



Written Statement of the
National Petrochemical & Refiners Association

delivered by
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Executive Vice-President

before the
Subcommittee on Energy
Senate Energy and Natural Resources Committee

concerning
Improving Renewable Fuels Infrastructure

July 31, 2007
Washington, D.C.

Chairman Dorgan, Ranking Member Murkowski, and members of the Subcommittee, I am Charles T. Drevna, Executive Vice President of NPRA, the National Petrochemical & Refiners Association. Thank you for the opportunity today to provide our perspective on biofuels and infrastructure needs relative to the proposed increases in the federal biofuels mandate. NPRA is a national trade association with more than 450 companies, including virtually all U.S. refiners and petrochemical manufacturers. Our members supply Americans with more than 90% of the nation's gasoline. They also provide them with a wide variety of products used in their homes and businesses. These products include gasoline, diesel fuel, home heating oil, jet fuel, lubricants and the chemicals that serve as "building blocks" for everything from plastics to clothing to medicine to computers.

A. Inadequate renewable and alternative fuels infrastructure creates significant production and environmental challenges.

NPRA supports U.S. energy policies that improve the security of our nation, assist our consumers, and protect our environment. There is universal agreement that alternative fuels will continue to be a strong and growing component of the nation's transportation fuel mix. NPRA supports the sensible and workable integration of renewable and alternative fuels into the marketplace based on market principles and demands. As we have stated in the past, we do not support the mandated use of renewable and alternative transportation fuels. However, existing fuels mandates require refiners, blenders and importers to blend significant quantities of renewable fuel with petroleum to create America's gasoline supply. The lack of adequate renewable and alternative transportation fuel infrastructure creates significant production and environmental challenges. This situation, coupled with the uncertainty of a guaranteed supply of affordable renewable fuels – especially when considering the massive amounts being discussed – will only lead to more market instability and consumer impacts.

Congress passed the Energy Policy Act of 2005 (EPACT) that includes a Renewable Fuel Standard (RFS) which increases to 7.5 billion gallons in 2012. Domestic refiners are already among the largest users of ethanol and the marketplace has signaled the blending of more ethanol than required by this new mandate. Besides extending the fuel supply, ethanol increases octane, has dilution benefits that help meet reformulated gasoline (RFG) specifications, and limits carbon monoxide emissions. Today, ethanol is used in all RFG year-round even though

oxygenates are no longer required, and in approximately 25 percent of all other gasoline produced in the U.S. (“conventional” gasoline). As a result, ethanol is in about 50 percent of all U.S. gasoline. Clearly, even without the original RFS mandate, refiners will continue to rely on ethanol as a vital gasoline blendstock.

Ethanol, however, has a lower energy content than gasoline and may create ozone emission problems, especially in warm weather. Creating artificial demand for biofuels places unwarranted strain on other industries that compete for the same feedstocks. Recent reports indicate that ethanol demand has raised corn prices, thus impacting food and other commodity prices. Projected ethanol demand is likely to further exacerbate the problem and create food price increases across the economic spectrum. Just as importantly, the use of ethanol raises significant transportation and logistical issues, as this hearing intends to explore.

Unlike gasoline or diesel, renewable fuels such as ethanol cannot be distributed through pipelines because of problems with water contamination or corrosion. Due to its water solubility, for example, ethanol separates from fuel during shipment through pipelines and results in noncompliant or substandard fuel. In addition, due to ethanol’s corrosive properties, it degrades the strength of pipeline valves and joints. Consequently, ethanol must be blended with gasoline or the appropriate blendstock as near to the consumer as possible, usually at the delivery terminal. Ethanol delivery and distribution, therefore, must be done through more expensive means such as truck, rail car, barge or ship before it is blended at the terminal. Terminals must either invest in new ethanol storage tank and blending equipment or dedicate existing storage tanks. This reduces the quantity and diversity of on-hand inventory. Clearly, any significant increase in the production of ethanol will only result in more stress to the distribution system, creating additional impacts on supply and market stability.

A recent GAO study evaluated the biofuels distribution infrastructure and found:

The biofuel distribution infrastructure has limited capacity to transport the fuels and deliver them to consumers, and significant growth in the distribution system faces a variety of impediments. Biofuels are primarily transported by rail, but also by truck and barge, and limited capacity in this distribution system has led to supply disruptions and concerns about the system’s ability to effectively transport greater amounts of biofuels if production significantly increases. The key challenges to meeting biofuel transport needs are potential capacity limitations in the freight rail system and the cost of developing a dedicated ethanol pipeline

system if one is needed. . . . The current biofuel transport system is also more costly than for petroleum fuels. According to NREL, the overall cost of transporting ethanol from production plants to fueling stations is estimated to range from 13 cents per gallon to 18 cents per gallon, depending on the distance traveled and the mode of transportation. In contrast, the overall cost of transporting petroleum fuels from refineries to fueling stations is estimated on a nationwide basis to be about 3 to 5 cents per gallon.¹

The July 18th National Petroleum Council report entitled “Facing the Hard Truths About Energy” also provides an instructive perspective:

As with any large-scale energy source, technical, logistical and marketing requirements will need to be met for biofuels to achieve their potential. Milestones along this development path will include: investments in rail, waterway and pipeline transportation; scale-up of ethanol distribution; and technology deployment for cellulosic ethanol conversion. The timeframes required in many cases to move technology from concept to full-scale application may make such sources available only later in the outlook period.² . . . Much of the infrastructure needed to increase biomass use does not exist today, limiting the growth rate of biomass, much as with any new energy source.³ . . .

- *Energy forecasts generally do not explicitly account for specific energy infrastructure requirements, such as capital requirements, return expectations, construction schedules, resources, and permitting processes.*
- *Uncertainty relating to energy demand outlooks may restrict or delay infrastructure investment.*
- *Data collection and analysis of energy transportation infrastructure is inadequate for evaluating infrastructure capacity, throughput and future needs. . . .*
- *Infrastructure requirements of many alternative energy sources at scale are not well understood and may be significant.*⁴

(emphasis in the original)

¹ U.S. Government Accountability Office, “Biofuels: DOE Lacks a Strategic Approach to Coordinate Increasing Production with Infrastructure Development and Vehicle Needs,” GAO-07-713, June 2007, pp. 6 and 23.

² NPC, Facing the Hard Truths about Energy, July 18, 2007, Chapter Two: Energy Supply, Section II. Prospects for Energy Supply, E. Biomass, page 16.

³ Ibid., Chapter Two: Energy Supply, Section III. Analysis of Energy Outlooks, D. Biomass, 4. Infrastructure, page 1.

⁴ Ibid., Chapter Two: Energy Supply, Section III. Analysis of Energy Outlooks, F. Energy Conversion and Delivery Infrastructure, 1. Key Observations – Energy Infrastructure, page 1.

The increasing integration of biofuels into the refined products distribution system can complicate distribution logistics, increase transportation costs, and reduce supply reliability. The requirements for transporting biofuels have led to large shipments by rail and truck from bio-refineries to product distribution terminals. This represents a shift in the fuels transportation system from large, cost efficient, bulk shipments by reliable and dedicated pipelines, barges, and ships to small, less cost efficient shipments by non-dedicated railroads. The shift may reduce supply reliability while increasing transportation costs. Efforts to incorporate biofuels into existing pipelines or construct new, dedicated pipelines for biofuels at significant cost are directed at overcoming such hurdles.⁵

GAO also believes that the Department of Energy, the Agency responsible for implementing energy policy, does not currently have “a comprehensive strategic approach to coordinate the expansion of biofuel production with biofuel distribution infrastructure development and vehicle production, and has not evaluated the effectiveness of biofuel tax credits.” Further, GAO also found “DOE has not yet developed a comprehensive strategic approach to coordinate the significantly larger volume of biofuel production that could result from the Biomass Program with distribution infrastructure development and vehicle production. DOE officials told us [GAO] they recognize the importance of developing a strategic approach and have taken an initial step in that direction.”

B. Transportation of Biofuels

The most notable economic challenge to the development of a viable, stand-alone biofuels transportation industry is the seemingly constant push for an ever-increasing mandate of these fuels. As the transportation biofuels sector grows, its expansion will have a direct impact on those industries that use and transport its products and those industries that compete with it for the same resources. A significant increase in biofuels consumption complicates the entire transportation fuel production, supply and distribution network. As previously mentioned, ethanol production occurs primarily in the Midwest and relies on truck, rail and barge infrastructure. The strain biofuels place on the nation’s rail infrastructure and tank-car capacity

⁵ *Ibid.*, Chapter Two: Energy Supply, Section III. Analysis of Energy Outlooks, F. Energy Conversion and Delivery Infrastructure, 3. Analysis of Refining Forecasts, page 6.

is of particular concern. During the spring of 2006, some federal RFG areas that required ethanol for blending faced real product shortages due to the inability of the rail infrastructure to handle the increased volume of ethanol. It remains to be seen whether transportation capacity growth will keep pace with biofuels production, particularly after factoring the significant increases in the government mandate that are being proposed. As the biofuels industry expands, it will monopolize increasing amounts of truck, rail and barge traffic. All industries reliant on these modes to distribute products will face increased competition for limited resources.

A free market-based fuel transportation system is the best mechanism to ensure development of the requisite infrastructure to support increased use of biofuels. The appropriate signals to producers and the investment community that infrastructure development is warranted will be sent by that market, not by mandates. There is universal agreement, and the marketplace has indeed proved, that biofuels will continue to be a strong and growing component of the nation's transportation fuel mix.

As relatively new biofuels enter the market, increased transportation and logistical issues are likely to arise. The market should be given ample opportunity to resolve these infrastructure and logistical complications.

C. Economics of E-85 Infrastructure

E-85 is an alcohol fuel mixture typically containing up to 85 percent ethanol with the remaining volume being gasoline or another hydrocarbon. E-85 is not currently compatible with fuel dispensing equipment at most retail gasoline stations. Furthermore, due to ethanol's corrosive nature, Underwriters Laboratories (UL), in October 2006, suspended authorization to use UL Markings on components for fuel dispensing devices that will dispense any alcohol blended fuels containing over 15 percent alcohol (such as E-85).

E-85 also has a substantially lower energy content per gallon than gasoline (only about 70 percent of gasoline's energy content) that results in a significant fuel economy penalty for E-85. In order for retail consumers to cover the same distance they would using gasoline at the same cost, the retail price of E-85 must be 25-30 percent lower than the price of gasoline. The use of E-85 is limited to flexible-fuel vehicles (FFVs), which currently represent a very small percent of today's vehicle fleet. Therefore, E-85 is incompatible with most vehicles and the near-term potential market for E-85 is constrained.

GAO examined the infrastructure costs for using ethanol:

The key challenge to increasing biofuel production is making biofuels cost-competitive with petroleum-based transportation fuels. . . . the average wholesale price of ethanol per gallon in 2006 was about 33 percent higher than the average wholesale price of gasoline. Since ethanol contains one-third less energy than gasoline, the price differential is even more significant than this comparison indicates. . . . For example, because ethanol is corrosive, E85 requires separate storage tanks, pumps, and dispensers at fueling stations. It can cost a fueling station operator around \$3,300 to minimally modify existing equipment or about \$60,000 to install new equipment – which may be a significant impediment for many potential retailers.⁶

Additionally, GAO also examined the economics of E-85:

High demand for ethanol in low blends as an oxygenate and fuel extender has contributed to wholesale ethanol prices that are significantly higher than the wholesale price of gasoline. An additional incentive to selling ethanol in blends of 10 percent or lower, according to one major fuel blender with whom we spoke, is that the fuel economy reduction at that level is too small for consumers to notice; hence, the fuel can be sold at the same price as conventional gasoline at fueling stations. On the other hand, to attract customers, fueling stations must generally sell E85 at a discount to conventional gasoline to offset the noticeably lower miles per gallon that drivers experience when using the fuel. For example, in 2006, according to DOE's Alternative Fuel Price Reports, E85 sold for 11 percent less on average than regular gasoline at a sample of fueling stations nationwide. However, few producers are willing to discount ethanol so that fueling stations can price E85 lower than gasoline. Consequently, EIA projects that use of ethanol for E85 will continue to be limited until the market for blends of 10 percent and under is nearly saturated.⁷

Given these perceptions of the economics, will a rational, orderly, and market-driven E-85 infrastructure be developed? I believe so only when the economics warrant this investment.

⁶ GAO, Op.Cit., pp. 5 and 6.

⁷ GAO, Op.Cit., p. 28.

D. Refinery Capacity Expansion Projects

Leadership on this Committee and elsewhere in Congress has stressed the need to maximize refining capacity in the United States, and our members have risen to the challenge, principally by adding hundreds of thousands of barrels of capacity at existing refineries. In fact, on the aggregate over the last 14 years, our companies have essentially built the equivalent of one new world-class refinery each year. But continued success in this area requires legislative and regulatory certainty that attracts capital investment to refining. We know that the Committee recognizes the need for such certainty.

It should be clearly understood that requirements to substantially increase the volume of ethanol and other renewables could essentially supplant a significant portion of the need and desire for additional domestic refining capacity. I must note that U.S. refiners are generating record amounts of refined product. According to EIA, production was at an all-time weekly high from June 22 – June 29, averaging about 9.4 million barrels a day. Despite the unplanned refinery outages and regularly scheduled maintenance, production for the first half of the year is at an all-time high (9 million barrels a day), about 700,000 barrels a day higher than the same period four years ago (8.3 million barrels a day).

But refiners must make their independent re-investment decisions today on what they believe to be the longer-term (10-15 years or more) outlook. The domestic refining industry is likely to look upon rapidly rising ethanol and other biofuels requirements in the coming years as adding significantly more risk to investments in capacity expansions. As recently as 2006, the Department of Energy forecast that domestic refiners were likely to add 1.5 million barrels per day of capacity between 2006 and 2010. These decisions are being re-visited in boardrooms across the refining sector as the anticipated surge in ethanol requirements and mandates in the near future will pressure domestic, and undoubtedly some foreign refiners currently supplying the U.S. market to postpone or cancel new investments in petroleum refining capability.

To illustrate the point further, the President's proposal, which calls for the use of 35 billion gallons per year of renewable and alternative transportation fuels by 2017, primarily ethanol, also aspires to a 20-percent reduction in the use of gasoline by the same time. EIA projects that U.S. gasoline demand in 2017 will be 161 billion gallons. A 20-percent reduction of this figure would result in 129 billion gallons of gasoline. In 2006, U.S. production of gasoline was 136 billion gallons and net imports of finished gasoline equaled 7 billion gallons.

Therefore, the Administration's target for gasoline use in 2017 is below today's U.S. production levels, sending a signal to the refining industry to reconsider expanding domestic refining capacity. The U.S., currently a net importer of gasoline, could become a net exporter of gasoline.

The U.S. is also currently a net importer of diesel, jet fuel and other petroleum products. In the next 10 years, demand for diesel, jet fuel and other non-gasoline petroleum products will grow. The demand for diesel may grow faster than biodiesel production. Current diesel demand is about 3.5 million barrels/day and biodiesel production last year was only about 15,000 barrels/day. If U.S. refining capacity is not expanded, the U.S. could require a significant increase in imports of diesel, jet fuel and other non-gasoline petroleum products to meet growing demand.

NPRA questions if this unbalanced future is the better alternative in terms of U.S. energy security. We believe that U.S. refining capacity expansions should be encouraged, not discouraged, to ensure the nation's our energy security.

E. State biofuels mandates should be preempted.

The present enthusiasm for renewable fuels has resulted in several states and even municipalities adopting *local* mandates. Local mandates will impose additional strain on the transportation fuels distribution system and increase costs for shipping and storage. While it still creates many problems, the existing federal Renewable Fuels Standard mandate with its credit-trading provisions contains a degree of freedom that allows the distribution system to operate at a low-cost optimum by avoiding infrastructure bottlenecks (such as lack of storage or rail capacity). Mandating ethanol or biodiesel usage in specific areas forces a distribution pattern that is less flexible, and therefore has less capability to minimize costs. These additional costs will be borne by consumers.

Public policy should focus on preventing the proliferation of state biofuels mandates that will have negative consequences for the motor fuel supply and will interfere with the smooth implementation of the federal RFS. EFACT includes a renewable content requirement for motor vehicle fuels, the RFS provision (see Section 1501). The RFS is administered by EPA and requires the increased use of ethanol or biodiesel in motor fuels. Although this is a federal mandate for biofuels consumption, it does not currently preempt similar state mandates. There

are several recent state biofuels mandates since EPACT was enacted, including those in Louisiana, Missouri, Oregon, and Washington. It is difficult for regulated parties to reconcile different state and federal biofuels mandates (e.g., credit trading, averaging, banking credits, identifying liable or obligated parties). Inconsistencies will lead to instability in the marketplace. Further, these mandates create boutique markets requiring special fuel formulations and transportation logistics, thereby balkanizing the national fuel market.

If Congress wishes to allow for as diverse a supply of alternative fuels as possible, and to promote as much flexibility in the system as possible, state and local biofuels mandates should be preempted.

F. Several studies will inform Congress.

Biofuels should be developed with complete analysis and full realization of economic and environmental impacts. This would include energy security, public health and the environment, infrastructure, job impacts, and economic development.

One known environmental impact of increased ethanol use is related to ozone emissions. When blended into gasoline, ethanol increases the Reid Vapor Pressure (RVP) of the fuel, resulting in higher volatile organic compound (VOC) emissions, an ozone precursor, in the summer months. These higher VOC emissions come from the combustion exhaust in the tailpipe as well as permeation from the gasoline tank of a vehicle sitting in the sun on a hot day. Although many areas of the country allow gasoline blended with ethanol to have a higher summer RVP than unblended gasoline, some do not (i.e., California, federal RFG covered areas, El Paso, TX and Pittsburgh, PA). Others areas may also restrict higher RVP in the future in response to a potential new ozone NAAQS.

The Fuel Harmonization Study (“the Study”) required under Section 1509 of EPACT requires EPA and DOE to jointly study the effect of federal, state, and local motor vehicle fuel requirements on the supply, quality, and price of fuels available to the consumer. In addition, the Study will examine the effects of the various requirements on the achievement of air quality goals, the impact on refiners and the fuel distribution system. Plans for this analysis, due June 1, 2008, are discussed in the EPA/DOE boutique fuels report released on January 5, 2007.⁸

⁸ “EPACT Section 1541(c) Boutique Fuels Report To Congress,” DOE and EPA, EPA 420-R-06-901, December 2006.

According to the Section 1541(c) Boutique Fuels Report, the Study will cover gasoline volatility (RVP), oxygenated gasoline, vehicle emissions and the effects on air quality of the RFS established under Section 1501 of EPACT. Furthermore, EPA and DOE suggest that in order to “ultimately assess the air quality and associated fuel supply and price impacts of future strategies, new vehicle and engine emission factors that represent the current fleet must first be established.” As there is uncertainty over the relationship between motor fuel specifications and vehicle emissions for the current fleet, the full realization of the air quality impacts of biofuels is not understood.

Section 1505 of EPACT requires EPA to study the effects on public health, air quality, and water resources of increased use of substitutes for MTBE in gasoline. This is to be completed by next month, August 2007. This report to Congress will include ethanol.

Section 1506 of EPACT requires EPA to analyze changes in air emissions and air quality due to the use of motor vehicle fuel and fuel additives resulting from the energy bill; a draft report is due by August 2009 and a final report by August 2010.

The California Air Resources Board (CARB) is conducting three areas of research on biodiesel: an emissions study, a NO_x formation and emissions study, and a multi-media evaluation of the impact of biodiesel on the environment and human health. The environmental benefits of biodiesel are of concern because biodiesel may increase NO_x emissions.

It is encouraging that several studies are underway, but others are also necessary, and they certainly must be conducted and their results known and fully understood before Congress enacts any additional fuel mandates.

G. Recommendations

1. The Congressional Budget Office should conduct a comprehensive environmental impact analysis.

Senate legislation passed last month mandates an expanded RFS of 36 billion gallons by 2022. Congress should consider energy security, public health and environment, transportation, infrastructure, job impacts, and rural economic development impacts. Legislation should not promote an extensive expansion of renewables without giving any consideration to the environmental or economic consequences to the U.S. We should only promote large changes in the mix of energy types with our eyes open and a full understanding of all consequences.

As previously stated, E-85 has a significantly lower energy content than gasoline. Therefore, consumers will need more frequent trips to E-85 pumps, and the fuel distribution industry must schedule more frequent delivery trips to retail stations with E-85 pumps. This will result in more delivery trips per week from terminals to retail stations with an increase in diesel fuel demand. Further, the overall environmental consequences of such a large increase in E-85 production and delivery need to be understood. Ethanol production depends on large volumes of water; each gallon of ethanol requires the consumption of three gallons of water. Also, associated environmental and other impacts of a large increase in corn ethanol manufacturing plant capacity on water supplies and quality must be quantified. Given that the scope of the environmental studies listed in section F. above is not based on 35-36 billion gallons per year, they will be informative when completed, but insufficient. NPRA recommends a comprehensive environmental impact analysis conducted by the Congressional Budget Office.

2. Congress should consider preempting state and local biofuels mandates.

New state biofuels mandates are not currently subject to the requirement that they be examined by EPA or DOE for their impact on air quality, fuel production, and the fuel distribution system. NPRA believes that they should be. If there is no mechanism to assess the impact of these state mandates on air quality, fuel supply and distribution, the result will undoubtedly be a proliferation of state biofuels mandates with negative consequences on motor fuel supply and considerable interference with implementation of the federal RFS. Congress, therefore, should strongly consider amending the Clean Air Act to include an explicit provision that preempts state and local biofuels mandates.

3. We strongly encourage Congress to further review and consider the five core strategies recommended in the recent National Petroleum Council report requested by Energy Secretary Bodman.

NPC recommends the following five core strategies:

- Moderate the growing demand for energy by increasing efficiency of transportation, residential, commercial, and industrial uses.
- Expand and diversify production from clean coal, nuclear, biomass, other renewables, and unconventional oil and natural gas; moderate the decline of conventional

domestic oil and gas production; and increase access for development of new resources.

- Integrate energy policy into trade, economic, environmental, security, and foreign policies; strengthen global energy trade and investment; and broaden dialogue with both producing and consuming nations to improve global security.
- Enhance science and engineering capabilities and create long-term opportunities for research and development in all phases of the energy supply and demand system (including studying energy infrastructure needs).
- Develop the legal and regulatory framework to enable carbon capture and sequestration (CCS). In addition, as policymakers consider options to reduce CO₂ emissions, provide an effective, global framework for carbon management, including establishment of a transparent, economy-wide cost for CO₂ emissions (market-based, visible, applicable to all fuels, predictable over the long term for a stable investment climate; to allow the marketplace to find the lowest cost combination of steps to achieve a carbon reduction).

Congress can and should take appropriate action to help refiners meet the transportation fuel needs of the American public. The simple fact remains that supply and demand for refined products are in an extremely tight balance. Necessary and prudent actions include the following:

4. Make increasing the nation's supply of oil, oil products and natural gas a number one public policy priority.

Now, and for many years in the past, increasing oil and gas supply has often been only a secondary concern of policymakers. Oil and gas supply concerns have rarely been factored into policy goals focused on environmental or other concerns. Refineries and other important onshore facilities have been welcome in limited areas throughout the country, including the Gulf Coast. However, policymakers have restricted access to much-needed offshore oil and natural gas supplies in the eastern Gulf and off the shores of California and the East Coast. These areas must follow the example of Louisiana and many other states in sharing their energy resources with the rest of the nation. This additional supply is sorely needed. Policymakers should pay

special attention to the timing and sequencing of any changes in product specifications. Failing such action, adverse fuel supply ramifications may result.

5. Resist tinkering with market forces, including imposition of “windfall profits” taxes, LIFO repeal, elimination of foreign tax provisions or “price gouging” legislation.

Market interference that may initially be politically popular leads to market inefficiencies and unnecessary costs. Policymakers must resist turning the clock backwards to the failed policies of the past. Experience with price constraints and allocation controls in the 1970s demonstrates the failure of price regulation, which adversely impacted both fuel supply and consumer cost. The state of Hawaii cancelled its less than one-year old gasoline price regulation because it led to higher prices and supply uncertainty. A windfall profits tax would discourage investment in refineries, which is needed to expand domestic production capacity and produce cleaner fuels.

H. Conclusion

NPRA members are dedicated to working cooperatively with government at all levels to ensure an adequate supply of clean, reliable and affordable transportation fuels. We stand ready to work with you to ensure a stable and effective fuels policy that utilizes a diversity of resources to improve our national security, assist our consumers and protect our environment. I appreciate this opportunity to testify today and welcome your questions.