

A photograph of a cornfield at sunset. The foreground shows several tall, green corn stalks with long, pointed leaves. The background is a soft, out-of-focus field of corn under a warm, orange and yellow sky. The sun is low on the horizon, creating a bright glow and long, gentle shadows.

# **FILL UP ON FACTS:**

## **THE U.S. RENEWABLE FUEL STANDARD**

**AMERICAN PETROLEUM INSTITUTE**

June 2018



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It is well past time to reform outdated energy policies to reflect the energy realities of today and tomorrow.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



# HISTORY OF

Congress creates the RFS, calling for **7.5 Billion Gallons** of biofuels by 2012 in the Energy Policy Act

EPA promulgates RFS rules waiving the cellulosic standard

EPA issues volume requirements that exceed 9.7% ethanol

EPA p  
total v  
does n

2007

2011

2013

2005

2010

2013

Ethanol lobby wins lawsuit limiting EPA's ability to exercise its waiver authority. 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)

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

RIN market jumps from under **5¢** to over **\$1.00**



# F THE RFS

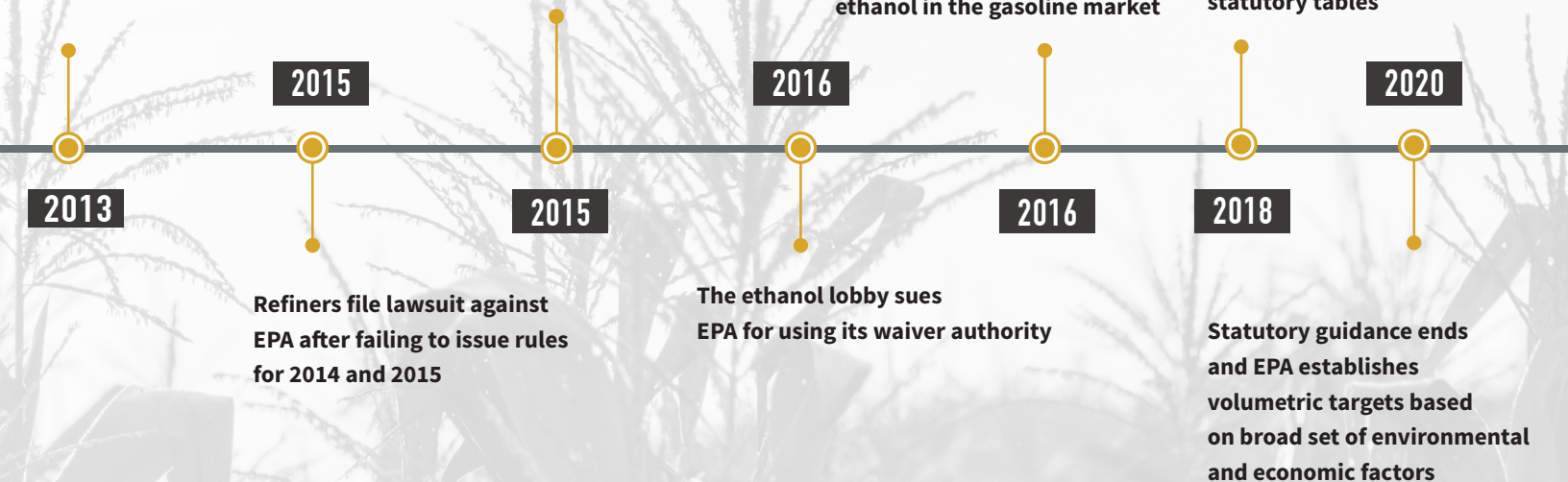


Proposes to waive the 2014 volume requirement, but can't finalize the rule

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

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

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

**Cellulosic Biofuel**  
(algae, switch-grass)  
16 billion gallons

**Biomass-Based Diesel**  
(biodiesel)  
1.0 billion gallons (minimum)

**Advanced  
Biofuel**  
(sugarcane  
ethanol)  
21 billion gallons

**Total Renewable  
Mandate**  
(corn ethanol)  
36 billion gallons

# RFS DOES NOT SUNSET

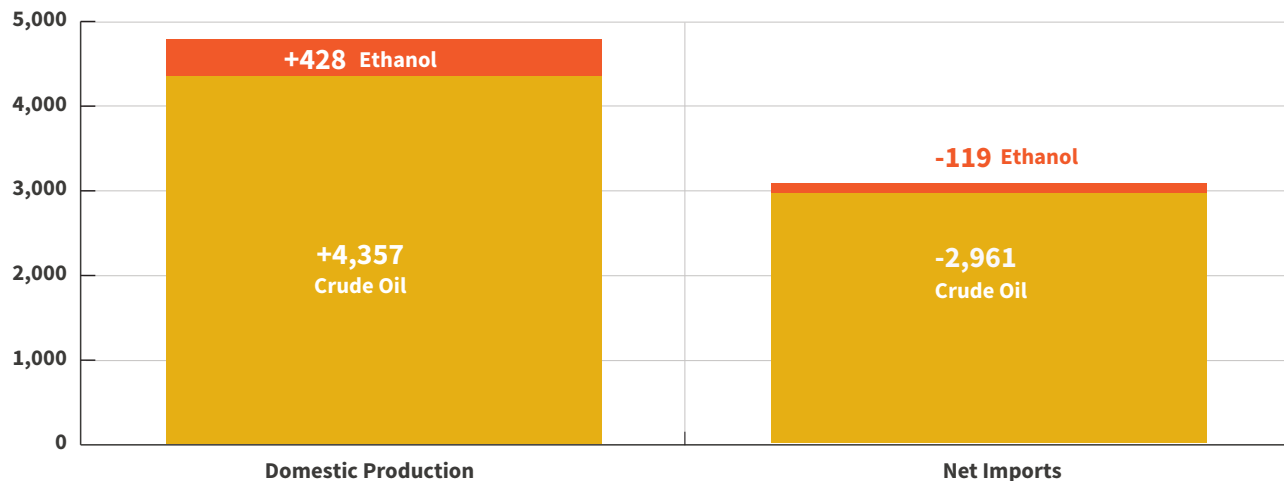


- **While Congress established biofuel volume targets through 2022, the program does not sunset and may continue on in perpetuity, leaving EPA to set annual RFS standards based on a broad set of criteria.**
  - » Environment (air quality, climate, wetlands conversion, ecosystems, wildlife habitat, water 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)



Source: EIA, Monthly Energy Review.

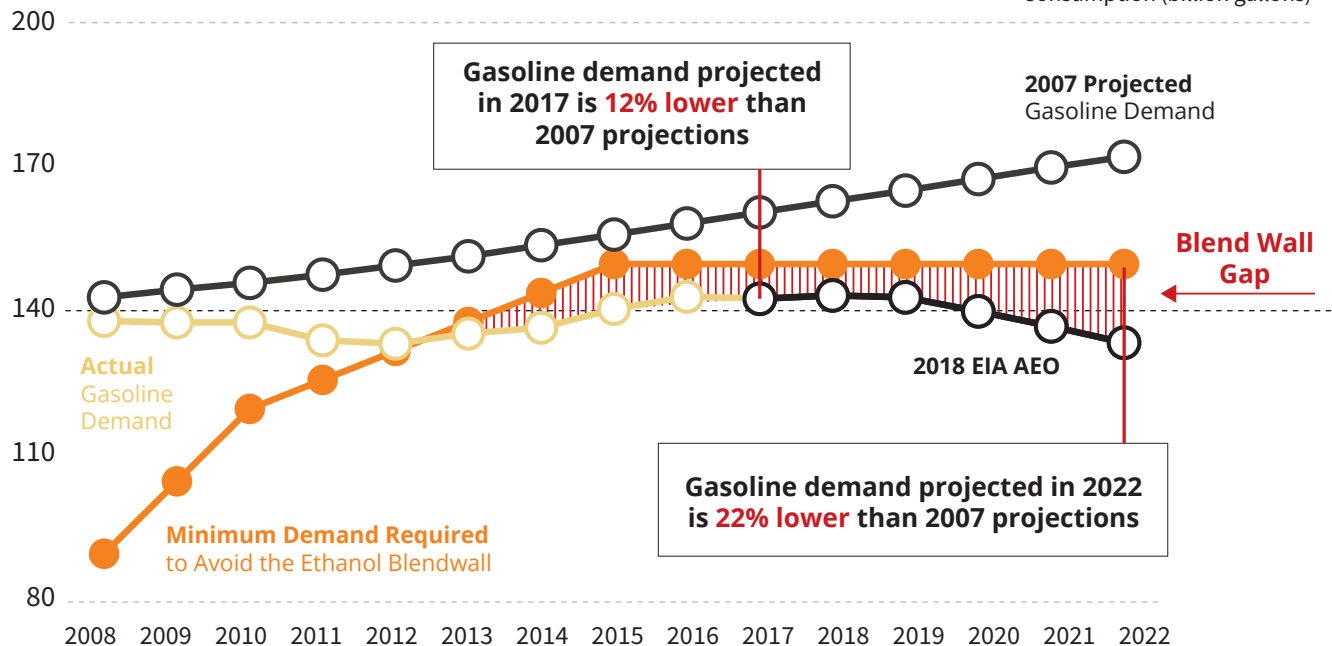


## THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007 RELIED ON FALSE ASSUMPTIONS

EISA PREMISES	REALITY
<ul style="list-style-type: none"> <li>Annual U.S. fuel consumption would continue rising indefinitely</li> </ul>	<ul style="list-style-type: none"> <li>Today gasoline demand is 12% less than the 2007 outlook and is projected to decline</li> </ul>
<ul style="list-style-type: none"> <li>Domestic oil supplies would be insufficient to meet that rising demand</li> </ul>	<ul style="list-style-type: none"> <li>Thanks to technology advances, crude oil and natural gas resources are <b>over 63% higher</b> than projections made in 2007</li> </ul>
<ul style="list-style-type: none"> <li>Growth in advanced (mainly cellulosic) biofuels would provide GHG benefits</li> </ul>	<ul style="list-style-type: none"> <li>Aspirational GHG benefits have not been achieved</li> <li>Corn ethanol does not offer GHG benefits</li> <li>Cellulosic biofuel advancement did not materialize to scale                             <ul style="list-style-type: none"> <li>» ~0.1 billion RINs vs. 3.0 billion target (2015)</li> </ul> </li> </ul>

## MARKET REALITY VS. RFS MANDATES

Consumption (billion gallons)



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

---





**Anti-Hunger  
Groups**



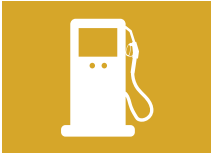
**Non-Corn  
Agriculture Groups**



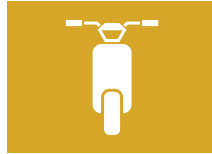
**Boaters And  
Other Non-Road  
Equipment Users**



**Restaurant  
Operators  
And Grocery  
Manufacturers**



**Gasoline  
Retailers/  
Petroleum  
Marketers**



**Motorcycle And  
Specialty Vehicle  
Groups**



**Fiscal  
Conservative  
Groups**



**Environmental  
Groups**

# THE ETHANOL BLEND WALL PROBLEM

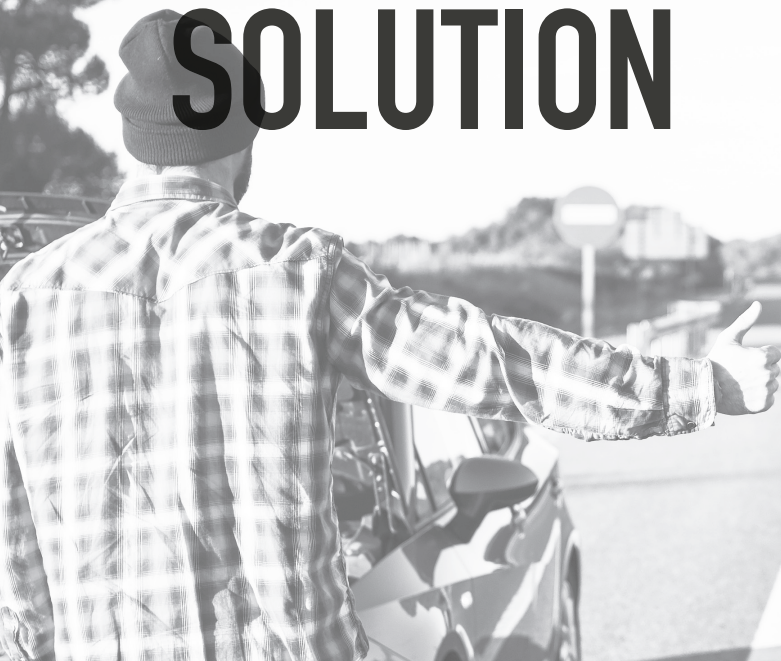


## WHAT IS THE “ETHANOL BLEND WALL”?

- 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





- **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;<sup>1</sup>
  - » CRC testing also uncovered potential risks to fuel systems;<sup>1</sup>
  - » Additional testing showed problems with check engine lights.<sup>3</sup>
- **Retail fueling infrastructure may not be compatible:**
  - » Studies show over 50% of fueling equipment may not be compatible.<sup>2</sup>
- **E15 use in non-passenger vehicles is prohibited by EPA and some manufacturers (motorcycles, boats, small engine equipment).**

<sup>1</sup> Final reports available at <http://www.crcao.org>

<sup>2</sup> UL. Gregory, "A Comprehensive Analysis of Current Research on E15 Dispensing Component Compatibility" March 2012

<sup>3</sup> Sluder, C., West, B., and Knoll, K., "Investigating Malfunction Indicator Light Illumination Due to Increased Oxygenate Use in Gasoline,"

SAE Int. J. Fuels Lubr. 5(3):1360-1371, 2012,



A stack of newspapers is visible in the lower-left corner of the image, with their pages fanned out. The background is a light, out-of-focus grey. The text is overlaid on the upper half of the image.

# WHAT HAVE OTHERS SAID ABOUT E15?



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



**High potential for consumers to inadvertently mis-fuel their vehicles thereby voiding the vehicle's warranty.<sup>1</sup>**



**We are not confident that our vehicles will not be damaged by E15.<sup>2</sup>**



**Ford does not support the introduction of E15 into the marketplace for the legacy fleet.<sup>2</sup>**



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



**HYUNDAI**

**The EPA tests failed to conclusively show that the vehicles will not be subject to damage or increased wear.<sup>2</sup>**



**Mercedes-Benz**

**Any ethanol blend above E10, including E15, will harm emission control systems in M-B engines.<sup>2</sup>**



**TOYOTA**

**Toyota cannot recommend the use of fuel with greater than E10 for Toyota vehicles.<sup>2</sup>**

<sup>1</sup> Comments to RFS Proposed Rule (EPA-HQ-OAR-2015-0111-2037) July 27, 2015.

<sup>2</sup> [http://www.api.org/~media/Files/Policy/Fuels-and-Renewables/What-others-are-saying/E15\\_Auto\\_Responses.pdf](http://www.api.org/~media/Files/Policy/Fuels-and-Renewables/What-others-are-saying/E15_Auto_Responses.pdf), July 5, 2011.

<sup>3</sup> Robert E. Ferguson, Vice President, General Motors Company to the Honorable F James Sensenbrenner, Jr., Representative, Fifth District Wisconsin, July 1, 2011.



A composite image featuring a woman with short blonde hair in the upper right, wearing a dark jacket and talking on a mobile phone. In the lower left, a car's side-view mirror is visible, reflecting a road scene. The background is a mix of these elements with a large, semi-transparent orange-brown rectangular area in the center. The text "MOST VEHICLES ON THE ROAD TODAY . . ." is written in white, bold, sans-serif capital letters across this central area.

**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

MANUFACTURER	MODEL YEAR																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>BMW</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
<b>Chrysler</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Most <sup>6</sup>	Most <sup>6</sup>	Yes
<b>Ford</b>	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>GM</b>	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Most <sup>4</sup>	Most <sup>4</sup>	Most <sup>4</sup>	Yes
<b>Honda/Acura</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	Some <sup>1</sup>	Yes	Yes	Yes	Yes
<b>Hyundai/Kia</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Most <sup>7</sup>	Most <sup>8</sup>
<b>Jaguar/Land Rover</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
<b>Mazda</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
<b>Mercedes</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No <sup>2</sup>	No <sup>2</sup>	No	No	No
<b>Mitsubishi</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
<b>Nissan/Infiniti</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Most
<b>Subaru</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
<b>Toyota/Lexus</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	Some <sup>3</sup>	Most <sup>5</sup>	Most <sup>5</sup>	Yes	Yes
<b>VW/Audi/Porsche</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
<b>Volvo</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

E15 Chart Sources: <http://www.edmunds.com/ownership/howto/articles/120189/article.html>

and auto company contacts

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

<sup>2</sup> Some owner manuals for 2014 and 2015 incorrectly stated that E15 was allowed.

<sup>3</sup> 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,

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

<sup>4</sup> Not Chevrolet City Express

<sup>5</sup> Not FR-S, xB (model discontinued after 2015).

<sup>6</sup> Not Dodge Viper

<sup>7</sup> Not Hyundai Santa Fe, Kia Optima

<sup>8</sup> Not Hyundai Sonata, Kia Forte, Kia Niro







# 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

---

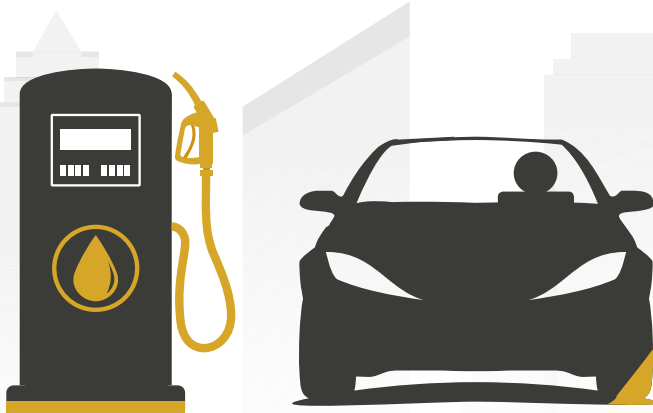
## E85 IS NOT A SOLUTION TO THE ETHANOL BLEND WALL

Annual Gasoline Demand

Chapter 5: E85 is Not a Solution

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



Source: U.S. Department of Energy.

## 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.**

## BLEND WALL

The maximum amount of ethanol that can be blended into gasoline based on the limitations of the vehicle fleet and refueling infrastructure, **9.7%** of gasoline demand

## E0

Gasoline  
**without** ethanol

## E15

Gasoline with  
**15%** ethanol

## E85

**51-83%** ethanol  
with gasoline

## EIA

U.S. Energy Information  
Administration

## EISA

Energy Independence  
and Security Act of 2007

## NERA

NERA Economic  
Consulting firm

## RFS

### **The Renewable Fuel Standard**

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

## RFS2

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

## RIN

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

# CONTACT



**Will Hupman,**

API, Director of Federal Relations

**HupmanW@api.org**

202.682.8396



1220 L Street, NW  
Washington, DC 20005

© Copyright 2018 - American Petroleum Institute (API),  
all rights reserved. Digital Media | DM2018-075 | 06.08 | PDF



Learn more at:  
[www.api.org/rfs](http://www.api.org/rfs)



Learn more at:  
[www.filluponfacts.com](http://www.filluponfacts.com)



Follow us on twitter:  
<https://twitter.com/energytomorrow>



Like us on facebook:  
[www.facebook.com/energytomorrow](https://www.facebook.com/energytomorrow)