

Advanced Biofuel Market Report 2012

Executive Summary



Why is E2 involved with biofuels?

E2 believes in a clean energy economy. E2 continues its involvement in advanced biofuels for their potential contribution to a clean energy future. Advanced biofuels are renewable, liquid transportation fuels that can replace traditional gasoline and diesel with less than half the greenhouse gas (GHG) emissions. Public transportation and vehicle electrification are critical ways to reduce our fossil fuel use. However, there will be a long-term requirement for liquid fuels for industrial, shipping and aviation. These long-term needs must also be addressed by encouraging the development of sustainable, domestic fuels.

Key policies such as the federal Renewable Fuel Standard (RFS) and state-level Low Carbon Fuel Standard (LCFS, or Clean Fuel Standard) have helped to move advanced biofuels from a demonstration into a commercialization phase. It is important that these policies remain in effect, in order for advanced biofuels to 'scale up' and become cost competitive with traditional fuels.



E2's 2012 report documents extensive economic activity surrounding advanced biofuels. This activity is illustrated by the significant federal and private investments over the last five years and the planned construction of 27 new production facilities by 2015.

Biofuel companies have had a challenging year, from an investment and policy standpoint, but continue to develop technologically and commercially. Many first of kind facilities are beginning or under construction, proving the scalability of some technologies.

As shown in the E2 report, existing and new facilities have sufficient capacity to satisfy the fuel standards currently in effect. Maintaining those standards will encourage investment of private capital to increase capacity.

Production Capacity

E2's analysis of production levels shows U.S. and Canadian biofuel production capacity increased from 437 million gallons annually in 2011 to over 685 million gallons in 2012. While this growth is slower than E2 anticipated in 2011, capacity will increase to at least 1.6 billion gallons by 2015. On the high end, this number could reach 2.6 billion gallons. If the LCFS and RFS continue and greater certainty is created, investments and biorefinery construction will increase at a greater rate while carbon intensity will be improved.

As shown below, the E2 report identified 165 active advanced biofuel producers in the United States and Canada: 91 biodiesel companies already in commercial production and 74 companies working to produce other types of advanced biofuels by 2015. E2 also identified 82 companies in the feedstock, technology, and infrastructure supply chain.

Financing

The U.S. market for biofuels will be about \$60 billion in 2021. At least \$3.4 billion of private capital has been invested in domestic low carbon fuel projects since 2007. This is an increase of \$651 million since E2's last report. Public agencies like USDA and DOE also have targeted programs for advanced biofuel projects, and have invested \$1.77 billion since 2008.

ADVANCED BIOFUEL CAPACITY						
IN MILLIONS OF GALLONS/YEAR						
	# Companies		2012 Capacity		2015 Capacity	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
Jet Fuel	1	6	0.1	0.1	23.1	150.0
Biodiesel	91	91	564.0	564.0	877.0	877.0
Butanol	1	4	19.0	19.5	56.0	370.5
Ethanol	24	35	14.2	14.2	337.2	512.2
Adv. Diesel	5	9	75.1	75.4	248.4	300.8
Adv. Gasoline	4	7	2.4	3.0	52.4	113.0
Fuel flexible	1	11	11.0	13.3	11.0	312.6
Biocrude	2	2	0	0	1.1	1.1
TOTAL	129	165	685.8	689.6	1,606.2	2,637.2

Jobs

From the 27 biorefineries coming online by 2015, about 1,518 permanent, 6,965 construction and 9,924 indirect jobs could be created. This number only scratches the surface, as it does not fully account for other jobs created within the biofuel value chain or corporate/R&D jobs. Also, this number is merely a starting point as the advanced biofuel industry continues to expand in coming years.

Costs

E2 found that at capacity, companies project production at \$0.60-\$3.50 per gallon, depending on the feedstock and technology, which is expected to be competitive with petroleum production costs.

Policy and Regulation

Requirements such as the RFS and LCFS, in concert with financial support from federal agencies like DOE and USDA are resulting in the construction or retrofit of 27 biorefineries by 2015. Fuel standards can be met by the capacity of these and existing facilities, but continued support of these government programs is crucial. Sufficient stability now will encourage investment of private capital into advanced biofuels, and increased quantities of fuel capacity. The barriers to meeting the LCFS and RFS goals continue to be the ability to finance plants to reach commercial scale production and maintaining regulatory certainty for both standards.

Advance agreements to purchase fuel provide a regulatory and policy free mechanism to incent the production of advanced biofuels. Stable demand through these agreements could result in increased advanced biofuel production capacity. E2 has begun to develop agreements for both public and private entities, which can specify carbon reduction requirements and dictate where the fuel is produced, so the purchaser's region receives the economic gains.

Ensuring Sustainability

Biofuels have the potential to address many problems related to fossil fuels, including cutting carbon pollution, so long as they are produced sustainably by incorporating critical environmental and social safeguards. Sustainability criteria seek to reduce risks to food security, wildlife, land, water and air resources, thereby helping advanced biofuels achieve scales by setting parameters that can realistically support growth with minimal consequences and controversy. E2 works on regulations that include appropriate carbon accounting and integrate sustainability certifications.

State policies to attract biorefineries are having a direct impact on the location of the facilities under plan. Many biorefineries will be located in the Southeast, where there are significant tax incentives and streamlined permitting processes.

National Security

The Department of Defense's leadership and interest in advanced biofuels has highlighted the national security motivations to build a domestic alternative energy supply. With the military as a major customer, the USDA's investment in feedstock production and DOE's investments in biofuel production are showing a deliberate federal strategy to have a U.S.-based fuel supply and its related economic benefits.

About E2

Environmental Entrepreneurs (E2) is a non-partisan national community of 850 business people who believe in protecting the environment while building economic prosperity. Our mission is to provide a platform for an independent business voice to promote environmentally sustainable economic growth. E2 represents entrepreneurs, investors and professionals from every sector of the economy. We work at both the state and national levels through bipartisan efforts. Learn more at www.e2.org.



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