (RFS1 in 2005, RFS2 in 2007)
- The RFG minimum oxygen requirement was eliminated in lieu of the RFS, but EPA’s legal obligation to control mobile source air toxics, & prevent backsliding, remains in force
- RFS2 does NOT require the production of targeted volumes, but rather their use to the extent the stipulated volumes are available
- Consequently, there is reason to believe that the 1990 CAAA can be used to complement RFS2 usage targets by creating market-based demand pull signals
SEN. DURENBERGER EXPLANATION OF 1990 CAAA REFORMULATED GASOLINE GOALS

- S 16921: “Over the 20 year history of the Clean Air Act most of the regulatory history has focused on the vehicle itself...But it is possible to accomplish much more pollution reduction by focusing on the fuel.”

- S 16922: “Senator Daschle offered an amendment to require reformulated gasoline when the Senate was considering the bill. It was adopted overwhelmingly...The conferees now return to the Senate with reformulated gasoline provisions that are tough, but workable.”
In 1990, Senator Durenberger noted that “Aromatic compounds include benzene, toluene, and xylene. All three are air toxics listed in Title III of the bill...Aromatics have a higher carbon content than the rest of gasoline, so gasoline high in aromatics contributes more to global warming.”

“Aromatics... have been used to replace the octane that was lost as a result of the lead phase-down. Oxygenated fuels could be used in lieu of the aromatics to provide the octane.”

EPA has also designated polycyclic aromatic hydrocarbons (PAHs) as mobile source air toxics (MSATs). PAHs are a group of compounds that have two or more fused aromatic rings, and are a byproduct of incomplete combustion of gasoline and diesel fuels. Gasoline-powered vehicles are the primary source of PAHs in most urban areas, and the heavier molecular weight gasoline PAHs are more toxic and more persistent than diesel PAHs.
1990 CAAA CLEARLY INSTRUCTS EPA ON IMPORTANCE OF AIR TOXICS REDUCTIONS

- S. 16923: “Para. (1) of the reformulated gasoline provision stipulates that: ‘Such regulations shall require the greatest reduction in emissions of ozone-forming volatile organic compounds…and emissions of toxic air pollutants (during the entire year) achievable through reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions, any non air-quality and other air-quality related health and environmental impacts and energy requirements.’ Proper implementation of this authority will require the Administrator to look at more than the formula…to determine whether additional measures would increase emissions reductions and are achievable.”

- S. 16961: Mr. Daschle. “The reformulated gasoline provisions contained in section 219 of the bill direct the Administrator to promulgate regulations requiring the greatest reduction in emissions of ozone forming volatile organic compounds and toxic air pollutants achievable through the reformulation of conventional gasoline…It is my understanding that these are minimum standards. As EPA promulgates regulations, the Administrator has the flexibility to make these requirements more stringent if it is determined that tighter standards are necessary to achieve the greatest reductions in VOC’s and toxics.”

- Mr. Baucus: “Yes, that is my understanding…if the Administrator determines that requiring more than 2.0 percent oxygen will result in greater reductions of VOC’s or air toxics, the legislation provides the flexibility to increase the oxygen content accordingly.” And in response to a second Daschle question, Baucus, EPW Committee Chairman, stated: “Yes…if EPA determines that a more stringent fuel formula will yield additional environmental benefit without undue economic difficulty, the Administrator could…adjust the formula accordingly.”
TECHNOLOGY-FORCING ASPECTS OF ENVIRONMENTAL STANDARDS

- S 16965: “The technology-forcing aspects of environmental standards have been, in general, highly effective in encouraging the development of either innovative control technology or material substitution and/or process change.”

- S 16976: “The reformulated gasoline and oxygenated fuels provisions contained in this bill will require the oil companies to modify their fuels in such a manner as to reduce their contributions to ozone and CO nonattainment problems, to reduce the personal exposure of people to toxic emissions from their vehicles; in short to require fuels manufacturers to push the state of science on the composition of gasoline and its components in the same manner that vehicle manufacturers will be required to under this legislation.”
Aromatics are the most toxic, energy inefficient/costly, & carbon intensive gasoline component, & constitute approximately 20 – 25% of the gasoline pool.

The primary source of fine/ultrafine, & black carbon (BC), particles in urban areas is the incomplete combustion of gasoline aromatics (more than 250 million LDV’s powered by approximately 140 billion gallons of gasoline).

Carcinogenic, mutagenic, & high carbon intensity PAHs coat the fine/ultrafine particles, & are absorbed by the BC particles.

These tiny particles easily penetrate into humans’ lungs, bloodstream, & organs, & are responsible for a wide range of costly health disorders, including asthma and other respiratory conditions, heart disease, cancers, autism, & behavioral disorders.

In a 2011 draft report to Congress, EPA found that 69% of all non-wildfire BC originates from mobile sources. In its recently proposed PM rulemaking, EPA called BC “the most strongly light-absorbing component of PM2.5, and that actions taken to reduce BC constituents…will have almost immediate effects on climate change.” [DRIA, p. 6-34]
ADVANCED ENGINE TECHNOLOGIES WILL INCREASE PARTICLE-BORNE TOXIC & BC EMISSIONS UNLESS FUEL QUALITY IS IMPROVED

- A recent Ford Motor study (Maricq, et al., *Aerosol Science and Technology*, 46:576-583, 2012) noted that motor vehicles and air quality are undergoing major changes due to several emerging trends, one of which is “the growth of gasoline direct injection (GDI) engine technology, aimed to offer fuel economy and CO2 emissions benefits.” For all of its many benefits, however, Ford notes that GDI “risks incomplete fuel volatilization and impingement onto piston and cylinder surfaces, exacerbating particulate matter (PM) emissions…Consequently, it is important to examine the interplay and potential synergies between fuel composition and engine technology in efforts to reduce emissions.” P. 576
RECENT STUDIES REPORT THAT E30+ BLENDS REDUCE PN, PM, & BC BY 30 – 45%

• In the same study, Maricq and his colleagues reported that “When the ethanol content increases to >30%, there is a statistically significant 30 – 45% reduction in PM mass and number emissions observed for both engine calibrations...Engine-out hydrocarbon and NOx emissions exhibit 10 – 20% decreases, consistent with oxygenated fuel additives.”

• The study also found that EC/BC emissions fall by approximately 45% when high-octane E30+ blends are used in direct injection engines.

• These are substantial reductions, and some believe that EPA’s goal of a 20% reduction in PM2.5 emissions could be largely achieved if a nationwide E30+ Clean Octane program were in place by 2025.
ETHANOL’S SUPERIOR OCTANE CHARACTERISTICS MAKE IT A COST EFFECTIVE SUBSTITUTE FOR AROMATICS

- Recent studies have confirmed that ethanol’s suite of higher chemical octane (esp. RON), heat of vaporization/charge cooling, and sensitivity advantages qualify it as a superior, & cost effective “Clean Octane” component
- Automakers have asked the EPA for higher octane gasoline specifications to help it to cost effectively comply with the new carbon & fuel efficiency rules
- Simple addition of 20 vol. % ethanol to widely available E10 blends (at either the terminal or retail level) can produce a 94 AKI premium-grade gasoline, without requiring refiners to adjust their blendstocks, at a competitive cost to today’s 87 RUL
- These premium-grade Clean Octane blends would enable automakers to further optimize their engines by increasing compression ratios, in addition to downsizing, boosting, & direct injection, allowing additional carbon & efficiency benefits
- Recent upstream (refinery) & downstream (terminal & retail) studies confirm that the U.S. gasoline system can cost effectively transition to EXX blends, while saving consumers at the pump, due to ethanol’s cost advantages vs. aromatics
BOTTOM LINE: EPA ENFORCEMENT OF 1990 CAAA WILL HELP SUPPORT RFS ETHANOL PRODUCTION GOALS

- A nationwide Clean Octane program would be a win/win/win for automakers, refiners, & consumers
- Federal & state governments, & the private sector, will save tens of billions of dollars annually in reduced health care costs & increased worker productivity
- Creating a level playing field for ethanol as a cost effective octane enhancer means that ethanol must have open access to the transportation fuels marketplace: 1) EPA must offer parity treatment to EXX-capable vehicles (on par with electric and CNG vehicles); & 2) EPA must enforce the Clean Octane provisions of the 1990 CAAA. Neither of these require new legislation, as sufficient statutory authority is already in force.
- By sending these market-based demand pull signals, private sector capital will flow to next generation ethanol & advanced biofuels production, & RFS targets will be met
The Status and Future of the Advanced Biofuels Industry

Michael J. McAdams
President

September 18, 2012
How to Think About Biofuels

**Technology**
- Gasification
- Hydrolysis
- Hydroprocessing
- Synthetic Biology
- Fermentation
- Catalyst

**Feedstocks**
- Corn
- Sugars
- Wood
- Grasses
- Municipal Waste
- Algae

**Molecule**
- Alcohol
  - Ethanol
  - Butanol
- Ether
  - ETBE
  - MTBE
- Ester
  - Biodiesel
- Hydrocarbon
  - Diesel
  - Jet
  - Gasoline
Fuel Properties

- Energy Content
- Environmentally Advantaged
- Fungibility (*drop in fuels*)
- Scalability
- Economically Competitive
Federal Biofuels Efforts

Total: 36 BG

Conventional
15 BG

Advanced
21 BG

Cellulosic
16 BG

EPA
RFS

Biomass Diesel
1 BG

BG = Billion Gallons

DOE
Biomass Program

USDA
Farm Bill Energy Title

DOD
MOU (DPA) + Contracting Authority

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
Bringing Barrels to the Market

- 6 advanced biofuels companies go public with success (Amyris, Gevo, Codexis, Solazyme, KiOR, Ceres)
- Dynamic Fuels
- KiOR
- Chemtex
- Gevo
- And others in the biomass-based diesel pool
Let’s Work Together
THE RENEWABLE FUEL STANDARD

THE PROGRESS AND THE POTENTIAL

Doug Berven, POET
RFS INTRODUCTION

• First introduced in 2005

• Expanded in 2007

• Calls for 36 billion gallons of renewable fuels by 2022

• Establishes a market for renewable fuels in a petroleum monopoly
BENEFITS OF ETHANOL TODAY

- National Security
- Economy
- Environment
- Food, Feed and Fuel
RFS PROMOTES CELLULOSIC ETHANOL
LOCAL PRODUCER INVOLVEMENT
THE FUTURE - WITH A STRONG RFS

• 50-state Solution
• World-wide Potential
• Continued Investment
• 350-400 New Biorefineries
• Rapid Expansion
• Less Dependence
• Cleaner Air

A THREAT TO THE STATUS QUO!
THE RFS IS WORKING
THANK YOU

Doug Berven, POET
The RFS and an environmental perspective on where we are now

Nathanael Greene
September 18, 2012

Natural Resources Defense Council
Economic Security = National Security = Environmental Security
Economic Security = National Security = Environmental Security

Too much corn; too little cellulosic; minimums being treated as maximums
Economic Security = National Security = Environmental Security

Too much corn; too little cellulosic; minimums being treated as maximums

133 votes targeting EPA; 302 against the environment
This congress cannot fix this problem
25 x ’25 & ACORE Webinar
The Renewable Fuels Standard and the Ethanol Complex

Matt Erickson
Economist
American Farm Bureau Federation®
September 18, 2012
Outline

• Economics of Ethanol

• The RFS and the 20% “Banking” Provision

• Corn Price Impact

• Gasoline/Ethanol Spread

• Concluding Remarks
Ethanol Production & Inventories

U.S. Ethanol Production vs. U.S. Ethanol Inventories (2011 - Present)

- 6-week = -13% decrease
- 2011
Ethanol Margins - Iowa

Iowa Weekly Ethanol Margins (2010 - Present)

Fixed Costs = $0.25/gal

Source: AFBF - Author Calculations
Example: 20% “Banking” Provision

Blender “X”

1.3 Bn RINs → 1.6 Bn RINs → Balance +300 million

“Bank” Provision: 20% of 1.3 Bn = 260 million

Remaining 40 million = sold to obligated parties

<table>
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<th>Year</th>
<th>Beginning RIN Stocks</th>
<th>+ Production</th>
<th>- Exports</th>
<th>- Mandate</th>
<th>Potential Ending RIN Stocks</th>
<th>Ending RIN Stocks</th>
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Sources: Production and Net Export from the Energy Information Administration, Mandate levels from EPA, RIN Stock levels calculated by the author.

Production and Net Exports for 2011 were only available through November 2011 at the time of this writing. These values were scaled by a factor of 1.091 (12/11) to arrive at annual estimates for 2011.
Purdue University Study

• 2013 partial RFS waiver: $0.00 - $1.30/bu. impact on corn prices.

• A lot depends on blender flexibility...
  • If there is no flexibility, issuing a waiver will do little to change the current market’s status quo.
  • If there is flexibility, waiver helps livestock producers and consumers of livestock products (hurts crop growers and ethanol producers).

• Currently and projected, there’s an incentive for blenders to blend 10% ethanol in gasoline – even during $8/bu. corn!
Gasoline/Ethanol Price Spread

Source: ProExporter
RFS Outlook and Conclusions

- Economic climate different than 2008
  - Oil, corn, ethanol and gasoline relationship – uncharted territory.
  - Drought causing harm to economy; RFS not causing drought.

- The RFS provides flexibility
  - 2012: RFS mandate will be met; 2013: conditions warrant uncertainty
    - For 2012: 2.5 Bn RINs for carry-over + over 796 million gallons in storage

- Waiving RFS for 2013 has uncertain impacts on corn prices.
  - Purdue University study: Corn prices decreasing $0.00 - $1.30/bu.
  - Still incentive for blender to blend 10% ethanol with gasoline even at $8/corn.
  - What will happen to DDG and Soybean Meal prices?

- Non-food feedstocks becoming reality!
Thank You!
Matt Erickson
Email: matthewe@fb.org
Phone: (202) 406-3625
Questions and Discussion
Moderated by Ernie Shea and Dennis McGinn
Thank You For Your Participation

A pdf of this presentation will be available for downloading at
http://www.25x25.org/index.php?option=com_content&task=view&id=878&Itemid=73