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# BIOFUELS POLICY

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# LIST OF ACRONYMS

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RFS	Renewable Fuel Standard
EPA	Environmental Protection Agency
LCFS	Low Carbon Fuel Standard
RVOs	Renewable Volume Obligations
RINs	Renewable Identification Numbers
GHG	greenhouse gas (emissions)
SJF	sustainable jet fuel
DOE	Department of Energy
BBD	biobased diesel

# EXECUTIVE SUMMARY

In the development of a new industry like biofuels, stable long-term policy is a key factor to reach commercialization of alternative fuel production. In the United States, relatively stable and consistent policy is one factor that enabled ethanol<sup>1</sup> as the first-generation alternative fuel to grow “dramatically” from 175 million gallons by 1980, to nearly five billion gallons by 2006, and over 14 billion gallons in 2015 (Renewable Fuels Association). Today, however, ethanol’s integration into the transportation fuel supply is said to be limited by the “blend wall”<sup>2</sup> (Verleger, 2014). At the same time, alternative second-generation biofuels have struggled to reach

commercial-scale production largely because of uncertainty of future policies, high cost of production, the capital required to initiate a project, and a myriad of technical, environmental and social issues (Warner). The uncertainty is caused in part by the Renewable Fuel Standard’s fluctuating biofuel production mandates set by the US Environmental Protection Agency (Lave, 2014). In particular, US law and policy for advanced biofuels has not provided adequate stimulus to foster predictable development and commercialization of the biofuel industry.

<sup>1</sup> As defined by the US Department of Energy, “Ethanol is a renewable, domestically produced alcohol fuel made from plant material, such as corn, sugar cane, or grasses.” (US Department of Energy<sup>3</sup>)

<sup>2</sup> The “blend wall” refers to the E10 transportation fuel limits for ethanol volumes in conventional vehicles.

# INTRODUCTION

The production and use of “biofuels” evokes strong reactions across a broad range of audiences. On one end, the biofuel industry can “move the US toward greater energy independence and security [and...] increase the production of clean renewable fuels”<sup>3</sup>. The US Department of Energy (DOE) highlights the potential for alternative fuels to reduce US dependence on oil; environmental benefits, including reduced greenhouse gas emissions; and economic opportunities in hard-hit rural areas (US Department of Energy<sup>b</sup>). On the other end, commentators decry the use of biofuels, saying that it is “a [t]ime to close the books on US biofuels policy” (Klippen & Gibson, 2014). The 2014 US National Climate Assessment Report notes that while “[t]ax credits for biodiesel and advanced biofuel production, alternative fuel infrastructure, and purchase of electric vehicles” are under discussion, there are also environmental concerns. For example, “the water resource implications of increased production of biofuels are substantial in some regions of the US” and “may result in negative impacts on ecosystems, power production, or residential water supply” (US Global Change Research Program). In addition, there are potential impacts to

areas such as air and biodiversity. On the other side, industry has “challenged the obligation under RFS [Renewable Fuels Standards] to use cellulosic biofuels that do not exist in sufficient amounts in commercial markets or pay a fee” (National Academy of Sciences, 2011; Schnepf & Yacobucci, 2013). These views reflect the ever-changing set of laws and policies that challenge a relatively new industry in the United States and elsewhere.

Analyzing US biofuel law and policy development, this task reviews how both federal and state governments have affected the biofuel industry in the United States and explores the demand for advanced biofuels from the US military and for commercial aviation. Given the uncertainty under the federal RFS standards, state and regional approaches may offer more predictable law and policy motivations on the supply side. In addition, market demand for biofuels in the military and commercial aviation sectors may help move the industry forward.

<sup>3</sup> Energy Independence and Security Act of 2007, Pub L. 110-140; 42 U.S.C. 7545(o)(2)(2013)









# NARA OUTCOMES AND FUTURE DEVELOPMENTS

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The law and policy surrounding alternative fuel in the United States began with early policy related to the development of corn-grain-based ethanol and now includes efforts to diversify feedstock and encourage the scale-up of the advanced biofuels industry. The original policy was designed as a response to the 1973 US energy crisis and as a way to develop domestic energy sources. As societal needs changed, US biofuel policy evolved in the 2000s to address not only energy prices and security, but also GHG emissions and rural economic development. Today, US energy policy is implemented through a relatively complex system designed to diversify feedstock; however, one result has been that special interests are often in conflict over

market share. The combination of federal policy with state and regional policy has created an interesting set of experiments that is playing out in real time. There is little doubt that this ever-changing set of incentives, both on the supply and the demand side, will continue to evolve at a rapid pace. At the same time, fluctuations in law and policy at a federal level make development of a stable industry more difficult. In light of recent and dramatic drops in gas prices during 2014 and 2015, the advanced biofuel industry in the United States will likely face continued development challenges.

