

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY**

**HEARING CHARTER**

*The Renewable Fuel Standard: A Ten Year Review of Costs and Benefits*

Tuesday, November 3, 2015  
10:00 a.m. – 11:30 a.m.  
2318 Rayburn House Office Building

**PURPOSE**

The Subcommittees on Environment and Oversight will hold a joint hearing titled *The Renewable Fuel Standard: A Ten Year Review of Costs and Benefits* on Tuesday, November 3, 2015, starting at 10:00 a.m. in Room 2318 Rayburn House Office Building. The purpose of this hearing is to examine the environmental impact and cost of the Renewable Fuel Standard (RFS) over the ten year history of the program, as well as the economic impact and specific technical challenges involved in meeting future RFS requirements. This hearing will also specifically examine the impact of the RFS on the price of food and fuel.

**WITNESSES**

- **Dr. Terry Dinan**, Senior Advisor, Congressional Budget Office
- **Mr. Ed Anderson**, CEO and President of WEN-GAP, LLC
- **Dr. John DeCicco**, Research Professor, University of Michigan Energy Institute
- **Mr. Brooke Coleman**, Executive Director, Advanced Biofuels Business Council
- **Mr. Charles Drevna**, Distinguished Senior Fellow, Institute for Energy Research

**BACKGROUND**

The Renewable Fuel Standard (RFS) was established in the Energy Policy Act of 2005 (EPACT 05), which required transportation fuels in the continental U.S. contain, or be blended with, renewable biofuels at increasing volumes.<sup>1</sup> When the RFS was initially designed, the primary goals were to reduce greenhouse gas emissions and reduce U.S. reliance on crude oil imports by accelerating the use of biofuels in the U.S. transportation fuel supply.<sup>2</sup>

In 2007, the Energy Independence and Security Act of 2007 (EISA) expanded the scope of the RFS (commonly known as RFS2) by mandating the blending of 20.5 billion gallons of biofuels into U.S. transportation fuels by 2015, and 36 billion gallons by 2022.<sup>3</sup> EISA established four

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<sup>1</sup> P.L. 109-58, Energy Policy Act of 2005. Aug. 8, 2005. Available at <http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf>

<sup>2</sup> Environmental Protection Agency, Renewable and Alternative Fuels. Available at <http://www.epa.gov/otaq/fuels/alternative-renewablefuels/index.htm>

<sup>3</sup> P.L. 110-140, Energy Independence and Security Act of 2007. Dec. 19, 2007. Available at <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

specific categories of renewable fuel—conventional biofuels, advanced biofuels, cellulosic biofuels, and biomass-based diesels, with specific target requirements for each category of fuel outlined in the law. The conventional biofuels category is primarily made up of fuels from corn ethanol.<sup>4</sup>

Advanced biofuels are biofuels produced from feedstocks other than cornstarch that achieve lifecycle greenhouse gas emissions that are 50% lower than petroleum fuels, while cellulosic biofuels are required to reduce lifecycle greenhouse gas emissions by 60%.<sup>5</sup>

Under EISA, the EPA has waiver authority to reduce volumes of renewable fuels below the volumes specified in statute under certain circumstances, including annual production rate of renewable fuels, impact on energy security and the environment, as well as other factors such as job creation, price and supply of agricultural commodities, rural development and food prices.<sup>6</sup> The EPA has consistently used this waiver authority, lowering the cellulosic biofuel mandate from 2010 to 2013, and proposing to do so again for all renewable fuel volumes in 2014-2016.<sup>7</sup> Under the terms of a consent decree from litigation brought by the American Petroleum Institute (API) and the American Fuel and Petrochemical Manufacturers (AFPM), the EPA is required to finalize volume requirements for 2014 and 2015 by November 30, 2015.<sup>8</sup>

After ten years, the RFS program continues to create compliance challenges for industry, and promised environmental and economic benefits have yet to materialize. In 2014, the Congressional Budget Office outlined ongoing challenges with the law, including the lack of domestic production capacity of advanced biofuels fuels, the blend wall, and outlining the significant difference in outcome between the volumes mandated in the EISA and the current EPA waiver volume requirements.<sup>9</sup> If the volumes mandated by EISA are strictly enforced, CBO estimated that the price of petroleum-based diesel would increase by up to 14%, and the cost of E10 (the most commonly used form of gasoline in the U.S.) increases by up to 9%.<sup>10</sup>

While the RFS program has contributed to a 267% increase in corn ethanol production (from 3.9 billion gallons in 2005 to 14.3 billion gallons in 2014), advanced biofuels and cellulosic ethanol production has stagnated.<sup>11</sup> This increase in corn ethanol production due to the RFS is

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<sup>4</sup> Environmental Protection Agency, *Renewable Fuel Standard (RFS)*. Available at <http://www.epa.gov/OMSWWW/fuels/renewablefuels/index.htm>

<sup>5</sup> Congressional Research Service. *Calculation of Lifecycle Greenhouse Gas Emissions for the Renewable Fuel Standard (RFS)*. March 12, 2010. Available at <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43325.pdf>

<sup>6</sup> P.L. 110-140, Energy Independence and Security Act of 2007. Dec. 19, 2007. Available at <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

<sup>7</sup> Congressional Research Service, *The Renewable Fuel Standard (RFS): In Brief*, June 29, 2015. Available at <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43325.pdf>

<sup>8</sup> Environmental Protection Agency, *2015 Announcements for Renewable Fuel Standard Program*. Available at <http://www2.epa.gov/renewable-fuel-standard-program/2015-announcements-renewable-fuel-standard-program>

<sup>9</sup> Congressional Budget Office, *The Renewable Fuel Standard: Issues for 2014 and Beyond*. June 2014. Available at <https://www.cbo.gov/sites/default/files/113th-congress-2013-2014/reports/45477-Biofuels2.pdf>

<sup>10</sup> Ibid.

<sup>11</sup> English, Burton and De La Torre Ugarte, Daniel, *A 10-Year Review of the Renewable Fuels Standard: Impacts to the Environment, the Economy, and Advanced Biofuels Development*. Department of Agricultural and Resource

significant due to the emissions profile of corn ethanol. In testimony during a Science Committee hearing last July, Dr. Jason Hill from the University of Minnesota confirmed that when considering lifecycle emissions, “corn ethanol has higher life cycle emissions than gasoline of five major pollutants that contribute to PM2.5 and O3 levels” while cellulosic ethanol emits greater amounts of some pollutants than gasoline but lower amounts of others.<sup>12</sup> This research contradicts predictions that if enacted, the biofuels mandate would significantly reduce emissions. With corn ethanol composing 87% of national biofuels production, the promised environmental benefits of the RFS appear to be impossible without significant adjustments to current law.<sup>13</sup>

### *RFS Compliance*

The EPA manages compliance with the RFS through a fuel credit system incorporating Renewable Identification Credits (RINs).<sup>14</sup> RINs are generated with each qualifying gallon of renewable fuels produced by biofuel producers and importers, and can be traded and sold like other commodities. In order to comply with biofuel volumes mandated under the RFS, petroleum refiners and importers within the continental U.S. and Hawaii must acquire RINs to meet their renewable volume obligation (RVO), and submit these RINs to the EPA to show compliance with annual RFS requirements.<sup>15</sup> The chart below provides an overview of the complex RIN credit system.

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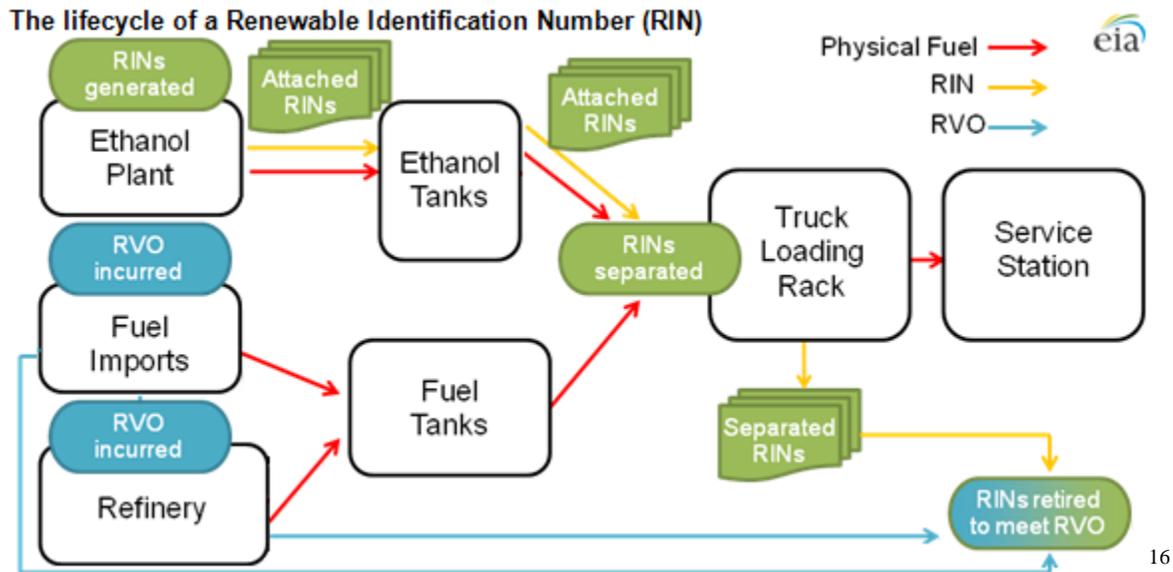
Economics, The University of Tennessee. October 14, 2015. Available at [http://beag.ag.utk.edu/pub/TenYrReviewRenewableFuelStandard\\_1015.pdf](http://beag.ag.utk.edu/pub/TenYrReviewRenewableFuelStandard_1015.pdf)

<sup>12</sup> Hill, Jason. *Statement before the Subcommittee on Energy and Subcommittee on Oversight on the EPA Renewable Fuel Standard Mandate*. July 23, 2015. Available at <https://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-114-SY20-WState-JHill-20150723.pdf>

<sup>13</sup> English, Burton and De La Torre Ugarte, Daniel, *A 10-Year Review of the Renewable Fuels Standard: Impacts to the Environment, the Economy, and Advanced Biofuels Development*. Department of Agricultural and Resource Economics, The University of Tennessee. October 14, 2015. Available at [http://beag.ag.utk.edu/pub/TenYrReviewRenewableFuelStandard\\_1015.pdf](http://beag.ag.utk.edu/pub/TenYrReviewRenewableFuelStandard_1015.pdf)

<sup>14</sup> Congressional Research Service, *The Renewable Fuel Standard (RFS): In Brief*, June 29, 2015. Available at <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43325.pdf>

<sup>15</sup> Ibid.



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The EPA sets the annual RVO by translating the biofuels volumes required under EISA into a percentage of the total transportation fuel (gasoline and diesel) sold within the U.S. The EPA estimates the total volume of the annual transportation fuel supply to determine this percentage, issues a proposed rule, and is required to promulgate an annual standard by November 30<sup>th</sup> each year to provide percentages to industry. Accordingly, each individual refiner’s RVO is determined by the total gasoline and diesel fuel they produce for sale multiplied by the annual renewable fuel percentage standards mandated by EPA.<sup>17</sup> This formula allows refiners to determine the number of RINs the refiner is responsible for submitting to EPA to prove compliance with the RFS.<sup>18</sup>

To date, the majority of annual volumes required under the RFS have been met with corn ethanol biofuels, largely through the sale of E10, or ten percent blended gasoline. However, as the RFS volumes continue to increase over time, the share of mandated volumes for advanced and cellulosic biofuels grows, with cellulosic biofuels requirements increasing from less than 1% of required volumes in 2010 to 44% of the required volumes in 2022.<sup>19</sup>

### Challenges

The RFS creates a number of compliance challenges for refiners, biofuel producers, engine manufacturers, and distributors of the U.S. transportation fuel supply—eventually impacting American consumers through the price and availability of fuels. These issues include ongoing uncertainty in EPA management of the RFS, difficulty in achieving adequate levels of renewable fuel production, and the impact of “blend wall” in meeting RFS volume requirements in the

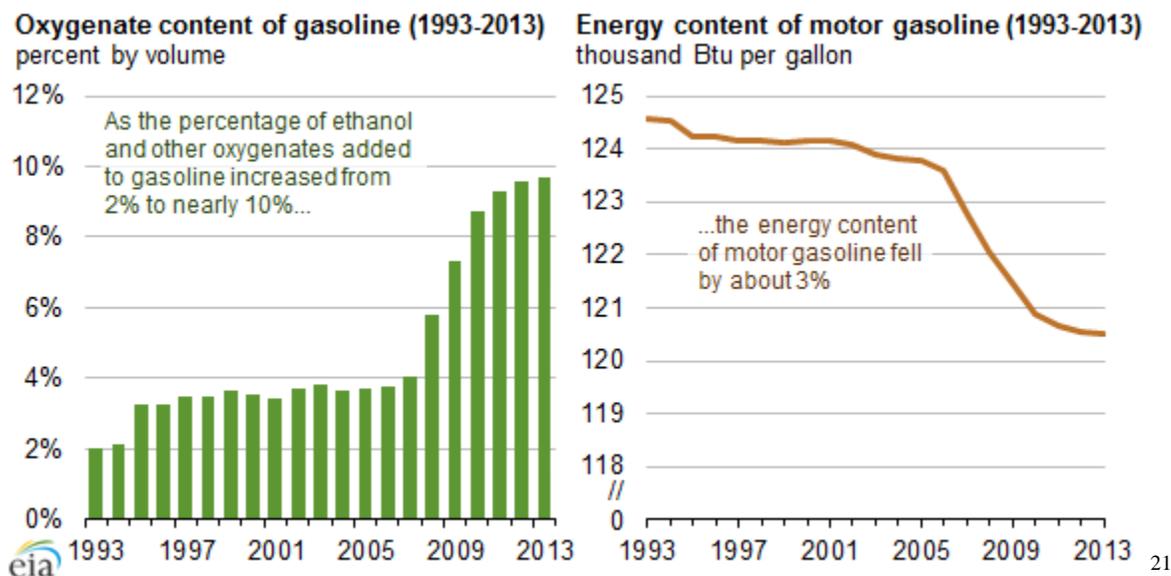
<sup>16</sup> Energy Information Administration, *RINs and RVOs are used to implement the Renewable Fuel Standard*. June 3, 2013. Available at <http://www.eia.gov/todayinenergy/detail.cfm?id=11511>

<sup>17</sup> Ibid.

<sup>18</sup> Energy Information Administration, *RINs and RVOs are used to implement the Renewable Fuel Standard*. June 3, 2013. Available at <http://www.eia.gov/todayinenergy/detail.cfm?id=11511>

<sup>19</sup> P.L. 110-140, Energy Independence and Security Act of 2007. Dec. 19, 2007. Available at <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

future. Reductions in the energy content and efficiency of transportation fuels due to increased blending of biofuels (as outlined in the graphic below) also lower customer demand for mid-level ethanol blend fuels.<sup>20</sup>



### Uncertainty and Demand

The EPA finally released a proposed standard to implement the RFS for 2014-16 on May 29, 2015, after almost an 18 month delay for the 2014 standard. This delay created uncertainty for both conventional and renewable fuel producers. In November 2014, EPA announced it would not finalize a rule at all during the calendar year, and would instead postpone the updated standard from 2014 until 2015.<sup>22</sup> The EPA’s decision to ignore statutory requirements created long-term uncertainty in the energy market place that threatened adequate supply for meeting volume requirements for renewable fuels in the future.

Demand and consumption rates also present challenges to the RFS. EISA projected significantly higher demand for gasoline than has occurred, and assumed technological advances in cellulosic and advanced biofuels production to meet increasing volume requirements.<sup>23</sup> As statutory mandates increase and demand declines based on projections, higher percentages of biofuels are required to be blended into the fuel supply to meet the RFS requirements. In the proposed RFS rule for 2014-2016, the EPA recognized that “limitations in the ability of the industry to produce sufficient volumes of qualifying renewable fuel, particularly non-ethanol fuels” was a significant

<sup>20</sup> Energy Information Administration, *Increasing ethanol use has reduced the average energy content of retail motor gasoline*, October 27, 2014. Available at <http://www.eia.gov/todayinenergy/detail.cfm?id=18551>

<sup>21</sup> Ibid.

<sup>22</sup> Bloomberg, *EPA Won't Finalize Renewable Fuel Standard in 2014, Cites Lengthy Delays*, November 24, 2014. Available at <http://www.bna.com/epa-wont-finalize-n17179912489/>

<sup>23</sup> Environmental Protection Agency, *EPA Proposes Renewable Fuel Standards for 2014, 2015, and 2016, and the Biomass-Based Diesel Volume for 2017*, May 2015. Available at <http://www.epa.gov/OMSWWW/fuels/renewablefuels/documents/420f15028.pdf>

limiting factor in meeting the volume requirements outlined in statute.<sup>24</sup> In addition, limits on the amount of ethanol that can be blended, also known as the “blend wall” offer a significant challenge to meeting future requirements.

### *The Blend Wall*

The “blend wall”, or ten percent ethanol, is considered the upper limit to the total amount of ethanol that can be blended into U.S. transportation fuel supply while still maintaining engine performance and compliance with the Clean Air Act.<sup>25</sup> The blend wall is considered a significant challenge to meeting future biofuel volumes mandated in the RFS, and is in conflict with the biofuel volumes mandated in the RFS. The EPA specifically acknowledged the blend wall in the proposed rule issued last May and recognized “limitations in the volume of ethanol that can be consumed given practical constraints on the supply of higher ethanol blends to the vehicles that can use them” as a primary factor in EPA’s decision to exercise its waiver authority.<sup>26</sup>

Due to the blend wall, which places a physical limit on blending that is less than what is mandated in statute, RFS volumes that exceed approximately 13.3 billion-gallons/year cannot be met by incorporating more E10 into the transportation fuel supply.<sup>27</sup> In an effort to avoid the blend wall, Growth Energy and 54 ethanol manufacturers petitioned the EPA in 2009 to allow E15, a mid-level or intermediate ethanol blend, into the commercial marketplace.<sup>28</sup>

### *E15*

Under the Clean Air Act, the EPA is prohibited from introducing a new fuel unless it is “substantially similar” to gasoline, but is authorized to grant a waiver of this prohibition. In response to the Growth Energy petition, the EPA issued a partial waiver for E15 in October 2010, to allow the introduction of E15 into the commercial marketplace for use in model year 2007 and newer cars, light-duty trucks, and SUVs.<sup>29</sup> In January 2011, EPA granted another partial waiver for use of E15 in model year 2001 and newer vehicles.

The EPA did not grant a waiver for the use of E15 fuel in model years prior to 2001. Nor is E15 approved for use in motorcycles, vehicles with heavy-duty engines, off-road vehicles (such as boats and snowmobiles), engines in off-road equipment (such as lawnmowers and chain saws),

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<sup>24</sup> Ibid.

<sup>25</sup> Congressional Research Service, *The Renewable Fuel Standard (RFS): In Brief*, June 29, 2015. Available at <http://www.crs.gov/pdfloader/R43325>.

<sup>26</sup> Environmental Protection Agency, *EPA Proposes Renewable Fuel Standards for 2014, 2015, and 2016, and the Biomass-Based Diesel Volume for 2017*, May 2015. Available at <http://www.epa.gov/OMSWWW/fuels/renewablefuels/documents/420f15028.pdf>

<sup>27</sup> Tyner, Wallace. *Biofuel Economics and Policy: The Renewable Fuel Standard, the Blend Wall, and Future Uncertainties* Purdue University, West Lafayette, IN, USA. Available at <https://www.safaribooksonline.com/library/view/bioenergy/9780124079090/XHTML/B9780124079090000304/B9780124079090000304.xhtml>

<sup>28</sup> Environmental Protection Agency, *E15 (a blend of gasoline and ethanol)*. Available at <http://www.epa.gov/otaq/regs/fuels/additive/e15/index.htm>

<sup>29</sup> Ibid.

cars manufactured in the year 2000 or earlier, light-duty trucks, and medium-duty passenger vehicles.<sup>30</sup> These limitations on the practical use of E15 reduce its demand and broader use.

### *E85*

E85 is a blend of 85 percent ethanol and 15 percent gasoline.<sup>31</sup> E85 is heavily restricted and is only available for use in Flex Fuel Vehicles (FFVs) that are specifically designed to run on E85, gasoline, or a blend of both fuels.<sup>32</sup> E85 cannot be used in gasoline-only, conventional engines of any kind. E85 also has limited availability nationwide, due to low demand and minimal distribution infrastructure.

However, much like E15, due to limitations in use that lower demand, E85 does not currently offer a reasonable pathway to overcome the limitations of the blend wall.

### **Important questions and key issues to be discussed at the hearing include:**

- After ten years, has the overall economic and environmental impact of the RFS been positive or negative?
- What is the impact of the RFS on the price of fuel and food for American consumers?
- Would these costs increase if the RFS was enforced as outlined in the EISA? Would these costs decrease if the RFS was repealed?
- Is the U.S. transportation fuel market capable of absorbing higher volumes of E85 and E15 that will be necessary to meet future RFS requirements? What impact could those higher volumes have on consumer pricing?
- What is the environmental impact of increased use of biofuels, including the lifecycle emissions and impact on air quality? How do the lifecycle emissions of corn ethanol and cellulosic ethanol compare to gasoline?
- How do the current emissions from biofuels compare with emissions predicted by models before the RFS was enacted? What steps should the EPA take to correct existing emissions models?

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<sup>30</sup> Ibid.

<sup>31</sup> Environmental Protection Agency, *E85 and Flex Fuel Vehicles*, May 2010. Available at <http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f10010a.pdf>

<sup>32</sup> Ibid.