Energy & Infrastructure Program

Energy Project

Options for Reforming the Renewable Fuel Standard

A Report from the Staff of the Bipartisan Policy Center

December 2014

BIPARTISAN POLICY CENTER

ABOUT THE BIPARTISAN POLICY CENTER

Founded in 2007 by former Senate Majority Leaders Howard Baker, Tom Daschle, Bob Dole, and George Mitchell, the Bipartisan Policy Center (BPC) is a nonprofit organization that drives principled solutions through rigorous analysis, reasoned negotiation, and respectful dialogue. With projects in multiple issue areas, BPC combines politically balanced policymaking with strong, proactive advocacy and outreach.

DISCLAIMER

This report was prepared by BPC staff to develop viable policy options for reforming the Renewable Fuel Standard, considering both legislative and regulatory options. Although the perspectives and assumptions that inform this report are consistent with those of other BPC Energy Project initiatives, the conclusions reached in this document do not necessarily reflect the views of the project's leadership, BPC, its founders, or its board of directors.

Advisory Group

In order to support constructive dialogue in this ongoing debate, the Bipartisan Policy Center's (BPC) Energy Project convened an advisory group of diverse stakeholders who agreed to discuss legislative and/or regulatory reforms that could put the Renewable Fuel Standard (RFS) on a stable footing. The advisory group met three times over the course of 2014, and their discussions, deliberations, agreements, and disagreements have informed the policy options outlined in this document. BPC also received feedback from a number of additional stakeholders at various times throughout the process. These options are intended as an inventory of regulatory and/or legislative policy actions to improve the RFS, though they do not represent the consensus of the advisory group. In addition, participation by individuals and/or organizations in the advisory group does not constitute or imply their endorsement of any of the options or information contained in this report.

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Introduction

Background and Goals of BPC's RFS Project

In the time since the Renewable Fuel Standard (RFS) was first passed into law in 2005, domestic biofuels production has risen and renewable fuels have increased as a percentage of the total U.S. transportation fuels supply. At the same time, persistent challenges in the implementation of enacted laws, as well as significant changes in the U.S. energy production landscape, have kept the RFS at the forefront of energy policy discussions.

The successes and challenges of the RFS are perhaps best illustrated by an examination of the various types of biofuels themselves. For instance, conventionally produced ethanol is generally price-competitive given its benefits as a fuel additive, but it requires the installation of infrastructure and the use of suitable vehicles when blended above certain levels. Conversely, infrastructure-compatible drop-in biofuels, such as renewable diesel, have the advantage of working with current fueling stations and vehicle systems but often face the obstacle of higher costs.

After nearly a decade of experience with the RFS and its implementation, it is increasingly possible to discern which aspects of the program have worked well and which could use improvement. For example, one particular area of focus is the process by which the annual, mandated biofuel volumes are adjusted. This process has frequently stretched beyond the yearly deadline required by law—in fact, volumes have often been announced well into the applicable compliance year or even later—creating significant uncertainty for all stakeholders involved in the program. In addition, issues surrounding the quality and price volatility of the program's Renewable Identification Numbers (RINs), which are used both as tradable credits and for compliance, have also been of particular concern.

However, experience with the program has not led to a consensus on what, if anything, should be done to improve the performance of the RFS program. On one hand, there are strong advocates in support of holding firm on the existing requirements. On the other, calls for outright repeal have grown louder. But there also exists a vast middle ground—to reform, not repeal, the RFS—in which BPC believes tangible progress can be made.

In 2013, BPC's Strategic Energy Policy Initiative released its final report, *America's Energy Resurgence: Sustaining Success, Confronting Challenges*. That report was the result of a consensus recommendation process chaired by former Senators Byron Dorgan (D-ND) and Trent Lott (R-MS), former National Security Director General Jim Jones, and former U.S. Environmental Protection Agency (EPA) Administrator William Reilly, and included an 18-member, high-level diverse stakeholder group.

Among its 50 recommendations, the report provided a high-level recommendation related specifically to the RFS:

> While we have diverse views regarding the Renewable Fuel Standard (RFS) provisions for conventional renewable fuels, we uniformly believe the nation should continue to develop advanced renewable fuels, and we support the role that the RFS can play in promoting these fuels. … However, a review of the RFS may be warranted after allowing some time to gain operating experience from the advanced biofuels refineries that have recently begun or are close to beginning production.

Building on this recommendation and in light of ongoing developments, BPC decided to take a deeper dive into the issue. Specifically, in order to support constructive dialogue in this ongoing debate, BPC's Energy Project convened an advisory group of diverse stakeholders who agreed to discuss legislative and/or regulatory reforms that could put the RFS on a stable footing. Stakeholders also agreed at the outset of the program to put aside preferred positions on repeal, reform, or keeping the status quo. The advisory group met three times over the course of 2014, and their discussions, deliberations, agreements, and disagreements have informed the policy options outlined in this document. BPC also received feedback from a number of additional stakeholders at various times throughout the process. These options are intended as an inventory of regulatory and/or legislative policy actions to improve the RFS, though they do not represent the consensus of the advisory group. In addition, participation by individuals and/or organizations in the advisory group does not constitute or imply their endorsement of any of the options or information contained in this report.

Overall, it is BPC's hope that regulators, Congress, and all groups with a stake in the program can explore ways to effectively address some of these issues. It is possible that tangible progress can be made through regulatory improvements alone, though such a strategy would likely lack the authority and scope to completely resolve complex biofuels issues in a holistic way. At the same time, there are also drawbacks and political considerations relevant to a legislative approach, including the possibility for dramatic changes to the structure of the program and the introduction of tangential policy items. In all cases, a successful effort to implement constructive reforms could create a more robust and effective RFS program.

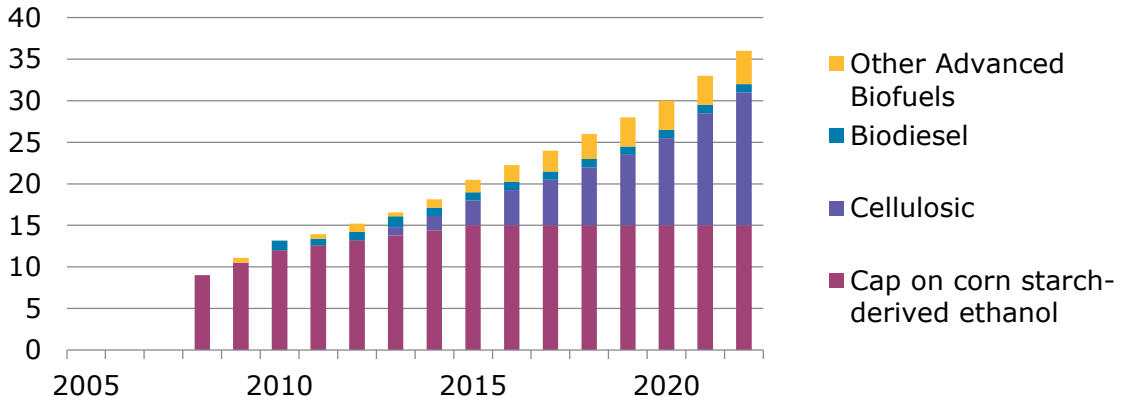
RFS Background

A variety of policies and programs have been introduced since the 1970s to promote alternatives to petroleum-based fuels for the U.S. transportation sector. One of the most significant federal programs for biomass-based fuels is the RFS, which was first enacted with bipartisan support as part of the Energy Policy Act of 2005. Often referred to as RFS1, the program mandated the use of at least four billion gallons of renewable fuel in the U.S. gasoline supply by 2006 and increased that mandate to 7.5 billion gallons in 2012.

The Energy Independence and Security Act of 2007 expanded on these requirements with bipartisan support. This program—now known as RFS2—increased the minimum quantity of

biofuels to 9 billion gallons in 2008, rising to 36 billion gallons in 2022. It also mandated that the total consists of 21 billion gallons of advanced biofuels by 2022.

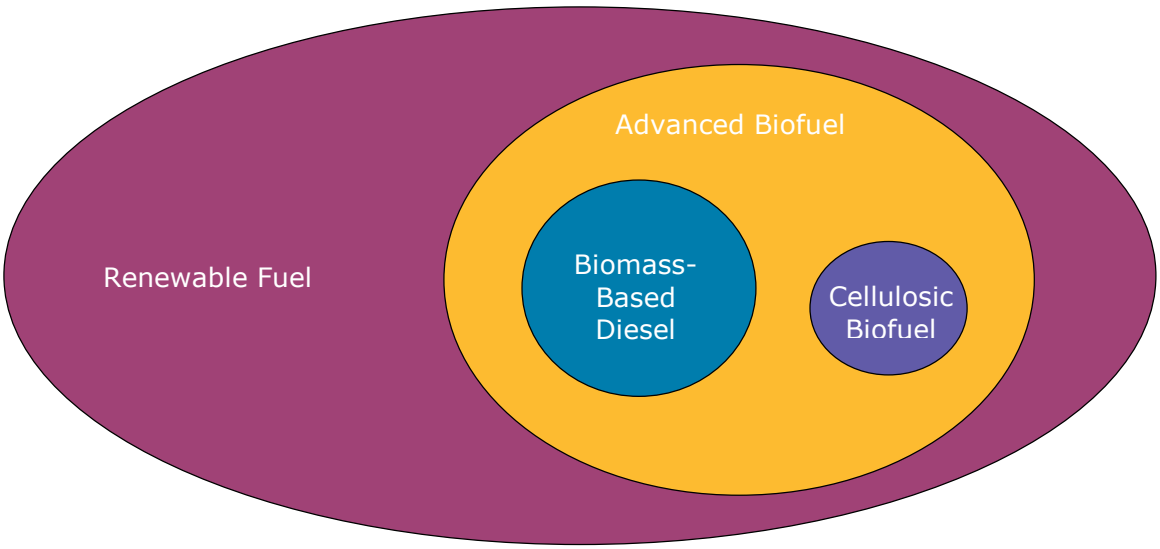
Renewable Fuel Standard Volume Requirements
billion gallons per year



Source: Congressional Research Service, *Renewable Fuel Standard (RFS): Overview and Issues.*
Note: The law places a cap on the total portion of the mandate that can be met with corn starch-derived ethanol, which increases to a level of 15 billion gallons in 2015 and remains constant thereafter.

In addition, the renewable fuel volume requirements were broken down into four nested categories: total renewable fuels, advanced renewable fuels, biomass-based diesel, and cellulosic biofuels. To qualify in each of these categories, biofuels are required to meet a minimum lifecycle greenhouse gas threshold and use renewable biomass that complies with certain land use restrictions. Biofuels do not have a lifecycle greenhouse gas emissions reduction requirement if they are produced at biofuel production facilities built before 2008. The nesting of the categories allows a fuel that qualifies in one category to automatically qualify in all of the encompassing categories; for instance, a qualifying cellulosic biofuel also counts as an advanced biofuel and as a general renewable fuel.

Nested Categories of the Renewable Fuel Standard



Under the RFS2, refiners and importers that supply gasoline or diesel to the domestic market are required to prove that a certain percentage of renewable fuels was blended into their total fuel supplied to the U.S. market each year. A two-step process determines each party's obligation. First, EPA calculates a percentage standard for total renewable fuels (and for each RFS2 fuel category) by dividing the total amount of renewable fuels mandated in a given year by the expected total U.S. non-renewable transportation fuel use, based in part on volumes projected by the U.S. Energy Information Administration (EIA). The obligated refiners and importers then apply these percentages to their annual non-renewable fuel sales to determine their specific Renewable Volume Obligation (RVO).

Obligated parties show compliance with their RVOs by holding the requisite number of RINs at the end of each year. RINs are 38-character codes issued by biofuels producers and importers at the point where biofuels are produced or imported. Each qualifying gallon of renewable fuel has its own unique RIN. Although there are some exceptions that add complexity to the implementation of the program, RINs are generally "attached" to their associated biofuels; when biofuels change ownership, the RINs are also transferred. In most cases, when renewable fuel is blended for retail sale, the associated RINs are "detached." The detached RINs may be retained for compliance with the current year's RVO, retained for compliance with the next year's RVO, or sold into the RIN market. RINs must be used in the year generated or for the following year. In addition, for each compliance year, no more than 20 percent of the compliance year's RFS obligation can be met using the previous year's RINs. If the biofuel is exported, the associated RINs must be retired and cannot be used by a refiner for RFS compliance.

Under its general waiver authority, EPA may waive—in whole or in part—the mandated volumes for any of the categories if implementation would "severely harm the economy or environment of a State, region or the United States," or if there is "inadequate domestic supply."

In addition, EPA has the authority to waive, and in some cases *must* waive, the mandated volumes for certain categories based on specific criteria. EPA must reduce the cellulosic biofuel mandate for a compliance year if, based on production projections provided by EIA, the minimum applicable volume will exceed expected production. In this case, EPA also has the option to reduce the volume requirements for the advanced biofuel and total renewable fuel categories by the same or lesser amount that it reduces the cellulosic biofuel volume. EPA must reduce the biomass-based diesel mandate—up to 15 percent for a 60-day period—if EPA determines that there is a significant feedstock disruption or other market circumstances that would significantly increase the price of biomass-based diesel. If such circumstances continue past the initial 60-day period, EPA may extend the waiver for a second, consecutive 60-day period. EPA also has the option to reduce the volume requirements for the advanced biofuel and total renewable fuel categories by the same or lesser amount that it reduces the biomass-based diesel volume.

Statutory language in the Clean Air Act (42 U.S.C. §7545) states that EPA must make long-term adjustments beginning in 2016 if EPA has waived at least 20 percent of a volume

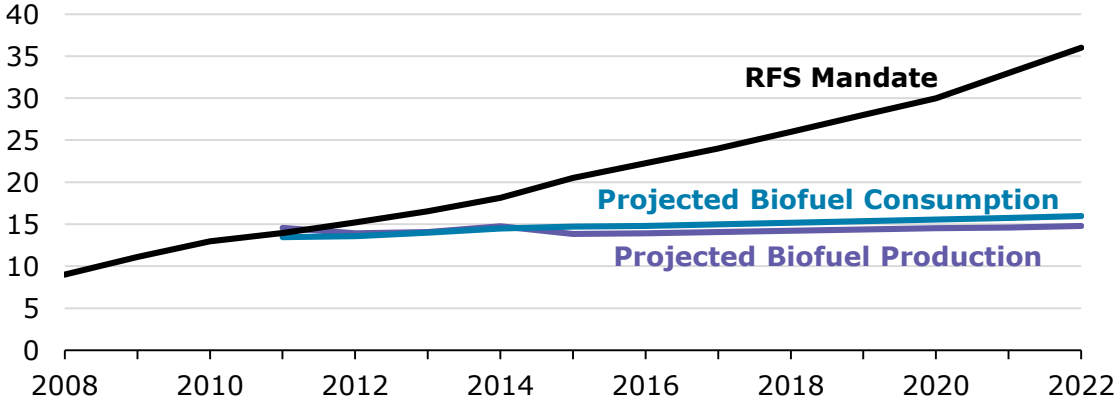
requirement for two consecutive years or at least 50 percent of a volume requirement for a single year. If one or both of these criteria are triggered, EPA must undertake a public comment and rulemaking process to establish new RFS volume mandate levels for any applicable category for all subsequent years through 2022. In adjusting the volumes, EPA must account for six criteria described in the statute. EPA must finalize rules establishing RFS volumes no later than 14 months before the first year for which the changes will apply.

Finally, an assessment of fuels' lifecycle greenhouse gas emissions is necessary to determine which fuel pathways meet the emissions reduction thresholds required for the four RFS renewable fuel categories. For the March 2010 RFS final rule, EPA assessed the lifecycle greenhouse gas emissions of multiple fuel pathways. EPA also provides parties with tools, information resources, and a petition process to request the examination of additional biofuel pathways that have not yet been modeled. These resources include the Pathway Screening Tool, which provides a structured format for applicants to submit preliminary information to EPA and then allows them to receive tailored feedback regarding whether and how to proceed with a full pathway petition. The Pathway Screening Tool and other tools—aimed at increasing the efficiency and transparency of the petition process—were published in 2014 after EPA conducted a six-month evaluation of its experience with the pathway petition process to date.

The Framework for BPC's RFS Discussions

During the first advisory group meeting, BPC staff presented a discussion framework by first examining projected volumes of biofuels consumption, biofuels production, and the RFS mandate. When comparing these volumes, a significant gap appears between the RFS-mandated volumes and projections of biofuels consumption and production (from both 2007 and 2014), which illustrates the larger challenge. To increase policy stability and certainty, the volumes for consumption, production, and the mandate must converge.

RFS Mandate and Projected Biofuel Production and Consumption
billion gallons per year



Sources: Mandate levels from Energy Independence and Security Act of 2007; projected consumption and production from U.S. Energy Information Administration, Annual Energy Outlook 2014.
Notes: Domestic biofuels consumption has been estimated by adding domestic production and net imports.

Two of the largest drivers of the divergence have been limitations on the consumption and production of some types of biofuels, which emerged over time and are now at odds with the aspirational nature of the RFS. For example, production of cellulosic biofuels has fallen short of the RFS volume requirements in recent years. In addition, EPA has defined the "ethanol blendwall" as the limitation on the consumption of ethanol, given the composition of the current vehicle stock, fueling infrastructure, consumer demand, and other factors. Throughout this paper, the phrase "limitations on the consumption of biofuels" is used to capture the ethanol blendwall as well as other barriers to biofuels consumption.

The first advisory group meeting focused generally on addressing the limitations on the consumption and production of all biofuels. Although many of the high-level barriers to increasing consumption are similar across blend levels, the group agreed to split apart the discussions of E85, E15, and other blends because of the unique details relevant to each. Much of the discussion of the limitations on the production of advanced biofuels and infrastructure-compatible drop-in fuels focused on barriers to investment in production capacity, especially due to policy uncertainty, and the challenges of producing these biofuels cost-competitively on a commercial scale.

The second meeting considered two topics: structuring the RFS mandate levels and improving EPA regulatory actions. With regards to structuring the RFS mandate levels, the advisory group was asked to consider the following questions, in the context of the limitations on the consumption and production of biofuels as discussed during the prior meeting:

1. What policy options could be used to modify the total renewable fuel mandate?
2. How should the mandate be allocated among the categories?
3. How could new equivalence values be applied to the mandate?

The group was also specifically asked about a number of regulatory topics, including: implementation of the annual RVO process, use of discretionary authority to link waivers between categories, setting long-term adjustments for the years from 2016 to 2022, and improving the technology pathway approval process.

Finally, the third meeting included a discussion of policy options to improve agricultural and environmental performance. Advisory group members also provided input on the policy ideas raised across all three of the meetings, commenting specifically on the advantages, disadvantages, and additional considerations relevant to each. These policy options are presented later in this document.

General RFS Policy Considerations

RFS Policy Goals

Throughout all three meetings, the advisory group discussed the policy objectives of the RFS. Although RFS1 focused on providing a replacement for oxygenate requirements for gasoline, RFS2 attempted to expand on the success of the RFS1, especially in the context of rising oil prices and the goal of reducing greenhouse gas emissions. During the meetings, the three primary objectives of the RFS2 program were identified as energy security (decreasing dependence on foreign oil, diversification of transportation-sector energy, and response to increasing world energy demands), environmental benefits (reducing greenhouse gas and other emissions), and economic development (increasing rural income, creating jobs, and stimulating innovation).

Over the course of the discussions, various views were expressed about which of these objectives, if any, still apply today, and if the RFS is the best way to achieve them. Many participants agreed that one or more of these objectives still exist. For instance, although significantly increased domestic oil and gas production continue to have tangible economic benefits, exposure to world oil markets and changing global energy consumption patterns are still matters of national security concern. In addition, mitigating climate change through the development of advanced, higher-performing biofuels was also discussed as a continuing goal—and is embodied in the Energy Independence and Security Act of 2007 both as a cap on conventional ethanol within the RFS and as a significant expansion of advanced biofuels. Finally, the development of rural economies was also mentioned as an ongoing driver of the policy.

As described by one advisory group member, another lens through which these policy objectives can be viewed are the dual goals of "more fuels" and "better fuels." In other words, the RFS strives for energy security and economic development through promotion of increased volumes of existing biofuels, as well as the development of new fuels and a more diversified fuel supply. At the same time, the RFS also strives for environmental outcomes through incentivizing the production of higher-performing fuels (including the development of infrastructure-compatible drop-in fuels, which have an implicit advantage within existing fuel and vehicle systems). Both of these goals come with unique challenges, however. Limitations on the consumption of ethanol-based biofuels, prices, and consumer acceptance, for example, could stymie the goal of "more fuels." And technology innovation, environmental factors, and development and production costs could hinder the goal of "better fuels."

The Need for Certainty

Another major theme throughout the advisory group meetings was the need for certainty and stability across multiple facets of the RFS program, both of which are particularly critical for driving investment in the development and commercialization of advanced biofuels, including infrastructure-compatible drop-in fuels, as well as investment in infrastructure and vehicles for higher-level ethanol blends. For refiners, decisions about crude slates, product output, exports, and investment are also tied in part to issues with the RFS. Participants often reiterated that, at the current time, significant *uncertainty* surrounds the RFS mandate levels, RIN markets, and the program itself.

Multiyear clarity surrounding the levels of future volume mandates, as well as confidence in the achievability of those volumes, would be a significant contributor to increased certainty and stability. Therefore, the group generally recognized that adjusting volumes on a year-by-year basis, as is currently done, will fail to achieve such goals. From this perspective, part of the challenge stems from the volumes and mechanisms outlined in the law itself; that is, although the law sets out mandated volumes, EPA is left with significant waiver discretion subject to certain constraints, leading to potential uncertainty. Some group members noted that more specificity in the law and/or in the regulations—with regards to volume-setting and waivers in particular—may directly increase needed certainty, while also yielding positive effects indirectly through the possible reduction of legal conflicts. However, the benefits of this specificity may be undermined to the extent that the volumes are unachievable, or viewed as unachievable, due to production and consumption constraints. In addition, whichever system is chosen, it is critical that EPA adhere to deadlines for determining volume obligations. Meeting these deadlines ensures that both obligated parties and producers have time to plan.

For RIN markets, certainty and stability are the product of several factors. Perhaps some of the most important are quality assurance and transparency—given that RIN fraud has a particularly negative effect on these markets—as well as the ability to show compliance with the mandated volumes. For some participants, RIN reform is a required part of any discussion on the mandate volumes. Flexibility—and the associated liquidity it may provide—is another important goal to consider when regulating the functionality of RIN markets.

In a broader sense, some observers believe that the RFS legislation created a huge aspiration that was not achieved and that the current difficulties with the program largely stem from that outcome and from reactions to that outcome. From this perspective, one approach is to take a look at the aspirations laid out for the program and recognize what can be supported given technology and other factors (see the section below on "Factors for the Mandate Level"). Notwithstanding these points, some group members have argued that, regardless of how the mandate volumes are modified going forward, there may be continued skepticism about technology development and the program's credibility.

In sum, advisory group members generally agreed that greater certainty surrounding all facets of the RFS program would be beneficial for biofuels producers, obligated parties, retailers, vehicle manufacturers, and consumers alike.

Capital and Financing

For a biofuels policy based on volume mandates—but really under any biofuels policy—the program must translate into capital availability for companies based on some level of certainty regarding a return for investors. Confidence in the financial viability of many of these enterprises hinges on expectations for the RFS program, both in the near term and for the period extending beyond 2022. Furthermore, a lack of confidence causes issues for existing companies and generates barriers to entry for start-up companies looking to enter the space. Such difficulties can be helped or hindered by external economic factors, and in recent years the financial crisis and resulting recession have had a chilling effect on investment.

In all, although there is always uncertainty when developing a new product, the level of financial volatility experienced by some biofuel production companies, due in part to the uncertainty described above, must be addressed if a new biofuels production sector is to be successful. In other words, certainty surrounding the program can help to reduce the fear of stranded assets and to allay capital risk.

From a theoretical point of view, once risks are addressed and investments are made, production costs will eventually fall and new fuels will be able to compete in the market, driving increased adoption. In the near term, given the inherent risk in developing new technologies, it may be desirable from a policy perspective to incentivize many different companies pursuing a spectrum of technologies because, ultimately, not all technologies will be successful.

Factors for the Mandate Level

Multiple advisory group members commented on the need to consider a range of factors when attempting to understand and set the RFS volume mandates. Examples of these types of factors include but are not limited to:

- Historical levels of biofuels production, the state of biofuels production technologies, and the potential for these technologies to increase in scale;
- Historical levels of biofuels consumption and patterns in consumer demand;
- The prices of feedstock, related commodities, fuels, and RINs;
- Research and development activities;
- The state of the vehicle fleet, including aggregate statistics on the age and models of vehicles, and their associated vehicle miles traveled (VMT);
- Potential misfueling and liability;

- Warranties and compatibility with existing vehicles and small engines; and
- Fueling infrastructure, particularly the number and geographical locations of fuel retailers offering gasoline blends with greater than 10 percent ethanol.

In general, any of these factors could be viewed from a current perspective or from an aspirational perspective; that is, it is possible to assess where the factors stand at the current time, but also to consider where—from a policy viewpoint—they should be at some time in the future. In the context of the BPC discussion framework described above, some of these factors relate to consumption, some to production, and some to the mandate (or a combination thereof). For instance, the state of the vehicle fleet—including how many of which vehicles are on the road and how much they drive—directly impacts how much and which types of fuels are consumed, and therefore has implications for the limitations on the consumption of ethanol-based biofuels. If a large portion of total VMT comes from relatively new cars, for example, then the technical capacity for ethanol consumption would be relatively higher.

Take RIN prices as another example, which cut across consumption, production, and the mandate. High RIN prices are a concern for many stakeholders, and therefore are an important consideration in setting the mandate levels. Some group members pointed out that stakeholders may not share RIN costs evenly, and so this distribution, as well as the overall merits of the improvements driven by changes in RIN prices (which may or may not produce benefits on net), must also be considered.

Differences between the current state of factors and how they could (or should) look in the future draws attention to the issue of timing, which many group members noted as just as important as the volumes and the "shape of the curve" when setting the mandate levels. For producers and refiners, this is the timing of bringing fuels to market; for retailers, it is the timing of delivering the product to consumers; and for automakers, the timing of bringing vehicles to the point of sale, which may require a lead-in period of a decade or more, from conception to deployment.

The Retailer and Consumer Demand

In addition to concrete factors, such as fueling infrastructure and vehicle deployments, it is important to consider more broadly the role of the retailer and the consumer. For many advisory group members, a successful RFS will require the increased involvement of both of these stakeholders. In other words, not specifically addressing the retailer in the RFS program or ignoring the role of consumer demand will create a substantial hindrance for the program.

From the retailer perspective, fueling infrastructure represents a significant investment. In the short term, these investments require monetary assets, and in the longer term—to be successful—they require consumers to purchase the associated product. Therefore, if lack of fueling infrastructure is a barrier to increased biofuels consumption, then addressing the financial and consumption aspects of the investment challenge are critical to future success.

Financial challenges may be aided through economic incentives to install this infrastructure, such as tax incentives, partnerships with refiners, or additional retailer profit from the sale of certain fuels.

From the consumer perspective, higher-level blends of ethanol must compete with E10 on a cost basis, taking into account the energy density differences among fuels and the associated frequency of vehicle fueling. Currently, this calculation does not consider the economic benefits of greenhouse gas reductions and of course cost is only one factor involved in consumption. Consumers' vehicles must be able to use these higher blends, and warranty and liability issues must be addressed. Education and consumer acceptance are also important, given that compatible vehicles and the availability of high-level ethanol blends do not necessarily lead to increased consumption of those blends. In all, these fuels must be attractive to consumers, as consumer purchasing power is the primary determinant in the build-out of fueling infrastructure.

International Considerations

The U.S. approach to the RFS, and biofuels in general, could have international ramifications. Other countries may look to the United States as a model for biofuels production and for an example of how to structure their programs. To that extent, decisions surrounding the RFS could have wide-ranging and long-lasting impacts. In addition, to the degree that the RFS impacts global food prices, supply, and other factors, the program could have geopolitical implications as well.

The possibility for the RFS to affect gasoline, diesel, and biofuels exports also needs to be considered. Changes in such exports would have impacts both domestically and abroad. In addition, the potential for continued or expanded biofuels imports may also have significant ramifications, particularly from an environmental perspective. In general, increased biofuels trade may yield economic benefits but would likely also require increased international cooperation, program harmonization, and documentation procedures to ensure that environmental and climate goals are not undermined.

Mechanisms Outside of the RFS

One final consideration is whether some additional economic mechanisms are required outside of the RFS to incentivize advanced biofuels production (including further commercialization of infrastructure-compatible drop-in fuels), vehicle deployment, and retail infrastructure build-out. In other words, some group members questioned whether or not the RFS, on its own, is capable of reaching the goals set out for it.

There are other areas of the economy where multiple incentives are used in tandem. For example, in the agricultural sector, there are multiple drivers to promote innovation: the farm bill, the RFS, credits, and other mechanisms. For the RFS, such outside incentives may include tax credits, grant or loan programs, and government research and development efforts.

End Goals and Metrics for Success

Within the RFS2, mandated volumes were clearly outlined for each of the four nested categories, and in a sense, these provided measurable goals for the program. In the time since the Energy Independence and Security Act of 2007 was passed, however, a number of difficulties—and particularly those associated with barriers to the consumption of ethanol-based biofuels and with cellulosic biofuels production—have caused EPA to significantly waive one or more categories downward. As such, several advisory group members highlighted the fact that, given the economic and market realities today, it is not clear how the original goals of the program would (or should) be translated into new goals nor how metrics of success could be defined.

A new and updated set of goals and metrics to measure progress could take several forms. As with RFS1 and RFS2, these goals could be volume mandates across multiple biofuel categories. From the perspective of producers, this structure provides the benefit of known consumer demand, assuming that infrastructure-compatible drop-in fuels can be commercialized more widely and/or that challenges related to consumption can be overcome.

A different type of goal could focus on the fuel. For example, the goal could be a range of ethanol content, a fixed octane level, and a date by which it would be available throughout a large geographical area. For vehicle manufacturers and others, the establishment of this type of goal would allow vehicles, infrastructure, and policies to be tailored toward a specific, common destination. One participant noted that, in a sense, the certification fuel serves as a focal point; another pointed out, however, that the current certification fuel does not necessarily align with the ambitions of the RFS. This type of goal might also explicitly incentivize drop-in fuels, given their advantages within the existing vehicle and fueling infrastructure.

One concrete example discussed by the group was the nation's transition to unleaded fuel, which required the involvement and coordination of many parties in a manner similar (though not identical) to the RFS; specifically, a key factor was an identified endpoint, including both fuel requirements and associated timing. In the case of the RFS, there is no analogous endpoint.

As mentioned above, beginning with the standards for 2016, EPA must modify the mandated volume of any category that it has previously waived by either 20 percent in two consecutive years or by 50 percent in a single year. If one or both of these criteria are triggered, EPA must undertake a public comment and rulemaking process to establish new RFS volume mandate levels for any applicable category for all subsequent years. Such adjustments could realign the goals of the program with the market and technological realities, creating additional certainty for the program. EPA is also able to consider a broader range of factors (environment, biodiversity, food vs. fuel, commodity competition, etc.) in making these long-term adjustments than it is able to consider in its annual process; as such, these adjustments may provide a seat at the table for stakeholders who

are not yet fully engaged. Building stakeholder consensus can deliver greater political stability and a more stable investment environment.

However, any long-term adjustments would not eliminate the need for EPA to revisit the volumes year by year, though future changes would likely be much smaller. To reduce the risk of significant revisions, EPA could indicate that it would only make certain adjustments and/or would limit adjustments to those based on certain predefined factors when considering the volumes each year. In addition, only categories for which the criteria have been met can be changed for the 2016 to 2022 period (this may also extend to the advanced and total renewable fuel volumes); therefore, any adjustments would only deal with a portion of the total program mandate. Given historical experiences with the program—the need to revisit the volumes on a year-by-year basis, constraints on the consumption of biofuels, and other factors—such long-term adjustments would likely not provide full certainty.

Finally, EPA is given the authority to determine the program volumes after 2022, but how this will be done is still quite unclear. Increased clarity on the form and levels of the mandated volumes is important from several perspectives. For investors and producers, it provides the certainty needed for long-term investment, given that planning and financial horizons can span a decade or more. Clarity on the RFS post-2022 is also significant from a policy perspective, as it ties into broader questions regarding the overall goals of the program, its efficacy, and how to evaluate its eventual success or failure. Ultimately, policymakers may need to assess the near-term and long-term duration of specific components of the program and may choose to include sunset provisions for the policy.

Although decisions regarding RFS policy objectives and measurable goals that work toward them are beyond the scope of this paper, they are important elements to consider when reviewing the policy options provided in the next section of this report.

RFS Policy Options Inventory

The advisory group's deliberations informed BPC's development of this inventory of policy options for reforming the RFS. These options are intended as an inventory of regulatory and/or legislative policy actions to improve the RFS, though they do not represent the consensus of the advisory group.

Given the complexity of the RFS, the inventory has been designed to address biofuels challenges at multiple scales, across many topical areas, through multiple mechanisms, and over varying periods of time. Therefore, no one policy option contained in the inventory will serve as a single solution to all of the challenges of the RFS; options must be combined—and considered in tandem—if they are to meet one or more desired objectives. In addition, some options may contradict others, and so policy priorities and goals must be considered when advocating for any particular package of options. The order of the policy proposals presented does not represent any form of prioritization.

To help in organizing the inventory, each of the policy options has been categorized in two ways. The first is the authority required to implement a particular option. More specifically, some of the ideas could be implemented through EPA regulatory action alone, without changes to the statutory elements of the RFS as outlined in the Energy Policy Act of 2005 or the Energy Independence and Security Act of 2007. These policy options have been marked as "regulatory." Conversely, some of the ideas would require congressional action and have therefore been labeled as "legislative." In other cases, legislative action may or may not be required depending on the specifics of the option's implementation; these ideas have been marked as both "regulatory" and "legislative," and their descriptions outline some of the ways in which their respective implementations might vary.

The policy options have also been categorized by topical area. Although these categories generally mirror the structure of the advisory group's discussion process, the categorization for each idea is based solely on its content and not on the meeting in which it was first raised and discussed. Specifically, each option is associated with one or more of the following: production, consumption, mandate, implementation, or environment and agriculture.

- Production options aim to reduce the limitations on the production of all biofuels, whether cellulosic, infrastructure-compatible drop-in, biomass-based diesel, or others;

- Consumption options target the reduction of limitations on the consumption of all biofuels, including E10, E15, E85, drop-in fuels, and any other blends of ethanol or non-ethanol fuels;
- Mandate options intend to—given the limitations on the production and consumption of biofuels—modify the biofuel mandate volumes, reallocate or otherwise distribute volumes among the categories, and/or affect the mandate through changes to RIN equivalency values;
- Implementation options deal with the regulatory and process aspects of the RFS as specified and carried out by EPA; and
- Environment and agriculture options aim to improve the environmental and/or agricultural performance of biofuels throughout their lifecycles.

In addition to the categorizations, each of the policy options in the inventory contains a description and lists of advantages, disadvantages, and additional considerations. The description provides background information relevant to the option, often about the structure or function of the RFS. For some options, various methods of implementation are included in the description. The advantages and disadvantages highlight the primary benefits and drawbacks of each option, assuming its implementation as described in the idea description. Note that these advantages and disadvantages are not comprehensive but bring to light the primary issues of potential concern, both positive and negative. Lastly, the list of additional considerations calls on stakeholders and policymakers to consider particular aspects of each idea in more detail. In most cases, the implementation of a policy option would require a number of additional decisions to be made, which may prompt the collection and review of supplemental data.

In all, none of these policy ideas, taken individually or in combination, represent a simple or immediate solution to the challenges associated with U.S. biofuels production and use. As mentioned above, only a combination of actions—at different scales, addressing different issues, and over both the short and long term—will serve to meet the policy objectives of the RFS.

Create equivalence values based on factors beyond energy density, such as rural development and greenhouse gas performance.

Description

EPA has set Renewable Identification Number (RIN) equivalency values based on the relative energy content of various types of biofuels; for example, corn ethanol generates 1.0 RINs per gallon whereas biodiesel creates 1.5 RINs per gallon. EPA has the ability to modify these equivalence values.

This option proposes the creation of new values based on one or more factors in addition to energy density, such as a rural economic development, jobs, and a fuel's greenhouse gas (GHG) performance. Other targeted characteristics might include feedstock type, location of source, broader economic/environmental considerations, and in what form the fuel is consumed (ethanol, non-ethanol, infrastructure-compatible drop-in fuels, etc.). In this type of system, RINs may be partially or completely fungible with one another across categories.

For GHG equivalence, values could be set on a continuous scale or based on improvements over certain threshold levels (and adjusted over time). For instance, in the former case, a gallon of conventional ethanol achieving a 20 percent GHG reduction might be worth one D6 RIN, while an ethanol gallon with a 40 percent reduction would be assigned two D6 RINs.

Advantages

- Given constraints on the consumption of biofuels, this option could prioritize the consumption of certain advanced fuels over conventional fuels, and/or would allow some advanced fuels to better compete with conventional fuels.
- Depending on implementation, this approach could be more technology-neutral and adaptable to future capacity than the current equivalency system.
- A RIN mechanism that bases equivalency values on rural development and GHG emissions (at least in part) is more consistent with the policy goals of the RFS.
- Incorporating a broader approach that recognizes all of the factors above can help stabilize the policy by navigating the many risks that have emerged as this policy has grown.

Disadvantages

- Determining GHG equivalence values would likely take a significant amount of time and resources.
- From the investor perspective, this type of system may create additional complexity and be harder to understand than the current RFS system.
- To the extent that a new equivalency value system undermines the volume aspect of the RFS program, it may hurt the goal of diversifying the transportation-fuel sector.
- To the extent that this proposal eliminates the category system, it may increase the risk of stranded assets.

Considerations

- How would this option impact RIN prices, consumers, refineries, and regional and rural economies? Should grandfathering be allowed in this approach?
- Which factors in addition to energy density, rural development, and GHG emissions should be considered, if any? What about land use considerations?
- Does EPA have the data, tools, and time to accurately determine such equivalency values?
- Would higher multipliers be significant enough to drive capital investment to different levels? Does such a system help with constraints on the consumption of biofuels, create needed consumer demand, and enhance certainty about the future availability of fuels?

Create additional Renewable Identification Number sub-categories that divide existing categories.

Description

Obligated parties show compliance with their renewable volume obligations by holding the requisite number of Renewable Identification Numbers (RINs) at the end of each year. Currently, there are five different types of RINs, which generally correspond to one of the four RFS biofuels categories: total renewable fuel, advanced biofuels, cellulosic biofuels, and biomass-based diesel.

This option suggests that additional RIN categories could be created to incentivize certain fuel characteristics, such as the way the fuel is consumed (ethanol, non-ethanol, infrastructure-compatible drop-ins, etc.), the geographic source (to minimize transportation costs, for instance), and other factors.

The implementation details of this option would determine whether or not legislative action is required. For example, if a new RIN category were to span multiple, existing mandate categories, then changes to law might be needed to address any differences in feedstock, greenhouse gas reduction, and other requirements among those categories.

Advantages

- This option may better incentivize certain desirable fuel characteristics and could better target very specific characteristics.
- Given constraints on the consumption of biofuels, this option could prioritize the consumption of certain advanced fuels over conventional fuels and/or would allow some advanced fuels to better compete with conventional fuels.
- Depending on implementation, this approach could be more technology-neutral and adaptable to future capacity than the current RIN structure.

Disadvantages

- Creating and implementing new RIN sub-categories, particularly if requiring legislative changes, would likely take significant time and political resources.
- For investors and other stakeholders, these changes may increase complexity and be harder to understand than the current RIN categories.
- To the extent that this proposal undermines the current system of mandated categories, it may increase the risk of stranded assets.

Considerations

- What characteristics should be used to split the existing RIN categories? How many new RIN sub-categories should be created?
- Should any new RIN sub-categories simply divide the existing mandate categories or span multiple categories with potentially different requirements?

Use a neutral third-party reviewer for technology pathway approvals.

Description

EPA must evaluate each biofuel production process to ensure that it meets feedstock and greenhouse gas reduction requirements to qualify as a renewable fuel or for a particular renewable fuel category.

For technology pathway approvals, a neutral third-party could provide independent review, either fully approving the pathway or, after initial inspection, sending it back to EPA for additional consideration. In the case that the third-party provides full review (perhaps issuing a certificate), the evaluation and certification could apply to an entire technology pathway or to discrete portions of the pathway (such as feedstock type or conversion technology). In the case that the third-party provides partial inspection (perhaps including a modeling exercise), the results would still be sent to EPA for final approval. A third-party review could validate EPA's data and assumptions.

Advantages

- This approach may expedite the approval of new technology pathways so more biofuels can qualify for the program.
- EPA's limited resources would be conserved, either partially or entirely, with respect to the technology pathway approval process—in both cases reducing the resources required from EPA.
- Depending on implementation, this approach could increase the environmental performance of biofuels production.

Disadvantages

- If there are multiple third-party reviewers, there may be inconsistencies in the level of review provided for each technology.
- Depending on the stringency of the third-party reviewer and/or of the certification process, this option may reduce environmental performance, particularly if large volumes of the associated fuel will be produced.
- To the extent that this approach short-circuits the public comment process, it could decrease confidence in the program and result in a limited ability for stakeholders to voice concerns and provide data.
- Strong opposition to this option could create additional policy uncertainty.

Considerations

- Should third-party review be mandatory or voluntary?
- Would third-party review and certification occur only once at the beginning of the process or continuously throughout all periods of time during production?
- Would this process require the review of all previously approved pathways?
- Should this process function differently for different fuels of different volumes?
- Should this process require some type of on-the-ground validation?

Allow companies to conduct a self-assessment of their technology pathway against a set of predefined criteria and then submit the pathway and supporting information to EPA for final approval.

Description

After conducting a six-month evaluation in 2014 of the petition process for new biofuel pathways, EPA published new tools and information resources to increase the efficiency of the petition process. One of these, the Pathway Screening Tool, provides a structured format for applicants to submit preliminary information to EPA and then allows applicants to receive tailored feedback regarding whether and how to proceed with a full pathway petition.

However, this tool and the other resources provided are not a replacement for the full pathway approval process. EPA must still evaluate each biofuel pathway to ensure that it meets feedstock and greenhouse gas reduction requirements.

This policy option would expand the role of the applicant to include data-gathering as well as analysis, substantially replacing the current technology pathway approval process that requires EPA evaluation, public comments, and rulemaking, all of which take a significant amount of time and resources. Under this option, the primary responsibility for analysis would rest with the applicant.

Advantages

- This option could help to expedite the technology pathway approval process so that more biofuels can qualify for the program.
- By requiring significant company involvement, as well as a consistent and predefined set of information, producers would have more power and control in the evaluation process.
- Depending on implementation, this approach could increase the environmental performance of biofuels production.
- EPA's limited resources would be conserved, either partially or entirely, with respect to the technology pathway approval process—in both cases reducing the resources required from EPA.

Disadvantages

- Given that multiple companies would be conducting their own self-assessments, this option might result in inconsistencies in the level of review provided for each technology.
- Depending on the company and the stringency of the self-assessment process, this option may reduce environmental performance. This is particularly true if large volumes of the associated fuel will be produced.
- To the extent that this approach short-circuits the public comment process, it could decrease confidence in the program and result in a limited ability for stakeholders to voice concerns and provide data.
- Strong opposition to this option could create additional policy uncertainty.

Considerations

- Should self-assessment be mandatory or voluntary?
- Would review and submission occur only once at the beginning of the process or continuously throughout all periods of time during production?
- Would this process require the review of all previously approved pathways?
- Should this process function differently for different fuels of different volumes?
- Should this process require some type of on-the-ground validation?

Conduct only a small-scale review for each new technology pathway until that industry reaches a certain scale, at which time a full review with more complete data would be performed.

Description

EPA must evaluate each biofuel production pathway to ensure that it meets feedstock and greenhouse gas reduction requirements to qualify as a renewable fuel or for a particular renewable fuel category.

This option would reduce the initial review for a new technology pathway and require a full review only when certain criteria are met, such as annual production over a set amount and/or the construction of a given number or size of production facilities.

The form and details of the initial review would determine whether or not this option requires legislative action. For instance, if the initial review used the existing lifecycle methodology, but applied assumptions for many of the inputs until additional empirical data were available, the option would potentially require an EPA process change only. Conversely, modifications to fuel requirements—including greenhouse gas reductions—would likely necessitate changes to law.

Advantages

- This option could help to expedite the approval process for new technologies, allowing companies to bring an initial amount of product to market (and to receive credits under the program) in a shorter period of time.
- EPA's limited resources could be conserved with respect to the technology pathway approval process, at least initially and/or in cases where production will not increase for many months or years. In both cases, the resources required from EPA are reduced.

Disadvantages

- Uncertainty about the final evaluation may undermine initial investment in the technology, thereby hindering further development.
- Depending on the stringency of the initial assessment, this option may reduce environmental performance.
- To the extent that this approach short-circuits the public comment process, it could decrease confidence in the program and result in a limited ability for stakeholders to voice concerns and provide data.
- Strong opposition to this option could create additional policy uncertainty.

Considerations

- In which ways would the initial review differ from the full review, and would such changes require legislative action?
- At what scale or timing should a full review be conducted?
- What guarantees, if any, would investors receive with regards to the period after full review? For instance, would any initial production continue to generate Renewable Identification Number credits, even if the technology does not ultimately receive approval under full-scale review?

Standardize the technology pathway approval process to better align with the current processes in other locations, such as Canada and the European Union.

Description

Under the RFS, EPA must evaluate each biofuel production process to ensure that it meets feedstock and greenhouse gas reduction requirements—as stipulated by U.S. law—to qualify as a renewable fuel or for a particular renewable fuel category.

At the same time, biofuels programs exist in other jurisdictions at the state, national, and international levels and contain their own requirements for biofuels. These include the Renewable Fuels Regulations in Canada and multiple directives within the European Union.

Although some work has been done to harmonize these standards, additional efforts would provide for greater consistency across borders and could potentially facilitate biofuels trade.

Advantages

- Standardization can provide consistency for fuels that will be sold in multiple countries, reducing the approval burden for biofuels producers.
- Standardization may expedite the review of biofuels in one jurisdiction if they already qualify in another jurisdiction. In addition, EPA's resources may be conserved if a technology under review has already been approved elsewhere.
- Depending on implementation, this approach could increase the environmental performance of biofuels production.
- Standardization might provide additional legitimacy to the final biofuels evaluation methodology.

Disadvantages

- This option has the potential to reduce evaluation stringency and therefore environmental performance, especially if the harmonized standards do not retain rigorous and credible accounting of indirect land use emissions.
- There may be inconsistencies in the level of review provided for each technology.
- Standardization would require additional time and coordination with other processes and could reduce U.S. flexibility to make future changes.
- This option may limit the ability of stakeholders to voice concerns and provide data.
- Strong opposition to this option could create additional policy uncertainty.

Considerations

- What are the current similarities and differences among the biofuel evaluation processes of various jurisdictions? For instance, do the different jurisdictions require different levels of information and requirements?
- How would approval of a pathway in one jurisdiction affect the approval of the same pathway in a different jurisdiction?
- What flexibility would countries/regions have to modify their technology pathway approval processes after the standardization exercise has been completed?

Expand the definition of cellulosic biofuel, such as by including wastes and residues.

Description

The implementing legislation defined cellulosic biofuels as "renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass" and provide a 60 percent reduction in greenhouse gas emissions. EPA has refined these definitions by providing regulatory interpretations for specific circumstances.

Among other goals, the cellulosic category was intended to avoid the food-versus-fuel tradeoff, but some parties feel it is too limited.

Although this option would require legislative action to modify core components of the definition, regulatory action could be used to modify previous interpretations or to develop new interpretations.

Advantages

- This option potentially increases the number of technology pathways of biofuels that could qualify as cellulosic.
- This option may result in a more efficient method to classify feedstock.

Disadvantages

- Some argue that broadening the cellulosic category (or any category) too much could undermine greenhouse gas emissions reductions, as well as sidestep the mandatory "renewable" and "biomass" components of the program.
- This option may reduce the benefits of certain feedstock requirements.

Considerations

- Are there other feedstock (including certain agricultural residues) that should be included in this category?
- What would be the environmental impacts of broadening?
- What data would have to be considered?

Specify a volume of E0 to be available for legacy equipment.

Description

E0 (gasoline without ethanol) is needed for certain applications; phase separation, overheating, and other issues can lead legacy equipment to suffer engine problems when used with E10. Within the last decade, some small equipment can handle E10, but legacy equipment cannot.

The specified E0 volume could be included in EPA's annual Renewable Volume Obligation calculation or as a specific mandate volume.

Advantages

- This approach may reduce the risk of causing harm to legacy equipment by guaranteeing the fuel it was designed for is still available
- This may provide consumers more choices at the pump.
- This is one approach that can help to address the possibility for misfueling in older vehicles and equipment.

Disadvantages

- Fueling infrastructure can only handle so many options at the pumps, and this may eliminate other biofuel blend options and increase costs.
- For the mandate option, the market may more efficiently determine what is available there.
- A standardization process could make this challenging to do because multiple regulatory bodies are involved.
- Mandating an E0 volume may create compliance issues in areas that have reformulated gasoline requirements to reduce smog and other air pollution, if ethanol is being used to help satisfy the requirements.

Considerations

- Does this approach need to be paired with other options to help address misfueling possibilities?

Create a longer-term period and increased amount of Renewable Identification Numbers for banking and borrowing.

Description

Currently, Renewable Identification Numbers (RINs) are only valid for the calendar year in which they are produced and for the following calendar year. In addition, out of an obligated party's total Renewable Volume Obligation (RVO), only 20 percent can be legally satisfied with RINs carried over from the prior year. In effect, this limits the total amount of RINs that can be banked from year to year.

This option would: expand the lifespan of the RINs beyond two years, increase the percent of an RVO that could be satisfied with RINs from previous or future years, or both. The option could include a discount rate applied to RINs that are banked or borrowed from other years.

Modifying the lifespan of RINs would require legislative action, while changing the carryover percent could be done with regulatory action.

Advantages

- Increasing the time limits for banking can increase the liquidity of RIN markets, which could possibly reduce market volatility.
- This approach gives more flexibility for obligated parties to show compliance, which can lower compliance costs.
- This option may help stakeholders to address policy uncertainty.

Disadvantages

- This approach may reduce certainty for producers, since obligated parties may choose to buy RINs at different periods of time. In other words, producers are losing consistency in the market.
- This approach will increase the ability of some parties to hold RINs for longer periods of time, which could reduce market liquidity.
- This approach can create additional complexity for RIN markets since more years of RINs vintages (for each year of compliance) would be available at once.

Considerations

- What would be the time limit on banking?
- How much can be carried over each year?

Allow exports of biofuels to meaningfully contribute to the RFS program.

Description

Under current law and regulations, exporters of any amount of renewable fuel, whether separate or mixed with gasoline/diesel, incur a Renewable Volume Obligation (RVO) for the appropriate categories depending on the makeup of the exported fuel. However, unlike producers and importers of gasoline/diesel, the exporters' RVOs are calculated based on the volumes of fuel they export, rather than a percentage derived from the mandates. Therefore, given that Renewable Identification Numbers (RINs) are separated from their associated biofuels when the fuels are exported, these RINs are, in effect, retired for compliance with the exporters' RVOs.

Conversely, this option suggests that the export of biofuels could meaningfully contribute to satisfying the RFS mandates. This could be accomplished in multiple ways, but one method would be to lower or eliminate exporters' RVOs. In that case, the separated RINs (or a portion of the RINs) from exported biofuels would be available for other obligated parties' compliance.

Advantages

- This approach supports more domestic production, especially in situations where additional consumption of biofuels may be limited.
- This approach may have a global environmental benefit if the biofuels are displacing other fuels that are more environmentally harmful.
- This approach may provide a better and more steady incentive for domestically produced fuels.

Disadvantages

- This approach may inhibit the ability of the program to reduce dependence on foreign oil.
- Biofuels exports may cause global environmental harm, depending on what they displace.
- This option may also increase the susceptibility of biofuels to global market circumstances and increased price volatility.
- This option might create the possibility for gamesmanship and manipulation of RIN credits. For instance, a U.S. company could import and then immediately export biofuels to create RINs, which could be used for compliance or to create a discount for the exported product.
- Depending on how it is structured, this option could raise legal trade issues.

Considerations

- Should the export of all types of biofuels generate RINs? If not, what are the distinguishing characteristics of the biofuels that should generate export RINs—feedstock type, production process, form of consumption (ethanol, non-ethanol, infrastructure-compatible drop-in), and/or other factors?
- Which factors should determine whether or not exports generate RINs at all? For example, should exports generate RINs if domestic production and/or consumption surpass certain threshold levels?

Modify the land accounting and documentation approach for domestic and/or foreign feedstock producers.

Description

The legislative definitions for the renewable fuel categories include certain land use restrictions and particularly exclude certain land sources.

Foreign producers have to present documentation about the land on which their feedstock were grown; this can create a barrier. In contrast, domestic producers are covered under EPA's aggregate compliance approach.

An alternative is a mass balance approach for land accounting—similar to that adopted by the Europeans—which provides more flexibility. Another option is to use third-party certification, like a "good housekeeping seal," similar to that developed by the Roundtable on Sustainable Biomaterials.

Advantages

- This approach could eliminate different levels of oversight for domestic production versus foreign production.
- This may increase environmental stringency, especially for domestically produced biofuels.
- If this option reduces the stringency of guidelines, it may result in increased production and lower costs of production.

Disadvantages

- If this option creates more stringent guidelines, it could lead to decreased production and higher costs of production.
- If this option reduces the stringency of guidelines, it may result in lower environmental performance.
- It can be more difficult to monitor and enforce guidelines for foreign biofuels than for domestically produced biofuels, which may result in varying levels of compliance.

Considerations

- How will changes in land use accounting affect prices and production volumes?
- If a third-party certification process is used, how is the certification system designed so that it meets stringent quality standards to ensure adequate environmental protection while balancing effects on prices and production volumes?

Recalculate the lifecycle greenhouse gas emissions assessments, possibly using a modified assessment methodology.

Description

Assessment of lifecycle greenhouse gas (GHG) emissions is necessary to determine which fuel pathways meet the GHG reduction thresholds under the RFS for the four required renewable fuel categories, except for grandfathered fuels produced at biofuel production facilities built before 2008. For the March 2010 RFS final rule, EPA assessed the lifecycle GHG emissions of multiple fuel pathways.

The implementing legislation allows EPA to adjust the GHG reduction levels only if there has been a significant change in the analytical methodology. If an adjustment is made, the adjustment only applies to renewable fuel from new facilities that commence construction after the effective date of such adjustment.

Since the time of EPA's assessment, the set of available data and model assumptions have changed. This option suggests that EPA periodically reconsider its lifecycle assessment methodology and potentially recalculate the lifecycle GHG emissions for applicable pathways.

Advantages

- This option could increase the environmental performance of future production of biofuels.
- This option could leverage and incorporate more recent data in its analysis, leading to more accurate and timely results.

Disadvantages

- This option creates additional complexity by creating new tiers of GHG qualifications based on when the facility began operation.
- All prior facilities would be grandfathered in and would not increase environmental performance unless they upgrade or expand capacity at the facility.
- Pursuing this option may distract EPA's already limited resources for the RFS.

Considerations

- What data sources and lifecycle analysis processes should be used?
- How often should EPA undertake reconsideration?
- What factors should trigger a reconsideration?

Modify the cellulosic waiver credit mechanism.

Description

According to the implementing legislation, whenever EPA reduces the cellulosic biofuel volume, it must make cellulosic waiver credits available for sale. The credit price is set as the higher of $0.25/gallon or the amount by which $3.00/gallon exceeds the average wholesale price of gasoline, adjusted for inflation.

The credit price creates a limitation on the incentive for innovation in the cellulosic category; for example, cellulosic was only credited 42 cents more than other categories in 2013.

A modification could be done by changing the formula to increase the credit value, creating a floor and/or ceiling on the price of cellulosic Renewable Identification Numbers (RINs), or by decoupling it from the price of gasoline. Additionally, prioritization could be created for purchasing RINs from produced cellulosic biofuels over the purchase of cellulosic waiver credits.

Advantages

- If the cellulosic waiver credit price increases, it may encourage additional investment in cellulosic biofuels.

Disadvantages

- Depending on how this option is implemented, it could increase (or eliminate) the effective price cap on cellulosic biofuels, potentially resulting in higher compliance costs for obligated parties.

Considerations

- What value would be adequate to incentivize these new fuels?
- If you remove the cellulosic credit-waiver mechanism, do you need to place another cap on the price of cellulosic RINs?
- When setting the new formula or creating a floor for the price of cellulosic RINs, how do you determine the appropriate price that encourages investment and production of cellulosic biofuels?
- Should this mechanism change over time as additional cellulosic biofuels are produced?

Start with mandate levels that more gradually slope to 20-21 billion gallons by 2022, and then consider additional volumes after that.

Description

Each year, EPA must determine the annual percentage standards for each renewable fuel category and evaluate possible use of waiver authority, particularly for cellulosic biofuel and biomass-based diesel. Invoking waiver authority for particular categories gives EPA discretion in setting annual volumes. EPA also has the authority to set long-term adjustments for certain categories, based on predefined criteria, for the years between 2016 and 2022.

The volumes proposed in this option are more closely aligned with modest and realistic growth in cellulosic biofuel production and are consistent with the ethanol limitations of the current vehicle fleet over the time period. In addition, this option could also explicitly extend and define volumes for the mandate categories for the years beyond 2022.

Advantages

- This approach could potentially provide more policy certainty.
- With the additional time provided by this approach, competition between E85 and infrastructure-compatible drop-in fuels can proceed.
- This approach provides a more gradual transition for vehicles and fueling infrastructure to accommodate increasing volumes of biofuels.
- Providing additional clarification of volumes for years after 2022 can provide more certainty for advanced biofuels investors.

Disadvantages

- Given that this option lowers the mandate volumes from their current levels, it reduces the potential for additional biofuels market penetration.
- To the extent that this option is implemented in conformance with the current limitations on the consumption of biofuels, it may not provide enough incentive to overcome those limitations.

Considerations

- How should the volume mandates be assigned across the different categories?

Create slight "stretch" goal of mandate levels.

Description

Each year, EPA must determine the annual percentage standards for each renewable fuel category and evaluate possible use of waiver authority, particularly for cellulosic biofuel and biomass-based diesel. Invoking waiver authority for particular categories gives EPA discretion in setting the annual volumes.

This option suggests that EPA uses its authority to set mandate levels that represent "stretch" goals for biofuels production and consumption. For example, this option could include setting mandate levels to achieve energy-parity pricing for E85 with gasoline. The Renewable Identification Number (RIN) mechanism—and its impact on retail fuel prices—could provide the means by which to incentivize consumption. To be effective in driving consumer behavior, any price differential for biofuels would likely have to capture factors such as energy density, as well as convenience and refueling frequency.

Given previous court rulings, this option may require legislative action depending on its implementation.

Advantages

- This option could provide certainty for investors and biofuels producers with a continuous push.
- Achieving E85 price parity with gasoline can create an incentive for E85 blending, E85 infrastructure development, and increased advanced biofuel production.

Disadvantages

- Higher RIN prices can increase compliance costs for obligated parties, which may lead to higher prices for consumers, and may be politically infeasible.
- If E85 is offered at a lower price to retailers, those retailers may retain the same price for consumers and capture the profits, which would likely not result in additional biofuels consumption.
- The RIN price may not be fluid enough to pass all the way through to the consumer.
- This option may push for additional biofuels production with disregard to unintended environmental risks.

Considerations

- If this option were implemented, would the RIN price stay high enough, for long enough, to achieve the intended goal?
- How would this option impact refiners, both large and small?

Flatten all mandate volumes at their current levels for some period of time and then bump the mandates up to a higher set of levels at another point in time.

Description

Under current law, the volume mandates for three of the four RFS biofuels categories—total renewable fuels, advanced biofuels, and cellulosic biofuels—increase through the year 2022. The mandated volume for biomass-based diesel (to be determined by EPA) must be no less than one billion gallons starting in 2012.

This option suggests that all of the mandate volumes be flattened at their current levels for some period of time and then increased at some later point in time. To provide policy stability, the timing and magnitude of the increase would likely need to be specified in advance or, alternatively, a methodology or set of criteria could be outlined to predictably determine the timing and increase of the volumes.

Advantages

- This approach gives stakeholders time to prepare, especially with regards to infrastructure, and it may improve political considerations.
- This approach creates regulatory targets and timeline certainty, which allows stakeholders to plan for the future.
- This approach avoids constraints on the consumption of biofuels, at least in the near term.

Disadvantages

- The future jump to a higher level implies a jump in technology, which may not occur.
- Holding the levels flat for a period—while planning for a future increase—may not create stability for the program if stakeholders do not have certainty that the jump will actually occur at the later point in time.
- If growth is static for a period of time, the correct price signals may not be present to incentivize infrastructure build-out and other actions.

Considerations

- Over what period of time should the mandate levels remain flattened?
- How should the future higher volume levels be determined?

Flatten the total renewable fuel mandate at its current level going forward, but continue to increase the three advanced categories.

Description

Under current law, the volume mandates for three of the four RFS biofuels categories—total renewable fuels, advanced biofuels, and cellulosic biofuels—increase through the year 2022. The mandated volume for biomass-based diesel (to be determined by EPA) must be no less than one billion gallons starting in 2012.

This option suggests that the total volume mandate be flattened at its current level, while allowing the mandates for the total advanced, cellulosic, and biomass-based diesel categories to be increased as initially envisioned or at a reduced rate. The sub-categories would need to fit within the new constraints of the total renewable fuel volume. The advanced mandates could be explicitly extended and defined for years beyond 2022.

In effect, this option aims for biofuels consumption to remain steady over time, but gradually replaces conventional biofuels with advanced biofuels within that overall volume. At the same time, total biofuels consumption could increase in the presence of external market drivers.

Advantages

- This approach could help to maintain policy stability.
- Given constraints on the consumption of biofuels, this option could prioritize the consumption of certain advanced fuels over conventional fuels and/or would allow some advanced fuels to better compete with conventional fuels.

Disadvantages

- This could result in stranded assets and investments if conventional biofuels are no longer produced and consumed.
- In the absence of external market drivers, this approach would place a cap on the policy incentive to increase the market penetration of biofuels, which may work against the energy security goals of the RFS (such as reduced dependence on foreign oil).

Considerations

- How should the mandates for the three advanced biofuels categories be determined?
- How would flattening the total renewable fuel mandate affect the consumption of conventional biofuels? How would it impact consumer gasoline prices?

Remove the total renewable fuel mandate and only maintain the three advanced biofuel categories.

Description

Under current law, the volume mandates for three of the four RFS biofuels categories—total renewable fuels, advanced biofuels, and cellulosic biofuels—increase through the year 2022. For biomass-based diesel, the mandated volume (to be determined by EPA) must be no less than one billion gallons starting in 2012.

In this option, the mandate for total renewable fuel would be eliminated immediately or at some future date, but the advanced mandates would remain. These mandates could either be revised on a year-by-year basis (as is currently done) or for multiple, future years. The advanced mandates could be explicitly extended and defined for years beyond 2022.

If this option were to be implemented, consumption of conventional biofuels would be completely market-driven (including both domestic consumption and exports).

Advantages

- This approach would no longer incentivize conventional biofuels beyond those that are already developed, cost-competitive, and blended for reasons other than the RFS.
- Given constraints on the consumption of biofuels, this option could prioritize the consumption of certain advanced fuels over conventional fuels, and/or would allow some advanced fuels to better compete with conventional fuels.
- This option would concentrate the program's limited resources on advanced biofuels that need more focus.
- Providing additional clarification of volumes for years after 2022 can provide more certainty for advanced biofuels investors.

Disadvantages

- This option may reduce the overall market penetration of biofuels.
- This could result in stranded assets and investments if conventional biofuels are no longer produced and consumed.
- If this undermines the credibility of the mandate policy, then it may discourage investment and create difficulty for future expansion of consumption infrastructure, such as new fuel pumps and/or new vehicle designs.
- Prioritizing advanced ethanol over conventional ethanol could result in circular trade with Brazil: exporting domestically produced conventional ethanol in order to import advanced sugarcane ethanol from Brazil.

Considerations

- How should the mandates for the three advanced biofuels categories be determined?
- How would eliminating the total renewable fuel mandate affect the consumption of conventional biofuels? How would it impact consumer gasoline prices?
- When should the total category be eliminated?

Convert all mandated volumes to percentage mandates.

Description

Currently, the RFS mandates are specified as absolute volumes across the four fuel categories. For each compliance year, these volumes are converted to percentages (forming the Renewable Volume Obligations) based on anticipated fuel demand in the United States during the compliance period.

An alternative approach is to create annual percentage mandates for each category. Based on expected U.S. fuels consumption, these percentages would then be converted to volumes. Given the nested nature of the categories, the cellulosic and biomass-based diesel percentages would necessarily be lower than the advanced biofuel percentage. Similarly, the advanced biofuel percentage would be set at some level less than or equal to the total renewable fuel percentage. Percentage mandates could also be created for other categories, such as infrastructure-compatible drop-in fuels.

This option might also include a cap on the ethanol part of the mandate, set as a maximum percentage on a per-gallon basis. Any changes to the percent blend should allow time for vehicles, engines, and infrastructure to adjust within planning and design cycles.

Advantages

- Depending on how the percentages are structured, this option may create greater certainty regarding future ethanol blend levels. This is particularly important for stakeholders with a consumption perspective, such as refiners, blenders, engine manufacturers, and others.
- In addition, to the extent this option provides greater certainty with regards to future blends, vehicles and fueling infrastructure can be designed to match the percentage mandate, avoiding potential technical, warranty, and liability problems, and allowing for engine optimization and efficiency.
- This option allows the policy to better adapt to changes in total demand for transportation fuels.

Disadvantages

- From the biofuels producer perspective, this reduces certainty about the level of demand for biofuels in the marketplace.
- Conversion from volume to percentage mandates will not necessarily create certainty with regards to future ethanol blend levels, given the nested structure of the categories.
- Even if future infrastructure is designed to handle higher blends of ethanol, there would still be concerns with regards to the legacy fleet.
- This option may not provide a long-term solution to the constraints on biofuels consumption, depending on the trajectory of petroleum demand and the types of biofuels produced within the overall renewable fuels mandate.

Considerations

- What projection(s) and other data should be used for converting the volumes into percentage mandates for the categories?
- Which petroleum fuels should have a percentage mandate (only gasoline and diesel)? Should infrastructure-compatible drop-in fuels be incorporated into the percentage mandate system?

Create a mandate for ethanol based on percentage of consumption, in addition to the volumetric RFS mandate categories.

Description

Currently, the RFS mandates are specified as absolute volumes across the four fuel categories. For each compliance year, these volumes are converted to percentages (forming the Renewable Volume Obligations) based on anticipated fuel demand in the United States during the compliance period.

An alternative approach is to create an ethanol mandate in the form of a percentage, which would be specified for each compliance year in the program. The percentage for each year would then be converted to a volume based on expected U.S. fuel demand for that year. This option might also include a cap on the ethanol part of the mandate, set as a maximum percentage on a per-gallon basis. Any changes to the percent blend should allow time for vehicles, engines, and infrastructure to adjust within planning and design cycles.

This approach would also include volumetric mandates for the four existing categories, along with clear and predictable methodologies (such as equations) for adjusting those volumes on a year-by-year basis.

Advantages

- Vehicles and fueling infrastructure can be designed to work with the target blend, regardless of the particular level; this allows technical optimization and avoids potential technical problems, which can better address program goals of reduced petroleum consumption and emissions.
- A predetermined ethanol percentage allows warrantees for future vehicles and fueling infrastructure to cover that specific blend, which avoids liability concerns; this would not help with legacy vehicles and equipment.
- This option allows the policy to better adapt to changes in total demand for transportation fuels.

Disadvantages

- Fuels in different RFS categories, such as those qualifying as conventional or cellulosic, can take the form of both ethanol and non-ethanol fuels, which can create complexity.
- Even if future infrastructure is designed to handle higher blends of ethanol, there will still be concerns with regards to the legacy fleet.
- If the chosen ethanol percentage is too low, it may not provide a long-term solution to the constraints on biofuels consumption, depending on the trajectory of petroleum consumption growth.
- From the producer perspective, this option would likely reduce certainty about the level of demand for biofuels in the marketplace.

Considerations

- What ethanol blend level(s) should the mandate be linked to: E15, E20, E30, E85, or some other percentage? Should there be a single target percentage in some future year, with a constant blend level until that time, or should there be multiple target percentages over time? In both cases, what would be the associated target year(s)?
- Under this type of system, how should the ethanol percent mandate be layered with the volume mandates for the existing RFS categories? How could a pre-specified methodology ensure that changes to these volumes are both clear and predictable?

Implement automatic consequences if EPA fails to meet statutory deadlines, especially for setting the annual volumes.

Description

Each year, EPA must determine the annual percentage standards for each renewable fuel category and evaluate possible use of waiver authority, particularly for cellulosic biofuel and biomass-based diesel. Under the legislation, EPA is required to finalize the biofuel standards by November 30 for the following compliance year. EPA has frequently been late in finalizing the renewable volume obligations, creating uncertainty for the market and for obligated parties.

This option would include some form of automatic consequences if deadlines are missed, such as making the compliance start date a certain number of months after publication of final requirements.

Advantages

- This option would provide additional incentive to ensure that EPA is complying with the law.
- This option would increase certainty for stakeholders and the market.

Disadvantages

- This option may reduce the level of analysis and stakeholder engagement that is performed if EPA does not have the proper resources to develop regulations within the statutory deadlines, possibly resulting in greater economic, political, and environmental risk.
- Given resource constraints, this option may pose significant challenges in practice.
- This option could compound the problem if the repercussions diminish EPA's resources.

Considerations

- Would a system of formulas for setting the annual volumes create a more manageable process, allowing EPA to better meet its deadlines?

Increase funding for EPA to enhance regulatory capacity.

Description

EPA is responsible for establishing and implementing regulations to ensure compliance with the RFS. These responsibilities include ensuring that technology pathways meet feedstock and greenhouse gas requirements, determining annual percentage standards, monitoring compliance, and other duties.

Advantages

- This option could increase EPA's ability to meet regulatory deadlines and could facilitate the more timely release of data.
- This option could provide the ability to process technology pathway approvals more quickly.

Disadvantages

- This option would pose an increased cost in the form of additional government spending.
- The increased funding could be wasteful if the main barriers to expeditious regulations is due to prioritization or politics.

Considerations

- Could this money be spent more effectively in other ways, while still working toward the goals of the RFS, such as the reduction of greenhouse gas emissions?

Change the definition of obligated parties.

Description

Under current federal regulations, obligated parties are defined as producers and importers of gasoline or diesel fuel (during a compliance period) in the contiguous states and Hawaii.

EPA has limited discretion under the law to determine the point of obligation, however, and the agency could choose to make such a change based on considerations of economic efficiency, burden-sharing, or other factors. For instance, the set of obligated parties could be modified by adding or removing entities at any point along the supply chain, to include or exclude certain parties.

Depending on implementation of this option, it may require legislative action.

Advantages

- Broadening the definition of obligated parties could provide an incentive for other parts of the fuels value chain.
- Putting the obligation closer to the consumer, such as shifting the obligation to the blender, could provide enhanced ability to push consumer behavior, provide more flexibility in allowing the mandates to be met while driving demand, and help to facilitate the build-out of fueling infrastructure.
- Putting the obligation on those with the greatest ability to make changes—based on the economics—would minimize social cost and create a more ideal economic system.

Disadvantages

- The current definition of obligated parties covers the largest entities in the fuels supply chain, providing benefits from the perspective of the regulator; moving the obligation could increase regulatory complexity.
- This approach may only work to shift the burden of compliance, but not address the constraints on the consumption of biofuels.

Considerations

- If the definition of obligated parties is changed, which entities should be included? Should refiners and importers continue to be obligated parties?
- Would any type of change to the definition of obligated parties address constraints on the consumption of biofuels?

Establish explicit methodologies for setting the annual volumes.

Description

Each year, EPA must determine the annual percentage standards for each renewable fuel category and evaluate possible use of waiver authority, particularly for cellulosic biofuel and biomass-based diesel. Under existing legislation, EPA is required to finalize the biofuel standards by November 30 for the following compliance year. This option suggests clearer methodologies for setting these volumes, including the use of some type of volume equations or the explicit consideration of prices. EPA could also integrate its reporting data into the annual volume-setting exercise or could be required to adopt projections from the U.S. Energy Information Administration.

As an example, some of the methodology rules could be: (1) the total renewable fuel mandate will be limited to the capability of vehicles and infrastructure; (2) where compatibility limits volume, preference will be given to high-performing biofuels (that is, categories with lower greenhouse gas emissions); and (3) absent compatibility issues, biofuels mandates will be limited either by available supply or by the statutory value, whichever is lower.

Advantages

- Leveraging EPA data would help the market to better understand the situation and EPA to understand future expectations.
- This approach could reduce the amount of resources needed to develop each year's annual renewable volume obligation rule.
- This option could provide better transparency of expectations to markets and stakeholders.

Disadvantages

- This approach may reduce flexibility to deal with unforseen future events or circumstances.
- This option may be controversial if it provides additional benefits to some types of biofuels while potentially overlooking or disadvantaging others.

Considerations

- What factors should be considered when creating the clearer methodologies? What form should the methodologies take?

Create an explicit methodology for discretionary use of waiver authority, possibly including quantitative definitions of severe economic harm.

Description

Under its general waiver authority, EPA may waive—in whole or in part—the mandated volumes for any of the categories if: implementation would "severely harm the economy or environment of a State, region or the United States" or if there is "inadequate domestic supply."

Criteria could be set that would more clearly specify when waivers would be granted, and for how much. The criteria could include factors such as fuel capability of the current fleet, infrastructure capability, and production volumes. The definitions of "economic harm" and "inadequate domestic supply" could be clarified. Criteria and definitions could be set with regulatory action.

EPA could also be allowed to adjust levels over a longer period of time, which would require a legislative change. Limiting EPA's ability to only short-term adjustments may undermine its ability to make any adjustments at all, as those adjustments could be seen to have little impact.

Advantages

- This approach could provide increased transparency and certainty for stakeholders, particularly on how the mandate levels could affect agricultural, commodity, and other issues.
- This could allow expectations to adjust as outside factors change over the course of the year.
- Taking out the political and/or "human factors" could create more certainty and ensure consideration of economic factors in a consistent manner.

Disadvantages

- This option may constrain EPA's ability to deal with unforeseen circumstances not triggered by whatever criteria are set.
- This option may be controversial if it provides additional benefits to some types of biofuels while potentially overlooking or disadvantaging others.

Considerations

- How should the criteria/triggers be defined?
- If the waiver process is modified to include certain triggers, how "hard" should these triggers be? Should flexibility and/or discretion be limited to ensure that the waivers are actually executed in practice?
- Should waivers target fuels from specific feedstock?

Create a clear methodology and criteria for linking waivers across RFS mandate categories.

Description

When the cellulosic and/or biomass-based diesel categories are waived, EPA has the authority to waive the advanced and total renewable fuel categories by the same or a lesser amount. This option would make clear under which circumstances (and by how much) the advanced and total categories would be waived if the cellulosic and/or biomass-based diesel categories are waived.

This "linking" of waiver volumes would fall into one of three categories along a spectrum: no linking, full linking, and partial linking. In the first case, the advanced and total categories would never be waived, regardless of the amount of the cellulosic and/or biomass-based diesel waivers. In the second case, the advanced and total categories would always be waived by the exact amount of the cellulosic and/or biomass-based diesel waivers. In the third case, specific criteria and a methodology would determine the waiver(s) at an intermediate level. Declaring no linking or full linking would require legislative action, while specifying criteria for linking could be done under regulatory authority.

Advantages

- This approach could increase certainty and transparency if EPA sets discrete criteria for when category-specific waivers would (or would not) translate into waivers for more general volumes. This advantage is particularly clear in the "always-link" and "never-link" scenarios.

Disadvantages

- This approach may reduce EPA's flexibility to deal with unforeseen future situations.
- This option may be controversial if it provides additional benefits to some types of biofuels while potentially overlooking or disadvantaging others.

Considerations

- How does the availability of biofuels in the advanced and total renewable fuel categories (and specifically, the volumes and prices of the surplus needed to fill in a shortfall in the cellulosic and/or diesel categories) factor in the decision to waive those categories?
- If certain criteria were set, what type of flexibility (if any) should be available for EPA to handle unusual circumstances? If this type of flexibility is provided, should the flexibility itself be governed by a set of criteria, or be under EPA's discretion?
- What policy considerations are relevant for the "always-link" and "never-link" options? How would these affect the consumption of conventional and advanced fuels in practice?

Separate the Renewable Volume Obligation calculations for gasoline and diesel.

Description

EPA calculates a percentage obligation/standard for total renewable fuels (and for each fuel category) by dividing the total amount of renewable fuels mandated in a given compliance year by the expected total U.S. transportation fuel use in that year. The resulting percentages are applied to each party's annual fuel sales, yielding the party's Renewable Volume Obligation (RVO).

Under the current framework, obligated parties incur a diesel obligation when supplying gasoline to the domestic market, and vice versa. (That is, two parties supplying the same total amount of gasoline plus diesel to the market incur the same RVO, regardless of their fuel mixes.)

This option would separate the gasoline and diesel obligations. This approach could allow obligated parties to over-comply for one of the fuels (either gasoline or diesel) and under-comply for the other.

Advantages

- Separate obligations for gasoline and diesel would eliminate the existing crossover, making constraints on the consumption of biofuels for each fuel easier to estimate.
- This approach helps to avoid the cross-obligation that occurs most problematically for parties primarily producing one fuel or the other.

Disadvantages

- This approach does not directly address the constraints on the consumption of biofuels.
- This approach may introduce complication in determining the details of all of the Renewable Identification Number categories.
- Cellulosic biofuels include both gasoline and diesel. Cellulosic feedstock can produce a variety of biofuels, which creates additional complexity to try to split the RVO calculations.
- If the obligation is the same on both gasoline and diesel and trading is allowed, then it may not accomplish the intent of separation.

Considerations

- How do you split some categories, like cellulosic biofuels, across the gasoline and diesel calculations?

Create a mechanism to ensure that obligated parties are not purchasing invalid Renewable Identification Numbers.

Description

Only Renewable Identification Numbers (RINs) that were validly generated may be transferred or used for compliance purposes. Because of this, some parties may spend considerable time and effort in evaluating the validity of RINs.

EPA has finalized a voluntary third-party quality-assurance program (QAP) geared toward providing a more structured way to ensure that RINs were validly generated.

The QAP may need additional refinement, especially by providing additional consideration for small producers, reconsidering invalid RIN replacement requirements, and determining when RINs can be separated from fuels.

Advantages

- Reduces liability of obligated parties by allowing them to choose their level of risk, which increases certainty in making RIN transactions.
- This option has the potential to reduce fraud.

Disadvantages

- Currently, there is a replacement requirement so that obligated parties still have to replace invalid RINs.
- Purchasing verified RINs may increase the costs of compliance.

Considerations

- Should this type of program include additional RIN assurance levels?
- What are the benefits and drawbacks of asking obligated parties to pay to replace invalid RINs?

Limit the participants in the Renewable Identification Number market.

Description

Obligated parties show compliance with their renewable volume obligations by holding the requisite number of Renewable Identification Numbers (RINs) at the end of each year. The RIN market has allowed parties with excess RINs to sell them or parties with a RIN deficit to purchase them.

The RFS legislation did not necessarily call for a tradable market, but EPA made that decision through regulation.

This option could limit participants in the market to only allow producers and obligated parties.

Advantages

- Reducing the number of participants could limit speculation and retain the compliance and "mechanical transaction" aspects of the RIN system.
- This option could reduce the ability of parties to artificially affect prices by buying and hoarding RINs, although parties may hold RINs for other legitimate reasons.

Disadvantages

- Reducing the market size may increase the chances for market distortions by decreasing the liquidity in the market.
- Fewer participants could reduce market price discovery and therefore may reduce market transparency.
- With only a few buyers and sellers, sensitive business information may not be as well protected.

Considerations

- Who should be allowed to buy and sell RINs?
- How would this proposal affect RIN prices?

Increase data availability, such as that related to volumes, prices, trades, and fuel blends.

Description

Data on U.S. biofuels production, consumption, and prices are available in various levels of detail and from multiple sources. For instance, the RFS regulations require regulated parties to submit all Renewable Identification Number (RIN) generation information and other RIN transactions to EPA's Moderated Transaction System. Using data generated from that system, EPA provides aggregated monthly data on RIN generation and renewable fuel volume production for specific fuel categories.

At the same time, and despite EPA's progress in increasing transparency, releasing data more quickly and providing additional data—such as that related to E15 and E85 pricing and consumption—could provide increased clarity to markets and to stakeholders. This may require legislative action to mandate the collection of new data by one or more government agencies. In addition, although certain information may already be collected by agencies and other sources—such as EPA, the U.S. Energy Information Administration, the U.S. Departments of Energy and Agriculture, and in economic studies and feasibility analyses—compiling data in one central location would greatly increase its availability and usefulness.

Advantages

- This option could increase transparency to the markets.
- When prices are moving or spike, it may be easier to determine if it is due to market fundamentals, speculation, or some other cause.
- This option may increase consumption potential if investors have relevant and timely data on the location and quantity of potential customers, including flex-fuel vehicle availability and the presence and pricing of E85 fuel.

Disadvantages

- Depending on the implementation, appropriate protections would be required to ensure that confidential business information is not divulged.
- This option may negatively impact private entities, such as the Oil Price Information Service and other non-governmental, private parties, that already have reports on RIN prices and data.

Considerations

- Is the level of market liquidity and transparency not yet sufficient?
- What types and quantity of data would be required to yield a change in decision-making processes?

Give the Department of Defense longer-term procurement ability.

Description

Given that the Department of Defense is the largest energy consumer in the federal government, efforts to use biofuels for military applications could have a large impact on biofuels growth.

However, the Department of Defense is limited in several ways when entering into contracts for energy procurement, particularly with regards to the length of these contracts. Providing the Department of Defense with longer-term procurement ability, in the form of power purchase agreements or other structures, would help to lower the cost of using these energy resources and would provide greater certainty for the supplying industries. In addition, an assessment of biofuel testing standards, and particularly how such standards differ across military branches and commercial applications, may facilitate greater biofuels procurement.

Finally, longer-term procurement ability could also be coupled with incentives and other programs promoting the military use of biofuels.

Advantages

- Given that the government is a significant energy consumer, this approach can create new biofuels consumption pathways beyond those in the transportation and commercial sectors.
- This approach can help to incentivize different types of biofuels production.
- This option may provide longer-term policy certainty for biofuels producers.

Disadvantages

- Extending the procurement period may cause oversight challenges or increase administration costs.
- Despite the availability of longer-term procurement options, the purchase of renewable fuels may be limited due to cost constraints.

Considerations

- What factors should be considered in setting the duration of the procurement time period?
- What additional incentives or programs are needed to promote the military use of biofuels?

Create an education campaign to inform consumers about new fuels, flex-fuel stations, and which engines can handle which blends.

Description

A key factor in the success of the U.S. transition from leaded to unleaded fuels was the development and implementation of a public education campaign. To supplement this information and avoid misfueling, unleaded cars were also required to have specially designed fuel inlets—matching unleaded fuel nozzles—to distinguish them from their leaded counterparts.

Similarly, this policy option suggests the creation of an education campaign to inform consumers about different types of motor fuels, where they can be purchased, and in which kinds of vehicles they can safely be used. For example, such a program may discuss the differences between E10 and E85, the availability of flex-fuel vehicles, and where to locate fueling stations that offer one or more types of biofuel blends.

Advantages

- This approach may help mitigate misfueling concerns in older vehicles and equipment.
- This option may increase the use of biofuels if consumers view them as beneficial.

Disadvantages

- This option could pose a significant cost for the government or other entities.
- Picking which facts to use about the benefits of biofuels may be challenging, since stakeholders may not agree on all the benefits of biofuels or the educational materials.
- If the campaign is insufficient, consumers might still misfuel.
- Providing additional educational material will not necessarily result in additional biofuels consumption.

Considerations

- Should this type of education campaign be tailored to specific states or regions?
- How should the information be provided such that it effectively informs consumers?

Create/expand incentive programs—such as government R&D, grants, loan guarantees, or tax incentives—for the production of advanced biofuels, with long-term stability that phases out slowly.

Description

These incentives could target all advanced biofuels generally, or they could specifically target cellulosic biofuels, aviation biofuels, and/or infrastructure-compatible drop-in biofuels.

To help new technologies get off the ground and provide certainty for investment, the support should be guaranteed for a certain timeframe, up to a certain dollar amount, and/or until a certain production volume is reached, depending on the type and the goals of the incentive. The incentive can be designed to phase out over a time period or as milestones are accomplished.

The tax incentive option could take multiple forms, such as an investment tax credit or a production tax credit. Also, it could be performance-based so that the value is commensurate with environmental performance. This could be measured as greenhouse gas emissions reductions or a mix of indicators, such as water consumption, land use, biodiversity protection, etc.

Advantages

- This approach could stimulate innovation and production of advanced biofuels, especially by allowing them to overcome costs associated with the economic barriers of market entry.
- A program with longer-term timeframes would reduce the political uncertainty associated with renewing the incentive each year.
- To the extent that the program stimulates the production of aviation fuels and/or drop-in fuels, it would help to create new outlets for biofuels consumption, thereby lessening the current constraints on consumption.
- A performance-based tax incentive would encourage biofuels that minimize the risk of unintended environmental consequences.

Disadvantages

- Parallel existence of both financial incentives and mandates can create gamesmanship, depending on the design of the incentives and mandates.
- This approach could have a very high cost for the government—especially a large upfront cost—which may create difficulties due to political considerations.
- If the incentive takes the form of a tax incentive, it must be structured correctly, or investors and companies may not receive the intended benefits if they are not incorporated in a certain way or have enough tax liability.
- Providing additional incentive programs will not necessarily ensure the use of the programs or the consumption of any biofuels produced as a result.

Considerations

- Would this type of incentive program be in addition to, or in lieu of, fixed mandate volumes or fixed mandate percentages? What factors should be considered in making this decision?
- Would layering tax incentives on top of the existing volume mandates (and the RIN system) create too much complication or an opportunity for gamesmanship?
- At what point—and under which criteria—should the subsidies phase out?

Create/expand incentive programs—such as government R&D, grants, loan guarantees, or tax incentives—for biofuels consumption infrastructure, with long-term stability that phases out slowly.

Description

The program could incentivize both the production of vehicles that can consume higher blends of biofuel, as well as the infrastructure needed to distribute those higher blends, including blender pumps and storage tanks.

To help provide certainty for investment, the support should be guaranteed for a certain timeframe, up to a certain dollar amount, and/or until a target deployment is reached, depending on the type and the goals of the incentive. The incentive can be designed to phase out over a time period or as milestones are accomplished.

Such an incentive program might aim, at least in part, to facilitate partnerships between producers, refiners, and retailers, by creating mechanisms for capital allocation, information-sharing, and joint coordination.

The tax incentive option could take multiple forms, such as an investment tax credit or a production tax credit.

Advantages

- This approach would stimulate innovation and production of biofuels consumption infrastructure (vehicles and fueling).
- This approach has the potential to expand markets for biofuels, which helps with the constraints on the consumption of biofuels.
- A program with longer-term timeframes would reduce the political uncertainty associated with renewing the incentive each year.

Disadvantages

- This approach could have a very high cost for the government—especially a large upfront cost—which may create difficulties for program development and implementation due to political considerations.
- Providing additional incentive programs ensures neither that the programs will be used nor that there will be additional biofuels consumption, even if they are used to build vehicles and/or fueling infrastructure.

Considerations

- At what point—and under which criteria—should the subsidies phase out?
- Are there ways in which a incentive program for vehicle development and production should differ from a program for fueling infrastructure build-out?

Provide a 1.0 Reid Vapor Pressure exception for ethanol blends above 10 percent and for other biofuels, as is in place for blends of up to 10 percent ethanol.

Description

The Clean Air Act directs EPA to regulate the volatility of fuels used in conventional gasoline (excluding reformulated gasoline), which can result in evaporative emissions—predominantly volatile organic compounds—and in ground-level ozone. Reid Vapor Pressure (RVP) is a measure of fuel volatility and EPA mandates that, during the summer ozone season in certain parts of the country, fuels measure only between 7.8 and 9 pounds per square inch (psi) RVP. However, by regulation, fuels that contain between 9 percent and 10 percent ethanol are allowed a 1 psi "bump"—that is, they can measure between 8.8 and 10 psi RVP.

This option would expand the exception to ethanol blends above 10 percent and/or to other types of non-ethanol biofuels, such as isobutanol.

Advantages

- This approach removes a significant barrier for consumption of higher blends of ethanol, especially in certain regions and during particular times of the year.

Disadvantages

- This option could result in potential negative air-quality impacts, which could affect the environmental reputation of biofuels production.
- This option alone may not change consumption behavior and would possibly need to be paired with policies that address pricing and infrastructure.

Considerations

- What percent blend level of ethanol should receive the exception?
- Should the exception be provided to other non-ethanol biofuels?
- How could implementation of this option affect air quality?

Remove the Federal Trade Commission labeling requirement for infrastructure-compatible drop-in fuels if they meet the petroleum specification.

Description

Although true infrastructure-compatible drop-in fuels are identical to their respective petroleum products from the perspective of vehicle technology—and therefore present no risk of misfueling or liability concerns—these fuels are currently treated differently than their respective petroleum products for labeling purposes. For example, the Energy Independence and Security Act of 2007 defines biomass-based diesel broadly enough that the U.S. Federal Trade Commission treats both drop-in biodiesel (renewable diesel) and non-drop-in biodiesel the same.

This option recognizes the importance of the Federal Trade Commission fuel-labeling requirements for consumer protection with regards to non-drop-in fuels, but suggests these labeling requirements can be safely eliminated for true drop-in fuels.

Advantages

- This option would remove a barrier to the distribution and consumption of infrastructure-compatible drop-in fuels, benefiting the producers of these fuels specifically, and more generally helping to reduce limitations on the consumption of biofuels.

Disadvantages

- This option may increase the complexity of tracking infrastructure-compatible drop-in fuels throughout the supply chain, once the drop-in fuel is mixed with conventional fuel. Similarly, the option could add complexity to tracking imports and exports of drop-in fuels.

Considerations

- How could fuel tracking and reporting be modified to account for changes in labeling requirements? Would this add to administrative costs?
- What are the purpose and benefits of tracking infrastructure-compatible drop-in fuels throughout the supply chain?

Mandate that all vehicles are created as flex-fuel vehicles.

Description

Flex-fuel vehicles (FFVs) can be fueled with pure gasoline or with gasoline blends up to E85.

New FFVs cost $70–$100 more to manufacture than a non-FFV of the same vehicle model. It is estimated that there are currently between 10-17.4 million FFVs in the United States, but only an extremely small percentage of those are used with E85 or with blends of ethanol higher than 10 percent.

Advantages

- Compared with the total cost of manufacturing a vehicle, the cost of FFV technology per vehicle is relatively low.
- If fueling infrastructure is in place to provide access to higher-level blends of ethanol, a larger FFV vehicle fleet could create a more elastic demand market for corn; for instance, when corn prices are low, corn can be converted to ethanol and sold (and consumed) as E85.

Disadvantages

- Designing all vehicles as FFVs can increase the complexity of optimizing vehicle efficiency and environmental performance.
- Mandating that all vehicles are FFVs does not guarantee that all FFVs will be used with biofuels, which instead requires a change in consumers' behavior.
- Although FFV technology has a relatively low cost per vehicle (compared with each vehicle's total cost), the sum of this option across a manufacturer's entire vehicle fleet could pose a significant financial burden. Such spending represents an opportunity cost that could negatively impact other efforts to more effectively address the program goals of reducing petroleum consumption and emissions.

Considerations

- Given current fueling infrastructure and prices, how would this option impact the consumption of higher-level ethanol blends?
- How would this option impact consumption given expanded infrastructure and under different price scenarios?
- How should this option be coordinated with efforts related to E85 pricing and refueling infrastructure availability?
- If the FFVs are not used with biofuel blends, how will this affect the environmental performance of the vehicle?

Evaluate the costs of, benefits of, and obstacles to introducing into commerce higher-octane gasoline blends.

Description

Congress could convene an expert body, such as the National Academy of Sciences, composed of automakers, fuel producers, and distributers to evaluate the costs and benefits of, and obstacles to, introducing into commerce higher-octane gasoline blends, including a careful consideration of potential octane sources, their fuel supply-chain costs, and impacts on a well-to-wheels lifecycle basis.

This panel could also evaluate the relative merits of a biofuels strategy based on high-octane ethanol blends versus one that prioritizes infrastructure-compatible drop-in biofuels. For instance, the latter strategy may minimize current infrastructure costs, but could involve less effective production and less efficient combustion of fuels as compared with a scenario with higher-octane fuels (once suitable infrastructure has been deployed).

Advantages

- Using higher ethanol blends to increase octane levels in gasoline may be helpful for increasing fuel efficiency and compliance with Corporate Average Fuel Economy standards.
- Using ethanol in a fuel blend that allows automakers to take advantage of the octane properties could result in larger reductions in oil use and greenhouse gas emissions at a lower cost than using the same quantity of biomass to produce infrastructure-compatible drop-in biofuels.

Disadvantages

- The biofuels system is complex and involves many diverse stakeholders. Significant effort would be required to facilitate agreement among parties on which path to pursue.

Considerations

- Is ethanol the best source for increasing octane?
- What are the environmental impacts of high-octane ethanol blends as compared with infrastructure-compatible drop-in biofuels?
- What currently available information should be reviewed before determining if a panel is needed?

Address warranty issues related to misfueling in older vehicles and equipment.

Description

Many passenger vehicles on the road today were designed for use with gasoline blends of up to 10 percent ethanol, but not more. A number of legacy vehicles, as well as equipment with smaller engines—such as lawnmowers, snowmobiles, and small boats—can have serious compatibility issues with any ethanol blend level. In all cases, vehicles and equipment are warrantied only when used with fuels that they were designed to take. Therefore, the use of higher-level blends can lead to both technical and liability issues in these cases.

This option suggests the creation of a retroactive policy administered by the government (or some other third-party organization) to take on liability for any misfueling that may occur in older vehicles and equipment. Such a policy would fill the gap where an engine might be safely used with a blend, but where liability and warranty concerns would otherwise discourage such use. Such a policy might cover all affected engines, or may only cover engines manufactured before a certain date.

Advantages

- This approach may increase the capability to use blended fuels in a larger set of vehicles and engines.

Disadvantages

- This approach could have a very high cost for the government or other third-party organization, which may create difficulties due to political considerations.
- Providing liability protection does not guarantee that there will be additional biofuels consumption.
- Engines and equipment were not designed to use certain fuel blends and manufacturers may still discourage customers from using the fuel, even if there is no warranty issue.
- This type of policy, if applicable to engines regardless of when they are manufactured, may provide a disincentive to the creation of smaller equipment that can handle blended fuels.

Considerations

- How much financial liability would the government or other entity be taking on?
- Would the liability policy encompass those engines covered by EPA's E15 waiver, engines not included in the waiver, or both?
- Would the policy cover all engines, or only those manufactured before a certain period of time?

Fully fund and enforce agricultural conservation programs.

Description

The U.S. Department of Agriculture conservation programs—such as those conducted by the Farm Service Agency, Forest Service, and Natural Resource Conservation Service—strive to implement practices to improve soil, water, air, plants, animals, and ecosystems, while also creating productive and sustainable working lands.

Advantages

- This approach could reduce the cost of environmental compliance with the RFS.
- This could create additional efficiencies for agricultural production outside of the RFS.

Disadvantages

- This option would pose an increased cost in the form of additional government spending, which may create difficulties due to political considerations.
- This option may not necessarily increase biofuels production or consumption.

Considerations

- To what extent should these programs be tailored to biofuels production?
- How should the benefits of these programs on the cost of environmental compliance with the RFS be monitored and measured?

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