



Answers to Questions for the Record Following a Hearing on the Renewable Fuel Standard Conducted by the Subcommittee on Environment and the Subcommittee on Oversight of the House Committee on Science, Space, and Technology

On November 3, 2015, the Subcommittee on Environment and the Subcommittee on Oversight of the House Committee on Science, Space, and Technology convened a joint hearing at which Terry Dinan, Senior Advisor at the Congressional Budget Office, testified about the Renewable Fuel Standard. After the hearing, Chairman Smith of the Committee and Chairman Bridenstine of the Environment Subcommittee submitted questions for the record. This document provides CBO's answers.

Chairman Smith

Question. CBO's analysis concluded that the RFS has had a minimal impact on the price of food over the 10 year lifespan of the law, and repeal of the law would not significantly reduce food prices. During the hearing, Mr. Ed Anderson raised the issue of corn crop yields as related to the current price of corn, which are significantly lower than the price in 2012. Mr. Anderson linked this price drop to three "record corn crops," and stated that this trend was unlikely to continue. Do you agree with this statement? If so, would more typical, lower yields of corn in the future be likely to significantly impact the price of food? Mr. Coleman also stated that the agriculture market is influenced heavily by the price of oil, with the price of corn dropping with lower oil prices. Do you agree with this statement? If so, could the current drop in oil prices be impacting the price of corn?

Answer. The Renewable Fuel Standard (RFS) affects the price of corn and thus the price of food. At present, roughly 40 percent of the U.S. corn supply is used to make ethanol. To the extent that changes in the RFS raise or lower the demand for corn ethanol, the RFS will raise or lower corn prices. However, because corn and food made with corn account for only a small fraction of total U.S. spending on food (roughly 1.5 percent in 2015), the effects of the RFS on overall food prices are small. For example, CBO estimated that food prices would be only slightly lower in 2017 (by less than 0.1 percent) if the RFS was repealed than they would be if the volumes of biofuels required under the RFS in 2017 were the same as those proposed for 2016.¹

1. Those standards, which the Environmental Protection Agency (EPA) proposed on September 29, 2015, were somewhat lower than the 2016 volumes that EPA mandated in its finalized rule, published on November 30, 2015. See Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017, 80 Fed. Reg. 33100, 33105 (proposed June 10, 2015), and Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017, EPA-HQ-OAR-2015-0111, ___ Fed. Reg. ___ (August 30, 2015) (to be codified at 40 C.F.R. pt. 80) (Final Rule to be published in the *Federal Register*).

To a considerable extent, the price of corn depends on the size of the annual corn harvest. For instance, the price of corn averaged about \$4.50 per bushel in 2013 and \$3.70 per bushel in 2014, when corn harvests reached historical highs of about 14.0 billion bushels each year. By contrast, the price of corn averaged \$6.90 in 2012 when the U.S. corn harvest totaled about 10.8 billion bushels—the smallest harvest since 2006. In general, greater production in any one year will reduce the price of corn in that year. However, because spending on corn accounts for such a small share of the total cost of food, variations in the price of corn—such as those resulting from changes in yields—are unlikely to significantly affect average food prices.²

Corn prices also depend on other uncertain factors, such as international supply-and-demand factors for corn and other agricultural products and the price of energy supplies. The cost of crude oil affects the price of corn and other agricultural goods because energy is an input into agricultural production. The decline in the price of oil in 2015—which has averaged about 45 percent below that in 2014—is one factor contributing to lower corn prices today. As with yields, variations in those factors can affect corn prices but are unlikely to significantly affect average food prices.

Question. During the hearing, Mr. Coleman questioned the quality of CBO’s analysis related to the RFS, stating that the report “did not analyze the economic benefits of reducing petroleum dependence,” and went on to assert that “that’s a little bit like looking at the economic benefits of a jobs program and not looking at the economic benefits of jobs creation.” Did CBO consider the economic cost or benefits of petroleum dependence? If not, why not?

Answer. CBO’s testimony focuses on two considerations: the feasibility of complying fully with the Energy Independence and Security Act (EISA) and how several alternative scenarios to EISA’s requirements would affect prices of food and fuel. In its testimony, CBO did not attempt to measure either the benefits or the costs of complying with the RFS. The benefits of complying with the RFS are generally described as the value of the reduction in greenhouse gas emissions that may occur as a result of substituting biofuels for petroleum-based fuels and the potential energy security benefits associated with consuming less petroleum. CBO has assessed both benefits in previous publications.

In particular, although researchers’ predictions vary considerably, available evidence suggests that replacing gasoline with corn ethanol has only limited potential to reduce greenhouse gas emissions (and some studies indicate that it could increase emissions).³ Evidence indicates that the success of the RFS in reducing emissions from transportation fuels will depend mainly on the extent to which it causes people to substitute advanced biofuels—particularly cellulosic biofuels—for gasoline or diesel over the long run.

2. Underlying CBO’s most recent assessment of the budget and economic outlook is the projection that 6.6 billion bushels of corn will be used directly as food or as animal feed in 2015. At a price of about \$3.80 per bushel, about \$25 billion will be spent on corn as food in 2015, which is about 1.5 percent of the roughly \$1.7 trillion expected to be spent on food. For CBO’s overall outlook, see Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2015 to 2025* (August 2015), www.cbo.gov/publication/50724.

3. See Congressional Budget Office, *The Renewable Fuel Standard: Issues for 2014 and Beyond* (June 2014), www.cbo.gov/publication/45477.

Reducing U.S. consumption of oil (for example, through the RFS) and offering consumers options to drive less during times of high prices (for example, by expanding public transportation service or promoting telecommuting) would make U.S. consumers less vulnerable to disruptions in the supply of oil.⁴ Such options would reduce the costs that households and businesses might bear as a result of spikes in fuel prices that such disruptions caused. (Because oil is traded in a global market, disruptions to oil production anywhere in the world raise the price of oil for every consumer, regardless of the amount of oil imported or exported by that consumer's country.) CBO has not estimated the magnitude of the benefit of marginal reductions in oil consumption.

The benefits associated with incremental reductions in consuming petroleum-based fuels are most appropriately compared with the incremental costs of achieving those reductions through the RFS. An estimate of those costs can be constructed from the prices that CBO estimated for renewable identification numbers (RINs), known as RIN prices, which indicate the marginal cost of adding one additional gallon of biofuel to the nation's transportation fuel supply, along with information on the amount of gasoline or diesel displaced by a single gallon of biofuel. EPA assigns a RIN to each qualifying gallon of renewable fuel; those RINs are used to enforce compliance with the RFS.

The marginal cost of adding one more gallon of biofuel to the fuel supply (and the corresponding RIN prices) rise as the volume requirements of the RFS increase. For example, CBO estimated that the RIN price for corn-based ethanol would be 40 cents if the volumes of biofuels required under the RFS in 2017 were the same as those proposed for 2016, which CBO refers to as the "2016 volumes scenario." Under more stringent standards—meeting the 2017 requirements for advanced biofuels (but not for cellulosic biofuels) and the cap on corn ethanol stated in EISA (the "EISA volumes scenario")—the RIN price for corn ethanol would be higher: CBO estimated that price would probably be between \$1.55 and \$2.10. Because ethanol has roughly two-thirds the energy content of the same amount of gasoline, the marginal cost of reducing gasoline consumption by one gallon through substituting corn ethanol would be 60 cents under the 2016 volumes scenario and would probably be between \$2.30 and \$3.20 under the EISA volumes scenario.⁵ Because the marginal cost of reducing gasoline consumption increases as the volume of biofuel required by the RFS rises, the average cost of each one-gallon reduction in the use of gasoline caused by the RFS would be less than the marginal cost.

The marginal cost of substituting advanced biofuels for petroleum-based fuels is higher than that of substituting corn ethanol for gasoline. For example, CBO estimated that the RIN price for advanced biofuels would be 55 cents under the 2016 volumes scenario and would probably be between \$3.00 and \$6.00 under the EISA volumes scenario. As a result, the marginal cost of reducing gasoline consumption by one gallon through substituting sugarcane ethanol (a form of advanced biofuel) would be roughly 85 cents under the 2016 volumes scenario and about \$4.50 to \$9.20 under the EISA volumes scenario. (The average cost of each reduction would be less than the marginal cost.)

4. See Congressional Budget Office, *Energy Security in the United States* (May 2012), www.cbo.gov/publication/43012. That report focused on the ability of U.S. households and businesses to accommodate disruptions of supply in energy markets. Other considerations, such as having the flexibility to choose not to import oil from countries that might seek to use their exports of oil to influence international affairs, were outside the scope of that report.

5. Those values are equal to the RIN price divided by 0.66 to account for ethanol's having less energy than gasoline; one gallon of ethanol replaces only two-thirds of a gallon of gasoline.

Chairman Bridenstine

Question. Dr. Dinan, in your testimony, you state that CBO's analysis shows that repeal of the RFS would have minimal effect on the price of transportation fuels. Does CBO's analysis take into account the elimination of RINs, the cost of which is currently shouldered by merchant refiners?

Answer. CBO's analysis of how repealing the RFS would affect the price of transportation fuels accounts for the elimination of the cost of acquiring renewable identification numbers (RINs). CBO's analysis accounts for the cost of complying with the regulation—including the cost of acquiring RINs and any increase in the cost of corn ethanol resulting from the mandate.

CBO estimated that repealing the RFS would have only small effects on prices in comparison with what would happen if the volumes of biofuels required under the RFS in 2017 were the same as those proposed for 2016. Specifically, CBO estimated that repealing the RFS would have essentially no effect on the 2017 price of E10, would lower the 2017 price of petroleum-based diesel by roughly 5 cents, and would increase the 2017 price of E85 by about 15 cents. (E10 and E85 refer to blends of gasoline with ethanol that are up to 10 percent ethanol and up to 85 percent ethanol, respectively.) The estimated effect on fuel prices of repealing the RFS is limited because the standards proposed for 2016 would increase the use of renewable fuels by a relatively small amount compared with the quantity that would be used without the mandate.

Repealing the RFS would have larger effects on prices of fuels if the requirements were more stringent, that is, if it mandated larger volumes of renewable fuels. For example, CBO found that prices for E10 and petroleum-based diesel would be significantly higher under a more stringent scenario—in which fuel suppliers would need to meet the 2017 requirements for advanced biofuels (but not for cellulosic biofuels) and the cap on corn ethanol stated in EISA—than if 2017 requirements were set at the volumes that EPA proposed for 2016.