Developing State Policies Supportive of Bioenergy Development

Technical Progress Report
October 1, 2004 through December 31, 2004
Submitted January 31, 2005

Submitted to the U.S. Department of Energy
National Energy Technology Laboratory
Pittsburgh, Pennsylvania

Cooperative Agreement Instrument No. DE-FC26-01NT41128

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Abstract

Working within the context of the Southern States Biobased Alliance (SSBA) and with officials in each state, the Southern States Energy Board (SSEB) is identifying bioenergy-related policies and programs within each state to determine their impact on the development, deployment or use of bioenergy. In addition, SSEB will determine which policies have impacted industry's efforts to develop, deploy or use biobased technologies or products. As a result, SSEB will work with the Southern States Biobased Alliance to determine how policy changes might address any negative impacts or enhance positive impacts.

In addition to analysis of domestic policies and programs, this project will include the development of a U.S.-Brazil Biodiesel Pilot Project. The purpose of this effort is to promote and facilitate the commercialization of biodiesel and bioenergy production and demand in Brazil.

Introduction

The Southern States Energy Board (SSEB) is an interstate compact that includes 16 southeastern states and Puerto Rico and the U.S. Virgin Islands. One of the Southern States Energy Board's goals over its 40-year life is to "... develop, promote, and recommend policies and programs on energy and environment that encourage economic development." The Board accomplishes this goal primarily through a number of task forces comprised of members from its states, the private sector, non-profits and others.

Southern States Biobased Alliance (Tasks 1-3)

SSEB's Southern States Biobased Alliance works closely with the Southeast Biomass State/Regional Partnership which SSEB hosts. Activities of the Southern States Biobased Alliance are focused on creating awareness and providing information and education for its members. During this reporting period (October 1, 2004 through December 31, 2004), SSEB focused on completing the compilation of bioenergy and bio-based related government policies and programs in the United States and to determine the effectiveness of these policies.

While awareness of existing policies and programs needs further development, state legislatures are moving forward with new policies and incentives that should create more favorable attraction to the bioenergy industry. As reported last quarter, a number of states passed legislation related to bioenergy during their 2004 sessions. On the federal level, the American JOBS Creation Act established the volumetric ethanol excise tax credit. The JOBS Act also redefined the small producer tax credit to include farm cooperatives and simplified E85 taxes. These actions at the federal and state level should contribute further to expanding growth of the ethanol industry and use. At the end of the 108th Congress, no comprehensive energy bill passed. However, reports indicate that the Administration and the 109th Congress will designate a comprehensive energy bill as a high priority.

U.S.-Brazil Biodiesel Pilot Project

On June 19, 2003, Energy Secretary Spencer Abraham and Brazilian Mines and Energy Dilma Rousseff signed a Memorandum of Understanding (MOU) to conduct a Ministerial Summit in energy issues by January 2004 in Brazil. Pursuit of joint objectives in clean energy and biofuels were specifically addressed in the MOU. In support of this collaboration, U.S. DOE modified this cooperative agreement DE-FC26-01NT41128 to include a U.S.-Brazil Biodiesel Pilot Project as a bilateral effort to enhance the prospects for success in developing biodiesel use in Brazil.

This project involves continuous monitoring of any developments affecting biodiesel production in Brazil. As reported last quarter, U.S. Secretary of Energy Abraham and Brazil's Minister of Mines and Energy, Dilma Rouseff, signed another MOU for cooperation in energy in April 2004.

During this reporting period, project team members completed the preliminary draft of the feasibility study and developed the executive summary of this report.

Executive Summary

Goal

The goal of this project is to have state and international policies positively impact the development, deployment, or use of bioenergy and are consistent among states.

Statement of Work

Southern States Biobased Alliance (Tasks 1-3)

Working within the context of the Southern States Bio-Based Alliance and with officials in each state, a staff member and/or contractor will identify bioenergy-related policies and programs within each state and determine their impact (in any way) on the development, deployment, or use of bioenergy. The staff member and/or contractor will be asked to determine as quantitatively as possible how this impact occurs, and how the legislation originally came to be promulgated.

Additionally and simultaneously, the staff member and/or contractor will be interviewing bio-based industry officials to determine what policies (or lack of policies) have impacted their efforts to develop, deploy, or use biobased technologies or products. The staff member and/or contractor will also try to determine the nature of these impacts and how policy changes might address any negative impacts or increase positive impacts.

In addition to attaining the project goal, this project approach will facilitate information sharing and education on state policies and their ramifications, create peer reaction, and ultimately provide more uniform regulations across the region that are supportive of bioenergy development, deployment, and use.

U.S.-Brazil Biodiesel Pilot Project (Task 4)

Task 4 is to develop a U.S.-Brazil Biodiesel Pilot Project to promote the commercialization of biodiesel and bioenergy production, technologies, and usage in Brazil. This task will consist of three primary components: Policy and Program Development; Feasibility Study and Technical Analysis; and bioenergy meeting design and execution to meet the U.S. Department of Energy goals.

Experimental

Due to the nature of the project, no experimental methods, materials or equipment are necessary.

Results and Discussion

Task 1-3 Activities

The SSEB, through the Alliance, is assisting the U.S. Department of Energy to determine the effectiveness of relevant government policies and programs. The **goal of this project** is to identify and compile into one document bioenergy and biobased-related government policies and programs in the US and to determine the effectiveness of these policies and programs. A preliminary summary of the findings related to government policies and programs follows.

Preliminary Summary

Biomass is generally defined as current or recently grown vegetable matter. As such, it is usually associated with forestry and agricultural industries—two sectors of the US economy that have struggled in recent years due to a variety of reasons. Part of this struggle pertains to growing global competition and the need to develop and maintain domestic markets for agricultural and forestry products. Making biomass a viable industry would decrease the need for tax-supported agricultural and forestry support payments, generate jobs and tax revenues in rural communities, create cash flow back into rural areas, and in general, revitalize rural economies.

Achieving these benefits sometimes takes government policies and incentives to direct, guide, or lead people in the desired direction. The goal of this project is to identify and compile into one document, bioenergy and biobased-related government policies and programs in the U.S. and to determine the effectiveness of these policies and programs. This final document is meant to serve as a resource for industry that has interest in and need for this specific information, and for government officials contemplating modification of existing legislation or creation of new legislation, policies, or programs. As a result, government officials will be able to learn from the experiences of others and efficiently create new model legislation for their states.

To conduct this project, SSEB consulted the listing of state policies and incentives located in the DSIRE database at www.dsireusa.org, which was last updated on January 13, 2005. In general, this database contains biomass-related policies and incentives that are *not* related to alternative fuel vehicles (AFVs) or alternative fuels (AF). Policies and incentives related to AFVs and AFs are in a separate database under the U.S. Department of Energy Clean Cities Program at http://www.eere.energy.gov/afdc/laws/incen_laws.html. A master state by state listing of over 250 policies and incentives was assembled from these two sources, which also included a brief summary of the incentive, the governmental authorization for the incentive (where available), and a source for additional information. Although in a few cases it appeared that there were some discrepancies between the databases, no attempts to clarify or correct the discrepancies were made as part of this project.

Since each state provided the information for the databases, the information should be fairly accurate as far as the content of each listing. However, this approach can lead to inconsistency in the types of policies and incentives included in the database. For example, some states chose to include their in-house outreach programs while others, although they

may have had quite extensive programs, did not include their programs. These omissions may have occurred because they felt that everyone had an outreach program, therefore listing their program was not important. Additionally, many states listed programs from the private sector, such as green pricing programs, that were voluntarily conducted by the private sector. Thus, although not a government-derived program or policy, it was an important incentive in that state. Because of these differences, it was felt that national and regional trends were more important than comparing states against states.

Each listing in the master listing of state policies and incentives was then analyzed for national trends concerning (1) the types of incentives used, (2) the types of biomass or biomass-related areas targeted, and (3) the economic sectors targeted. Additionally, data on regional trends was analyzed. For the latter, the states were assigned regions based on the U.S. Department of Energy's Biomass State/Regional Partnership.

Financial Incentives

Financial incentives are some of the most popular for obvious reasons. Financial incentives provided by the government can include grants, rebates, loans, and various tax treatments directed to a specific sector of the economy (e.g., industrial, residential) for a particular type of biomass-related thing (e.g., ethanol fuel production). The following table summarizes the different types of incentives found in reviewing the master listing of over 300 state policies and incentives.

- Grants
 - Interest subsidies on loans
 - Producer incentives (e.g., support payments)
 - Business development (e.g., infrastructure development)
 - R&D
 - Outreach
 - Equity investments
 - Equipment including vehicles
 - Planning and studies
- Rebates
 - Alternative Fuel
 - Equipment including AFVs
- Loans
 - Equipment and facilities
 - Equity investments
- Tax treatments
 - Tax credits
 - Corporate
 - Personal income
 - Tax exemptions
 - Property taxes
 - Sales taxes
 - Excise taxes
 - Use taxes
 - Tax application

- Mandates
 - Net metering
 - Generation disclosure
 - RPS
 - Renewables set aside (a special case of RPS, see IA-11)
 - Use exemptions (e.g., HOV)
 - Green power purchases (state govt)
 - Offer green power option (utilities)
 - Standards/definitions
- Outreach (in-house programs)
- Voluntary
 - Green power purchases
 - Rebates (equipment)
 - Production incentive (by utilities)

Biomass Targets

The types of biomass targeted varied widely; however, ethanol and biodiesel easily dominated the listings in the national compilation. The following is a listing of the types of biomass or biomass-related areas targeted:

- Alternative fuel vehicles/renewable fuel vehicles
- Alternative/renewable fueling stations
- Biodiesel
- Biogas/methane/on-farm anaerobic digestion
- Biomass
- Biomass facilities/renewable energy facilities/renewable energy systems
- Biofuels/alternative fuels/alternative transportation fuels
- Cogeneration
- Ethanol
- Fuel cells
- Landfill gas
- Microturbines
- MSW
- Stirling engines
- Wood stoves/wood heaters
- Wood energy

Note that overlap frequently occurs in this summary table. For example, ethanol and biodiesel are specific biofuels; however, if they were specifically identified in the listing, they were kept in separate categories.

Landfill gas is a form of biogas or methane; however, if the listing specifically stated that the policy/program only applied to landfill gas, it was placed under landfill gas.

Microturbines, fuel cells, Stirling engines, alternative fuels, and alternative fuel vehicles are all areas that may or may not apply to biomass. If the listing was not specific, then these policies and programs were included in the master listing.

The term “wood energy” as commonly used in trade refers to industrial wood energy use. Thus the policies and programs pertaining to wood energy were kept separate from wood stoves, which are distinguished by their residential use.

Economic sectors

The following summarizes the various economic sectors specified in the listings:

- Consumers/general public
- Construction
- Commercial
- Farms/agriculture
- Government, Federal
- Government, local
- Government, state

- Industrial
- Institutional
- Individuals/residential
- Non-profits
- Private businesses
- Schools (k-12, colleges/universities)
- Transportation
- Utilities

This summary also has some overlap. For example private businesses can include commercial, industrial, and farmers/agriculture, transportation, construction, utilities and non-profits.

SSEB expects the compilation and analysis of the government policies document to be in final draft before the end of the next quarter. The final document will cover only existing/current policies even though policy development in this area is a dynamic process.

Task 4 Activities

As stated in the project proposal, the overall objective of Task 4 is to provide market development assistance to the Brazilian biodiesel market by assisting with an evaluation of the economic viability of producing biodiesel. Specifically, the following aspects will be addressed in the pre-feasibility study:

- Feedstock Assessment
- Technology Evaluation
- Brazilian Market Segmentation (opportunities & barriers)
- Evaluation of Petroleum Distribution Channels
- Market Drivers & Demand Potential
- Evaluation of Economic Viability
- Factors to Consider and Recommendations

The final draft of the feasibility study will be completed during the next quarter. For purposes of this report, the executive summary of the *Biodiesel Economic Pre-Feasibility Study for Soybased Biodiesel Production in Brazil Preliminary Draft* follows.

Biodiesel Economic Pre-Feasibility Study for Soybased Biodiesel Production in Brazil Preliminary Draft – Executive Summary

From a renewable energy perspective, Brazil is many times viewed as a showcase example due to its significant use of ethanol from sugar cane and a large hydroelectric industry. Now, the Brazilian government has announced their plans to permit B2 blends (2% by volume biodiesel mixed with 98% by volume diesel fuel) that would require almost 200 million gallons of biodiesel production. Although the federal government has not finalized whether the program will be mandated or voluntary, the announcement has created a need to evaluate the feasibility of biodiesel production.

The purpose of this project is to evaluate the pre-feasibility of producing biodiesel from soybeans. Biodiesel is an alternative fuel that can be used in neat (pure) form, or blended with petroleum diesel for use in compression ignition (diesel) engines. Its physical and chemical properties as it relates to operation of diesel engines are similar to petroleum based diesel fuel. The Brazilian economy is heavily dependent upon diesel fuel and other petroleum products. Although there are 13 refineries in Brazil that produce diesel fuel, these facilities cannot meet Brazil's appetite for diesel. Last year, Brazil imported 10% of their refined diesel fuel needs.

Diesel fuel consumption is concentrated in the South and Southeast of Brazil. The most significant growth in diesel fuel consumption has been in the West Central agricultural regions where consumption grew by almost 5% between 2001 and 2002. Relative to the Southeast region, diesel fuel is slightly more expensive in the soy-producing regions such as Mato Grosso (West Central region); approximately \$0.04 per gallon on average.

Biodiesel has a number of inherent properties that are favorable compared to petroleum based diesel fuel. These properties include reduced exhaust emissions, a non-toxic and biodegradable product, reduced greenhouse gas emissions, and improved lubricity. Although these factors are very favorable, they are also difficult to quantify in terms of value to the diesel consumer. Without incentives for the use of an environmentally friendly fuel, many of these traits will have to be a side benefit of use instead of a primary driver.

Feedstocks make up a lion's share of the production costs for methyl esters. Animal fats and vegetable oils generally account for between 65% and 75% of the overall cost of producing a gallon of biodiesel. Meanwhile the other components, usually an alcohol source and a base catalyst comprise an additional 4% - 6% of production costs. The choice of the biodiesel feedstock is dependent upon many factors but the leading determinants are usually cost, quality, finished product impact and the reliability of supply. A common mistake of groups and individuals evaluating the location of biodiesel production plants is to evaluate the geographic regions where soybeans are produced and the number of bushels produced. In fact, this data is not near as important as the location and capacity of oilseed crushing plants. Sufficient crush capacity exists in Brazil to implement a B2 national policy. Furthermore, sufficient crush capacity exists in all five regions to supply a 2% blend for the existing diesel fuel demand in those respective regions.

Several biodiesel technology companies are able to provide cost effective biodiesel technology for refined soybean oil and are available to groups considering a biodiesel operation. A group interested in biodiesel production must thoroughly evaluate each technology company against their own internal criteria to determine which companies represent the most likely technology choices. The best option for crude glycerin resulting from the plant is most likely to sell the crude glycerin to existing glycerin refiners.

The preliminary analysis shows that soybased biodiesel plants will have an economic advantage in the interior region of Brazil compared to plants constructed on the coast. This is due to the slightly lower cost of soybean oil and the slightly higher price of diesel fuel in the interior. However, the analysis also demonstrates that public policy will play an important role in the development of the Brazilian biodiesel industry.

Even with higher than average petroleum prices and if consumers are willing to pay a slight premium for B2 blends, a biodiesel production facility may not be economic without a decrease in tax compared to petroleum diesel fuel. In this analysis, a biodiesel plant that sold biodiesel without paying federal tax could be profitable. Economies of scale do exist. That is, as plant size increases break-even costs decline and a significant cost savings can be realized by constructing a plant in the 15 to 20 million gallon per year range.

A complete outline of the Table of Contents is included under Appendix A.

Conclusion

Beyond the potential economic development benefits, states gain the opportunity to strengthen and integrate the work of energy, agriculture, forestry, environmental and other state agencies. Where issues are the same among several states, strategies can be developed to address these issues without regard to state borders. Examples include the development of similar legislative actions, working with the private sector with multi-state locations, and multi-state training and outreach to economize resources.

Notably, several southern states have long-standing policies and programs that support the use of bioenergy. Therefore, some states have a more developed bioenergy economy than others. However, all states in the southern region have significant biomass resources. SSEB will report these findings in the final report.

During the 2004 state legislative session, SSEB member states enacted policies and implemented programs that support the use of biomass and biobased products. During this reporting period, the final draft of the compilation of government policies and incentives is nearly completed. SSEB expects the final document to be completed in the next quarter.

Under Task 4, the U.S.-Brazil Biodiesel Pilot Project, continued analysis and specific application is needed of business risks to design approaches to overcome key risks and barriers to financing. Raising investment sources and options is a top priority for the Ministry of Mines and Energy in Brazil.

The Brazilian Government is pursuing a national program of biodiesel inclusion at the 2%, by volume, level. According to official releases, Brazil's Mines and Energy Ministry plans to announce regulations for the use of biodiesel as an additive to diesel by November 2004. However, Brazilian Government officials are determining if the additive should be optional or obligatory

The final draft of the feasibility study will be completed during the next quarter. Also, during the next quarter SSEB will host a Biodiesel Business Risk Roundtable. Key Brazilians from industry, academia and government will attend as well as representatives from various sectors in the United States. Participants will gain an in-depth understanding of key business risks from multiple perspectives and with insights on financing issues in biodiesel markets.

Appendix A
Biodiesel Economic Pre-Feasibility Study for Soybased Biodiesel Production in Brazil
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Executive Summary

Overview

Diesel Consumption in Brazil

 Brazilian Refining Capacity

 Regional Diesel Consumption

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 Enhanced Lubricity

 Emissions Benefits

 Energy Balance

 Biodegradability

 Toxicity

Proposed Brazilian National B2 Program

 Important Implementation Issues

 Fuel Distribution System

 Brazil Biodiesel Specifications

 Brazil Fuel Tax

Feedstock for Biodiesel Production

 Evaluation of Supply Potential from Soybeans

 Realistic Supply Estimation

 Soybean Pricing

 Comparison of Selected Oils and Fats

Technology Assessment

 Factors in Technology Selection:

 General Biodiesel Technology Overview

 Transesterification Reaction

 Methanol Removal

 Separation

 Glycerine Neutralization

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- Fatty Acid Esterification
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 - Axens
 - Ballestra
 - BDI
 - Biodiesel Industries, Inc.
 - Cimbria-Sket/Bratney
 - Connemann
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 - Energea
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- Technology for soybean oil based biodiesel
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Feedstock Market
Biodiesel Market
Proposed Tax Incentives
Alternative Feedstock