COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

HEARING CHARTER

Conflicts and Unintended Consequences of Motor Fuel Standards

Wednesday, November 2, 2011
2:00 p.m. to 4:00 p.m.
2318 Rayburn House Office Building

PURPOSE

On Wednesday, November 2, 2011, the Subcommittee on Energy and Environment of the Committee on Science, Space, and Technology will hold a hearing to examine motor fuel standards currently in place at the federal level and under consideration at the federal or state level; assess the scientific foundation for such standards; explore the inherent conflicts and unintended consequences of such standards; and question whether or not conflicts exist within the standards and the consequences of such effect the fungibility of, safe use of and affordability of the United States motor fuel supply.

WITNESSES

Mr. Brendan Williams, Senior Director of Advocacy, National Petrochemical & Refiners Association.

Dr. Ingrid Burke, Director, Haub School and Ruckelshaus Institute of Environment and Natural Resources, University of Wyoming, and Co-Chair, National Research Council Committee on Economic and Environmental Impacts of Increasing Biofuels Production.

Ms. Margo T. Oge, Director, Office of Transportation and Air Quality, U.S. Environmental Protection Agency.

Dr. Jay Kesan, Professor and H. Ross & Helen Workman Research Scholar and Program leader of the Biofuel Law & Regulation Program, Energy Biosciences Institute, University of Illinois College of Law.

Mr. Bob Greco, Group Director, Downstream and Industry Operations, American Petroleum Institute.

Mr. David Hilbert, Thermodynamic Development Engineer, Mercury Marine.

Mr. Jack Huttner, Executive Vice President of Commercial and Public Affairs, Gevo, Inc.

Background

The Clean Air Act Amendments (CAAA) of 1970, 1977, and 1990 provided a number of regulatory tools to the EPA to reduce air pollution across the U.S. These tools can be divided into two types of approaches: ambient air quality standards and technology standards. Each approach attempts to address difficulties in attaining air quality improvements in a variety of ways, utilizing regulatory mechanisms to focus on stationary and mobile sources, pollution that travels across state lines, and technology limitations.

National Ambient Air Quality Standards

The regulatory scheme established by the CAAA of 1970 was based primarily on the concept of nationwide air quality goals and the development of individual state plans to meet those goals. EPA has identified six "criteria pollutants" for National Ambient Air Quality Standards (NAAQS): sulfur dioxide (SO_2), particulate matter (PM)[1], nitrogen oxides (NO_X), carbon monoxide (CO), ozone (O_3), and lead (Pb). For each of these pollutants, EPA has set a primary standard at a level designed to protect the public health within an "adequate margin of safety". In addition, the statute allows EPA to set a secondary NAAQS to protect public welfare. At this point, EPA has not set secondary standards at different levels than the primary standards.

The standards themselves are not directly enforceable. Rather, NAAQS establish ceilings for concentrations of criteria pollutants in ambient air. States are required to develop their own State Implementation Plans (SIPs) that outline source-specific emission limitations (either stationary or mobile sources) in which the NAAQS will be "attained" or "maintained". SIPs must be approved by EPA. If EPA determines that a SIP will not be able to attain or maintain the NAAQS concentrations, EPA can require States to abide by a Federal Implementation Plan (FIP) until such time that the State develops an approved SIP.

Mobile Source Controls in the Clean Air Act

Title I of the CAAA directs the EPA to set NAAQS and standards for other harmful air pollutants, and focuses on reducing pollution from stationary sources such as coal-fired power plants, refineries, and factories. However, emissions reductions from these sources are typically not sufficient for States to achieve the goals laid out in their SIPs, so additional tools are needed. Title II of the CAAA provides a framework for achieving further emissions reductions through regulation of mobile sources. Although separate titles, changes to Title I automatically impact implementation of Title II, and vice versa. For example, if EPA sets a NAAQS at a more stringent level using the authority laid out in Title I, the tightened requirements apply to mobile sources under Title II.

Mobile Source regulation under the Clean Air Act targets engines and the fuel used to power those engines. The Clean Air Act outlines categories of engines: on road, those used in the Nation's light duty and heavy duty vehicle fleet and off road, those engines used in locomotives, aircraft, recreational vehicles such as boats and jet skis, as well as construction and farm equipment, lawnmowers, and chainsaws. On the fuel side of the equation the Act provides for the regulation of not only tailpipe emissions but also evaporative emissions from motor fuels.

[1] For the first time, during the 1997 revision of the PM NAAQS, EPA established separate standards for fine particulate matter (smaller than 2.5 micrometers or PM2.5) and coarse particulate matter (smaller than 10 micrometers or PM10).

California Waiver

Unique in Title II of the CAA is what is often referred to as the California waiver, Section 209(b), which provides that the Administrator may waive the prohibition against a State adopting or enforcing any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines as long as the State standards are at least as protective of public health and welfare as the applicable federal standard. In practice this permitted California to continue to adopt more stringent standards than the rest of the country. Given the State's economic size and market share, California regulations tend to influence national standards. For example, CAFÉ standards negotiated in 2009 included EPA, the Department of Transportation, California regulators, and the auto industry.

Tailpipe Emissions

The 1990 CAAA expanded EPA's authority so as to require reductions of emissions previously ignored, including evaporative and refueling emissions, cold temperature emissions and air toxics. The amendments outlined new tailpipe emissions standards for light duty cars and trucks (Tier I) and authorized EPA to set more stringent standards down the road (Tier II). Tier II standards phased in beginning with the model year 2004, and attempted to be fuel neutral. Tier II targeted the refining process as well, requiring refiners to reduce the sulfur content in gasoline to 30 parts per million (ppm). This requirement necessitated by States needing to meet more stringent revised ozone and particulate matter (PM) standards.

Fuel Specifications

Section 211(f) of the CAA prohibits the introduction of a new fuel into commerce unless that fuel is certified to be "substantially similar" to an existing fuel on the market. Under the Act, EPA may waive the prohibition if the manufacturer of the fuel proves the new fuel or fuel additive (or concentration thereof) will not cause or contribute to a vehicle's failure to meet existing emissions standards.

In the 1990 amendments, Congress sought to address the problem summertime ozone increases, by creating the Reformulated Gasoline (RFG) Program. The RFG Program required that gasoline sold in certain areas (starting with the 9 largest metropolitan areas with the most severe summertime ozone levels and other nonattainment areas that opt into the program) be reformulated to reduce emissions of toxics and ozone precursors including volatile organic compounds (VOCs). VOCs are released in part due to the evaporative nature of gasoline. In order to make gasoline cleaner burning, the Act, as part of the RFG program, specified that RFG include 2 percent by weight oxygen content. The oxygenate requirement was initially met by adding the fuel additive, MTBE to gasoline, as ethanol when used as an oxygenate introduced additional volatility, thereby increasing evaporative emissions. The Energy Policy Act of 2005, however, eliminated the oxygenate requirement for the RFG program as the Renewable Fuel Standard (RFS) became the primary driver of gasoline content requirements.

The standard approach used to measure gasoline volatility is in pounds per square inch (psi) of Reid Vapor Pressure (RVP). The higher the RVP, the higher the fuel's volatility or tendency to evaporate. The gasoline standard ranges from 7.0 psi to 9.0 psi for the summer months. Since as mentioned above, ethanol, increases the volatility of gasoline, EPA provided a 1.0 psi (1 pound waiver) for gasoline containing 10 percent ethanol.

Boutique Fuels

Under Section 211(c), the EPA has approved requests for some States to adopt fuel standards that are more stringent than those required under EPA's RFG program. These fuels, often called boutique fuels, are produced for a specific geographic area in order to help States achieve their NAAQS compliance. Boutique fuels produced for one area may not satisfy requirements in another area. The Energy Policy Act of 2005 sought to address the proliferation of boutique fuels by limiting their number.

The Renewable Fuel Standard

The Energy Policy Act of 2005 (EPAct05) established in law a renewable fuel standard (RFS). It required that 4 billion gallons of renewable fuel be used in the national fuel mix by 2006, rising to 7.5 billion gallons by 2012. The Energy Independence and Security Act of 2007 (EISA) greatly expanded the RFS (RFS2). EISA increased the volume of renewable fuel to be used in the U.S. to 36 billion gallons by 2022. Furthermore, in order to promote the use of advanced biofuels, the amount of corn-based ethanol to be used in meeting the RFS2 was capped at 15 billion gallons. In 2010, the United States consumed approximately 13.2 billion gallons of corn-based ethanol. RFS2 created four categories of biofuels:

- Total *renewable fuels* is the loosest definition, with the only requirement that the biofuel have a lifecycle greenhouse gas (GHG) emission profile that is 20% below the estimated lifecycle GHG emission profile of traditional gasoline. Corn-based ethanol qualifies in this category.
- *Advanced biofuels* must reduce lifecycle GHG emissions by 50% compared with traditional gasoline. Corn-based ethanol does not qualify for this category but ethanol derived from sugarcane (Brazilian ethanol) does.
- *Cellulosic and agricultural waste-based biofuels* must reduced lifecycle GHG emissions by 60% compared with traditional gasoline. These renewable fuels must be derived from cellulose.
- *Biomass-based biodiesel* must reduce lifecycle GHG emissions by 50% compared with traditional diesel fuel. Qualifying fuels are any diesel made from biomass feedstocks.

RFS2 nests the requirements for the advanced biofuels. For example, in 2022, the RFS mandates the use of 36 billion gallons of biofuel (table 1). However, only 15 billion can be from corn-based ethanol. The remaining 21 billion must come from advanced biofuels. Of the 21 billion, 16 billion must come from cellulosic, at least 1 billion from biodiesel, and 4 billion of unspecified other advanced biofuels.

EPA has the authority to reduce or waive the RFS requirements, in whole or in part, based on the availability of domestic supply. For example, in February 2010, EPA waived the 2010 cellulosic requirement of 100 million gallons to 6.5 million gallons, and in November 2010, EPA waived the 250 million gallon cellulosic requirement for 2011 to 6.6 million gallons. Even if the adjusted volume of cellulosic biofuel is not actually produced, the obligated parties (including refiners) are still required to buy credits to satisfy the adjusted amount.

Table 1. RFS 1 and 2 Requirements – billions of gallons[2]

Year	RFS1 (EPAct05)[3]	RFS2 Biofuel mandate				
		Total Renewable Fuel	Cap on corn-based ethanol	Advanced Biofuels		
				Cellulosic	Biodiesel	Other
2006	4.00	———	———	———	———	———
2007	4.70	———	———	———	———	———
2008	5.40	9.00	9.00	0.00	0.00	0.00
2009	6.10	11.10	10.50	0.00	0.00	0.10
2010	6.80	12.95	12.00	0.0065	1.15	0.20
2011	7.40	13.95	12.60	0.0066	0.80	0.30
2012	7.50	15.20	12.20	0.50	1.00	0.50
2013	7.60[4]	16.55	13.80	1.00		0.75
2014	7.70	18.15	14.40	1.75		1.00
2015	7.80	20.50	15.00	3.00		1.50
2016	7.90	22.25	15.00	4.25		2.00
2017	8.10	24.00	15.00	5.50		2.50
2018	8.20	26.00	15.00	7.00		3.00
2019	8.30	28.00	15.00	8.50		3.50
2020	8.40	30.00	15.00	10.50		3.50
2021	8.50	33.00	15.00	13.50		3.50
2022	8.60	36.00	15.00	16.00		4.00
2023	--					

Unintended Consequences and Potential Conflicts

E15

As a result of approaching the ethanol "blend wall" of ten percent (E10) and the increasing volumes required by the RFS, EPA, prompted by an application by Growth Energy in March of 2009, has recently permitted the use of intermediate ethanol blends (up to E15) in some vehicles. [5] Despite technical concerns involving emissions, reliability, infrastructure, and liability being raised by a diverse coalition of stakeholders, in October 2010 and January 2011, EPA partially approved waivers for the use of E15 in model year 2001 and newer light-duty motor vehicles. In approving the waiver, EPA was required by Section 211(f) of the CAAA to determine first that E15 would "not cause or contribute to a failure of any emission control device or system." In making the determination, the Administrator relied almost exclusively on a set of tests conducted by the Department of Energy in 2009 and 2010.

[2] Congressional Research Service. "Renewable Fuel Standard (RFS): Overview and Issues". February 1, 2011.
[3] EPAct05 required that for 2013 and thereafter required that a minimum of 250 million gallons of renewable fuel be generated from cellulosic feedstocks.
[4] Calendar years 2013 and beyond are estimated as what would have been required beyond the original mandate.
[5] For more background information on E15, see the Subcommittee's July 7 hearing, "Hitting the Ethanol Blend Wall: Examining the Science on E15," http://science.house.gov/hearing/energy-and-environment-hearing-science-e15.

In June, EPA mandated a new label to be placed on service station fuel pumps when stations choose to sell E15 to "help reduce the potential for vehicles, engines, and equipment not covered by the partial waiver decisions to be misfueled with E15."

Tier III

EPA has signaled its intentions to move forward later this year with so-called "Tier 3" standards for light-vehicle emissions and fuels. This forthcoming action, which would strengthen limits on gasoline vapor pressure and sulfur content even further than the current Tier 2 standard, is prompted by the expanded use of renewable fuels under the RFS and the likely expansion of ethanol consumption resulting from the approval of E15. There are several elements of note to this Tier 3 rulemaking:

- Section 211(v) of the CAA requires EPA to first conduct and complete an "anti-backsliding" study to determine if the RFS will "adversely impact air quality." The study was required to be completed 18 months after enactment of the 2007 EISA legislation, but it remains unfinished.
- An analysis conducted earlier this year suggests that Tier 3 standards would result in negative economic outcomes, including the closure of up to 7 refineries and gasoline price increases of up to 25 centers per gallon, as well as increased energy use and greenhouse gas emissions in order to comply.[6]
- As a result of the predicted shift by automakers toward direct fuel-injection systems in order to comply with EPA greenhouse gas emissions standards, EPA's Tier 3 rulemaking appears poised to tighten vehicle emissions standards as well, including a first-ever particulate matter emission standard for all light-duty vehicles.[7]
- EPA is considering, as part of the Tier 3 proposal, changing the Agency's certification fuel from E0 (pure gasoline without biofuel additives) to E15 (15 percent ethanol blend). A change in this certification fuel, which is the test gasoline that EPA and automakers use to certify that engines meet emissions standards, could generate significant problems for automobile and engine manufacturers, refiners, and advanced biofuels.

Low-Carbon Fuel Standard

Furthermore, proposed and enacted low-carbon fuel standards at the federal, state, and regional levels create additional regulatory tension and uncertainty in the marketplace.[8] As the Congressional Research Service suggested in a 2008 report on the subject, "The establishment of a Low Carbon Fuel Standard – at either the state or federal level – would add another major regulatory requirement."[9] Studies have indicated that these new standards could significantly raise prices, reduce energy security, and, in some cases, increase greenhouse gas emissions.[10]

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[6] Baker & O'Brien, Inc., "Potential Supply and Cost Impacts of Lower Sulfur, Lower RVP Gasoline," July 2011, http://www.api.org/Newsroom/upload/110715_LowerSulfur_LowerRVP_Final.pdf.

[7] Curt Barry, "Vehicle GHG Controls Drive EPA Plan for Strict PM Limit, Worrying Industry," *Inside EPA*, July 22, 2011.

[8] These efforts include California's Low Carbon Fuel Standard Program (http://www.arb.ca.gov/fuels/lcfs/lcfs.htm), the Northeast States for Coordinated Air Use Management's (NESCAUM) proposed Clean Fuel Standard (http://www.nescaum.org/topics/clean-fuels-standard), and President Obama's proposed National Low Carbon Fuel Standard (http://my.barackobama.com/page/content/newenergy_more).

[9] Brent Yacobucci, "A Low Carbon Fuel Standard: State and Federal Legislation and Regulations," CRS Report 7-9662, December 23, 2008.

[10] See: IHS, "Assessment of the NESCAUM Economic Analysis of a Clean Transportation Fuels Program for the Northeast/Mid-Atlantic Region," October 22, 2011; Barr Engineering Company, "Low Carbon Fuel Standard 'Crude Shuffle' Greenhouse Gas Impacts Analysis," June 2010, http://www.npra.org/files/Crude_Shuffle_Report_0616101.pdf; Michael Canes and Edward Murphy, "Economics of a Low Carbon Fuel Standard," 2009, http://www.marshall.org/pdf/materials/642.pdf; Jeff Kueter, "National Security, Energy Security, and a Low Carbon Fuel Standard," 2009, http://www.marshall.org/pdf/materials/643.pdf; Charles River Associates, "Economic and Energy Impacts Resulting from a National Low Carbon Fuel Standard," June 2010, http://consumerenergyalliance.org/wp/wp-content/uploads/2010/06/CRA-LCFS-Final-Report-June-14-2010.pdf.