FILL UP ON FACTS: THE U.S. RENEWABLE FUEL STANDARD

AMERICAN PETROLEUM INSTITUTE

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Since the inception of the ethanol mandate a decade ago, the United States has undergone an energy transformation from a nation of energy dependence and scarcity to one of energy security and abundance.

It is well past time to reform outdated energy policies to reflect the energy realities of today and tomorrow.

Frank Macchiarola,
API, Downstream Group Director
Congress creates the RFS, calling for 7.5 Billion Gallons of biofuels by 2012 in the Energy Policy Act

2007
Congress revises the RFS in the Energy Independence & Security Act
- Calls for 36 billion gallons by 2022
- The new “RFS2” created four nested biofuel categories:
  * Cellulosic
  * Advanced
  * Biomass-based Diesel
  * Renewable Fuel (corn ethanol)

2010
EPA promulgates RFS rules waiving the cellulosic standard

2011
EPA issues volume requirements that exceed 9.7% ethanol

2013
EPA permits the use of E15 in 2001 and newer light-duty vehicles

RIN market jumps from under 5¢ to over $1.00

2013
Refiners file lawsuit against EPA after failing to issue rules for 2014 and 2015

2015
Issues a multi-year rule acknowledging the ethanol blendwall by waiving the overall volume requirements in 2014, 2015 and 2016.

2016
The ethanol lobby sues EPA for using its waiver authority.

Bipartisan group in congress introduces legislation to cap the RFS to not more than 9.7% ethanol in the gasoline market.
HISTORY OF THE RFS

  - Calls for 36 billion gallons by 2022.
  - The new “RFS2” created four nested biofuel categories:
    - Cellulosic
    - Advanced
    - Biomass-based Diesel
    - Renewable Fuel (corn ethanol)
- **2010**: EPA promulgates RFS rules waiving the cellulosic standard.
- **2010**: EPA permits the use of E15.
- **2013**: EPA issues volume requirements that exceed 9.7% ethanol.
- **2013**: RIN market jumps from under 5¢ to over $1.00.
- **2013**: EPA proposes to waive the 2014 total volume requirement, but doesn’t finalize the rule.
- **2015**: Refiners file lawsuit against EPA after failing to issue rules for 2014 and 2015.
- **2015**: Issues a multi-year rule acknowledging the ethanol blendwall by waiving the overall volume requirements in 2014, 2015 and 2016.
- **2015**: Bipartisan group in congress introduces legislation to cap the RFS to not more than 9.7% ethanol in the gasoline market.
- **2016**: The ethanol lobby sues EPA for using its waiver authority.
- **2018**: Statutory guidance ends and EPA establishes volumetric targets based on broad set of environmental and economic factors.
- **2020**: EPA is expected to trigger reset of the RFS and begins the process of rewriting statutory tables.
WHAT WAS THE RFS INTENDED TO DO?

In an effort to expand the nation’s renewable fuels sector while reducing reliance on imported oil and reduce greenhouse gas emissions, Congress created the renewable fuel standard (RFS) program. The program does not, however, effectively achieve its intended goals.
NESTED STANDARDS:  
FURTHER COMPLICATING THE RFS
### "NESTED" STANDARDS

<table>
<thead>
<tr>
<th>Biofuel Type</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>Cellulosic Biofuel (algae, switch-grass)</td>
<td>16 billion gallons</td>
</tr>
<tr>
<td>Biomass-Based Diesel (biodiesel)</td>
<td>1.0 billion gallons (minimum)</td>
</tr>
<tr>
<td>Advanced Biofuel (sugarcane ethanol)</td>
<td>21 billion gallons</td>
</tr>
<tr>
<td>Total Renewable Mandate (corn ethanol)</td>
<td>36 billion gallons</td>
</tr>
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**CHAPTER 1 | Introduction to the RFS**
RFS DOES NOT SUNSET
While Congress established biofuel volume targets through 2022, the program does not sunset and may continue on in perpetuity, leaving EPA to set annual RFS standards based on a broad set of criteria.

- Environment (air quality, climate, wetlands conversion, ecosystems, wildlife habitat, water quality, and water supply)
- Energy security
- Expected rate of biofuel production
- Impact on infrastructure (deliverability of materials, goods, and products other than biofuels, and the infrastructure to deliver and use renewable fuel)
- Cost of transportation fuels to consumers and to transport goods
- Impact on job creation, price and supply of agricultural commodities, rural economic development, and food prices
INCREASED U.S. CRUDE OIL PRODUCTION HAS BEEN THE PRIMARY FACTOR IN DECLINING CRUDE IMPORTS  
Change in Fuel Sources Between 2008 and 2017 (kb/d)  
(1,000 Barrels Per Day)
## THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007 RELIED ON FALSE ASSUMPTIONS

<table>
<thead>
<tr>
<th>EISA PREMISES</th>
<th>REALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Annual U.S. fuel consumption would continue rising indefinitely</td>
<td>• Today gasoline demand is 12% less than the 2007 outlook and is projected to decline</td>
</tr>
<tr>
<td>• Domestic oil supplies would be insufficient to meet that rising demand</td>
<td>• Thanks to technology advances, crude oil and natural gas resources are over 63% higher than projections made in 2007</td>
</tr>
<tr>
<td>• Growth in advanced (mainly cellulosic) biofuels would provide GHG benefits</td>
<td>• Aspirational GHG benefits have not been achieved</td>
</tr>
<tr>
<td></td>
<td>• Corn ethanol does not offer GHG benefits</td>
</tr>
<tr>
<td></td>
<td>• Cellulosic biofuel advancement did not materialize to scale</td>
</tr>
<tr>
<td></td>
<td>» ~0.1 billion RINs vs. 3.0 billion target (2015)</td>
</tr>
</tbody>
</table>
CHAPTER 2 | The RFS is Based on Outdated Assumptions

**MARKET REALITY VS. RFS MANDATES**

Consumption (billion gallons)

Gasoline demand projected in 2017 is **12% lower** than 2007 projections

Gasoline demand projected in 2022 is **22% lower** than 2007 projections

**Source:** EIA Annual Energy Outlook (AEO) and EISA.
EFFECTS OF THE BLEND WALL PROBLEM

- The blend wall problem could constrain domestic fuel supply and result in severe economic harm, according to a study by NERA Economic Consulting. NERA found that:
  - It is not feasible to achieve the volume of total renewable fuels required by the RFS statute.
  - A 30% reduction in gasoline and diesel supply would be required to reach the required blending percentage.
  - Severe rationing of diesel fuel would cause an extreme disruption in the commercial transportation sector.
A broad set of stakeholders has become critical of the RFS.
Chapter 3: Problems with the RFS

- Anti-Hunger Groups
- Non-Corn Agriculture Groups
- Boaters And Other Non-Road Equipment Users
- Restaurant Operators And Grocery Manufacturers
- Gasoline Retailers/Petroleum Marketers
- Motorcycle And Specialty Vehicle Groups
- Fiscal Conservative Groups
- Environmental Groups
THE ETHANOL BLEND WALL PROBLEM
Chapter 3: Problems with the RFS

WHAT IS THE “ETHANOL BLEND WALL”?  

• The maximum amount of ethanol that can be blended into gasoline, based on the limitations of the vehicle fleet and refueling infrastructure.  
• The practical maximum ethanol volume is at 9.7% of total gasoline demand.

INCREASED E15 AND E85 ARE NOT FEASIBLE SOLUTIONS TO THE BLEND WALL (AS EXPLAINED IN THE FOLLOWING PAGES).
E15: NOT A BLEND WALL SOLUTION
Chapter 3: Problems with the RFS

- **A automakers do not recommend or warranty E15 in vehicles not specifically designed to use it:**
  - About 75% of vehicles were not designed for E15.

- **The vehicle testing EPA used to approve E15 was inadequate:**
  - Testing was only designed to determine impacts to emissions system;
  - Study observations were inappropriately extrapolated to engine durability impacts.

- **Coordinating Research Council (Auto/Oil Testing) uncovered problems with E15**
  - Using industry recognized engine durability tests, CRC testing shows some vehicles may be compromised with E15;¹
  - CRC testing also uncovered potential risks to fuel systems;¹
  - Additional testing showed problems with check engine lights.³

- **Retail fueling infrastructure may not be compatible:**
  - Studies show over 50% of fueling equipment may not be compatible.²

- **E15 use in non-passenger vehicles is prohibited by EPA and some manufacturers (motorcycles, boats, small engine equipment).**

¹ Final reports available at [http://www.crcao.org](http://www.crcao.org)
WHAT HAVE OTHERS SAID ABOUT E15?
Chapter 4: Automakers Agreed: E15 is not Suitable for the Legacy Fleet

AAA
High potential for consumers to inadvertently misfuel their vehicles thereby voiding the vehicle’s warranty.¹

CHRYSLER
We are not confident that our vehicles will not be damaged by E15.²

Ford
Ford does not support the introduction of E15 into the marketplace for the legacy fleet.²

GM
We are not confident that our cars and trucks from model year 2001 and later will be undamaged by the use of E15.³

HYUNDAI
The EPA tests failed to conclusively show that the vehicles will not be subject to damage or increased wear.²

Mercedes-Benz
Any ethanol blend above E10, including E15, will harm emission control systems in M-B engines.²

Toyota
Toyota cannot recommend the use of fuel with greater than E10 for Toyota vehicles.²

³ Robert E. Ferguson, Vice President, General Motors Company to the Honorable F James Sensenbrenner, Jr., Representative, Fifth District Wisconsin, July 1, 2011.
MOST VEHICLES ON THE ROAD TODAY . . .
AREN'T RECOMMENDED FOR OPERATING ON E15 BY MANUFACTURERS.
WAS YOUR VEHICLE DESIGNED AND WARRANTED TO OPERATE ON E15?
### WAS YOUR VEHICLE DESIGNED AND WARRANTED TO OPERATE ON E15?

**Chapter 4: Automakers Agreed: E15 is not Suitable for the Legacy Fleet**

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL YEAR</th>
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<tbody>
<tr>
<td>-----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>BMW</td>
<td>No</td>
</tr>
<tr>
<td>Chrysler</td>
<td>No</td>
</tr>
<tr>
<td>Ford</td>
<td>No</td>
</tr>
<tr>
<td>GM</td>
<td>No</td>
</tr>
<tr>
<td>Honda/Acura</td>
<td>No</td>
</tr>
<tr>
<td>Hyundai/Kia</td>
<td>No</td>
</tr>
<tr>
<td>Jaguar/Land Rover</td>
<td>No</td>
</tr>
<tr>
<td>Mazda</td>
<td>No</td>
</tr>
<tr>
<td>Mercedes</td>
<td>No</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>No</td>
</tr>
<tr>
<td>Nissan/Infiniti</td>
<td>No</td>
</tr>
<tr>
<td>Subaru</td>
<td>No</td>
</tr>
<tr>
<td>Toyota/Lexus</td>
<td>No</td>
</tr>
<tr>
<td>VW/Audi/Porsche</td>
<td>No</td>
</tr>
<tr>
<td>Volvo</td>
<td>No</td>
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</tbody>
</table>

**E15 Chart Sources:** [http://www.edmunds.com/ownership/howto/articles/120189/article.html](http://www.edmunds.com/ownership/howto/articles/120189/article.html) and auto company contacts

¹ Accord, Civic, Crosstour, CR-V, CR-Z, Insight, Odyssey, Pilot; Acura: ILX, MDX, RDX, RLX, but not TL, TSX, TSX Wagon

² Some owner manuals for 2014 and 2015 incorrectly stated that E15 was allowed.

³ Avalon, Camry, Corolla, Highlander, iQ, Prius, RAV-4, Scion tC, Sienna, Venza; Lexus: CT200H, ES350, GS300/350, GS450H, IS250, IS350, LS460, RX350, RX450H, but not 4Runner, FJ Cruiser, Land Cruiser,

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Sequoia, Tacoma, Tundra, Yaris; Lexus: IS250C, IS350C, IS F, GX460, LX570

¹ Not Chevrolet City Express

² Not FR-S, xB (model discontinued after 2015).

³ Not Dodge Viper

¹ Not Hyundai Santa Fe, Kia Optima

⁴ Not Hyundai Sonata, Kia Forte, Kia Niro
Chapter 5: E85 is Not a Solution

E85 ENERGY COST

According to the Energy Information Administration, the energy content of ethanol is about 33% less than pure gasoline, and E85 contains 51-83% ethanol, lowering gas mileage and forcing consumers to fill up more frequently.
NOT ENOUGH CONSUMER DEMAND FOR E85
Chapter 5: E85 is Not a Solution

E85 IS NOT A SOLUTION TO THE ETHANOL BLEND WALL


ACCORDING TO EIA DATA THE ANNUAL AMOUNT OF E85 SOLD IS LESS THAN ONE TENTH OF ONE PERCENT OF ANNUAL GASOLINE DEMAND.

LESS THAN 0.1 PERCENT OF GASOLINE DEMAND

Annual Gasoline Demand
2017 OBLIGATIONS – PUSHING THE BLEND WALL

- Ethanol volumes beyond 9.7% begin to trigger the impacts of the ethanol blend wall.
- 2017 RFS standards are based on unrealistic assumptions intended to push the limits of the ethanol blend-wall. Under the rule, total ethanol is set at about 10.4% of gasoline supply.
  » EPA drastically underestimated E0 demand
    ♦ EPA’s estimate of 200 million gallons is unrealistic
    ♦ EIA estimates 5.3 billion gallons of E0 were consumed in 2015. EPA ignored this valid data demonstrating significant consumer demand for E0
WHAT HAPPENS BEYOND 9.7%?

The EPA pushes the market to sell fuels the consumer doesn’t want - E15 and E85 - and ignores the fuels that people are asking for, like E0. The RINS, used to demonstrate compliance, become scarcer. The RIN scarcity increases the cost to provide transportation fuels.

Additional ethanol cannot be absorbed into the fuel supply, and compliance can be met with
  » Carryover RINS from prior years
  » Additional biodiesel beyond its mandated volume
RFS COMPLIANCE: WHAT IS A RIN?
( Renewable Identification Number)

- RINs are generated by biofuel producers and importers
- RINs can be traded after the biofuel is blended with gasoline or diesel
- Obligated parties submit RINs to EPA to demonstrate compliance with each category of biofuel
- The ability to supply transportation fuel is limited by the availability of RINs
  » RINs are in essence permits to supply gasoline and diesel fuels
- RINs are not free. RINs increase the cost to supply transportation fuels
CHANGING THE POINT OF OBLIGATION: NOT A SOLUTION TO THE RFS

- **EPA should not change the point of obligation**
  - Doesn’t address the blendwall problem or impact the overall volume of renewable fuels
  - Will create additional uncertainty in the RFS program and the RIN market
  - Adds unnecessary complexity for EPA and for obligated parties

- **Moving the point of obligation is merely passing the RFS obligation from one segment of the industry to another.**
### Chapter 7: Glossary of Terms

<table>
<thead>
<tr>
<th>BLEND WALL</th>
<th>EO</th>
<th>EIA</th>
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<tbody>
<tr>
<td>The maximum amount of ethanol that can be blended into gasoline based on the limitations of the vehicle fleet and refueling infrastructure, <strong>9.7%</strong> of gasoline demand</td>
<td><strong>Gasoline without</strong> ethanol</td>
<td><strong>U.S. Energy Information Administration</strong></td>
</tr>
<tr>
<td><strong>E15</strong></td>
<td><strong>Gasoline with 15% ethanol</strong></td>
<td><strong>EISA</strong></td>
</tr>
<tr>
<td><strong>E85</strong></td>
<td><strong>51-83% ethanol with gasoline</strong></td>
<td><strong>NERA Economic Consulting firm</strong></td>
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</table>

**BLEND WALL**

- **EO**
  - Gasoline without ethanol
- **E15**
  - Gasoline with 15% ethanol
- **E85**
  - 51-83% ethanol with gasoline

**EIA**

- **EISA**
**RFS**

The Renewable Fuel Standard program created under the Energy Policy Act of 2005 (EPAct), which amended the Clean Air Act (CAA)

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**RFS2**

The current RFS program, expanded under the Energy Independence and Security Act of 2007 to create four nested biofuel categories

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**RIN**

Renewable Identification Numbers are credits used for compliance and are the “currency” of the RFS program
CONTACT

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