South Carolina Biomass Brief

Information about Biomass in South Carolina

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Introduction to Biomass in South Carolina

Biomass Basics

For thousands of years, people burned wood to cook their food and heat their homes. It was only when the Industrial Revolution began that the use of fossil fuels increased, eventually dominating as the world's primary source of energy. When burned, fossil fuels emit carbon dioxide and other substances into the air. The millions of tons of these emissions released into the atmosphere each year adversely impact our environment.

Biomass fuels present a solution to this and many other concerns. Biomass offers safe ways to provide relatively inexpensive and environmentally benign fuels from reliable and renewable domestic sources of energy. Since South Carolina has no uranium, coal, oil, or natural gas reserves but does have several biomass resources, the progressive use of biomass fuels for energy has immense economic potential in the state.

Another major reason to intensify the use of biomass fuels is to reduce United States dependency on imported fossil fuels, especially petroleum and natural gas. Gulf Coast hurricanes Katrina and Rita in 2005 made it clear to all Americans that our "pipeline lifeline" could end in a matter of minutes, putting our country and everyday way of life in an economic tailspin.

Biomass is a desirable source of energy because it is available over much of the earth's surface. Unlike fossil fuels, it is renewable. Since it has little or no net contribution to the global warming of the earth, it is more environmentally friendly than fossil fuels.

Biomass refers to any plant mass harvestable for conversion to fuel, as well as to any animal and human wastes convertible to solid or gaseous fuels. Thus, it includes a broad range of materials biological in nature, such as agricultural and forestry products, farm and wood waste products, selected garbage, and manure and other animal wastes.

Current Consumption

The majority of energy consumption in South Carolina comes from fossil fuels (63.6 percent). Of this percentage, petroleum provides 28.5 percent, coal provides 25.6 percent, and natural gas accounts for 9.5 percent. Nuclear energy contributes 31.4 percent of the total energy consumption in the state, although it is the source of 57 percent of the electricity generated in South Carolina (nearly half of which is sold out-of-state). Biomass energy provides 3 percent of the total U.S. energy consumption, but less than 5 percent of the total South Carolina energy consumption. South Carolina has an abundance of biomass resources. This makes the progressive use of biomass fuels for energy attractive in South Carolina.

Following are some brief descriptions of biomass activities in South Carolina.

Solid Fuels Activities

University of South Carolina to Add Waste Wood Gasification System

The University of South Carolina will soon add a waste wood gasification system to its central energy system, using existing waste products from sawmills, logging and timber operations in the Midlands to produce 60,000 pounds of steam per hour (about 85 percent of campus steam needs) and approximately one megawatt of electricity.

The biomass energy plant will utilize one million tons of South Carolina homegrown energy over 20 years, saving students and taxpayers almost $2 million annually while improving air quality through substantially reduced emissions of sulfur dioxides, nitrogen dioxides and particulate matter.

About $1.5 million annually in wood waste expenditures will be pumped into the South Carolina economy, displacing spending now going to oil and natural gas producers in Gulf States and abroad. Furthermore, campus operations will be significantly protected from future oil and natural gas supply disruptions, such as those occurring in late summer of 2005.

Savannah River Site to Replace Coal Plant with Waste Wood Boiler

As part of a collaborative process between the Department of Energy (DOE), the Washington Savannah River Company (WSRC), Honeywell Building Solutions, and the Savannah River Site (SRS) broke ground on a new clean energy efficient steam plant today, the first of two energy infrastructure upgrade projects.

Honeywell proposed the A Area Steam Plant replacement as an energy conservation measure, which involves the construction of two new 30,000 lbs/hr steam boilers to replace the existing coal-fired boilers. The current plant, installed in 1951, is too large for today's reduced A Area steam requirements, resulting in venting and reduced plant efficiency. The boiler plant is also past its useful life, requiring additional maintenance and repair.

It is the Site's intent that the biomass or wood-fired boiler will be primarily supplied from wood chips from waste generated by SRS forest management activities, under the direction of the U.S. Forest Service-Savannah River Site. The new system will result in lower environmental emissions, less energy consumption, lower operating and maintenance costs, and compliance with new Clean Air and Water Act Standards.

One of the new boilers will be wood-fired and will provide the majority of the steam required for the area. The other will be a standby, fuel-oil fired boiler that will operate during maintenance periods for the wood-fired boiler and during peak steam demand times.

This construction is being funded and managed under an Energy Savings Performance Contract that allows SRS to repay the project costs over a period of nine years. The estimated capital cost of the project is approximately $14 million, with an average projected savings of $1.5 million per year. Savings generated from the new system will be used to pay the total costs of the project.

Construction of the new plant is expected to begin prior to August 2007 with a projected completion date of August 2008. Until that time, the existing coal-fired boilers will continue to supply steam to the site's A Area. The second upgrade project in the D Area and K Area is scheduled for completion in late Fiscal Year 2009.

Carolina Soya to install Waste Wood/Glycerin Boiler

Carolina Soya, a soybean crushing facility in Estill, is installing an additional biomass boiler as part of a major expansion project. This additional boiler will enhance the capacity of an existing waste wood fueled boiler already on-site. The existing boiler was installed in 1984 and generates 30,000 lbs of steam an hour, typically using 30,000 tons of waste wood a year. This is equivalent to four to five truckloads of wood per day (100 tons/day). The waste wood comes from local sawmills and includes materials like bark and scrap wood. The new boiler is slightly larger, generating 40,000 lbs of steam an hour and will use an additional 40,000 tons of fuel a year. In addition to wood, the new boiler will also burn glycerin, a significant byproduct of biodiesel production. Where glycerin has been burned at other locations as a liquid, this site is different in that it will be burned in a solid fuel boiler. A biodiesel plant, Ecogy Biofuels LLC, is currently being constructed near the soy oil production facility and will provide the glycerin. The glycerin will reduce wood requirements significantly at Carolina Soya.

Gaseous Fuels Activities

Since 1999, the South Carolina Energy Office (SCEO) has partnered with the US Environmental Protection Agency's Landfill Outreach Program (LMOP) in an effort to reclaim and use landfill gas in the state. Concentrated efforts on the Landfill Gas to Energy (LFGTE) projects have resulted in significant energy and environmental benefits to the state.

BMW's South Carolina car assembly plant uses landfill gas (LFG) from Waste Management's Palmetto Landfill to fuel four gas turbine cogeneration units (4.8 megawatt capacity) and recovers 72 MMBtu/hr of hot water. The project cost approximately $12 million and was coordinated by BMW Manufacturing Co., LLC, Ameresco, Durr Systems, Inc., SCEO, and Waste Management, Inc. The turbines fulfill about 25 percent of the plant's electrical needs and nearly all of its thermal needs. For these outstanding environmental efforts, BMW was awarded LMOP's 2003 Project of the Year.

With excess landfill gas available and a continued desire to be environmentally responsible, BMW turned to the largest consumer of energy in the entire plant: the paint shop. Employing Durr Systems, the original designer of the paint shop, BMW converted equipment to burn LFG and still had enough excess LFG to burn in one of three boiler systems. This effort earned BMW Manufacturing recognition as LMOP's 2006 Energy Partner of the Year.
The project's highlights include:

- Nearly 70 percent of BMW's energy consumption comes from LFG.
- World's first automotive paint shop to integrate use of LFG in process equipment.
- A 9.5-mile pipeline crosses a river, two creeks, an interstate, and BMW's test track, delivering about 4,800 scfm of filtered and dehydrated landfill gas.

- Protection from rising and fluctuating natural gas prices over a 20-year contract, saving the company on average one million dollars a year.
- According to BMW, a reduction of carbon dioxide emissions equivalent to driving 105 million miles per year, or more than 4,000 times around the earth.

In 2001, Santee Cooper became the first electric utility in the state to generate and offer Green Power to its customers from the 3 megawatt Horry County Landfill Generating Station near Conway. The company opened its second Green Power facility, a 5.4 megawatt station in 2005. Located at Allied Waste's Lee County Landfill, it makes electricity from three 1.8 megawatt engines that use methane gas as fuel. Screaming Eagle Road Landfill in Richland County opened in March 2006 and is capable of generating 5.5 megawatts of power.

The fourth Santee Cooper landfill-gas-to-energy project which will soon enter commercial operation is Anderson Regional Landfill in Richland County. Anderson Regional Landfill is still in the testing phase of their systems. This additional facility will bring Santee Cooper's total Green power generation to 25 megawatts. Santee Cooper and Allied Waste have signed an agreement with the Richland Northeast Landfill. Two LFGTE projects in the negotiation stages with Waste Management are Oak Ridge Landfill in Dorchester County, and Hickory Hill Landfill in Jasper County.

In 2006, Act 386 created tax credits for manufacturers purchasing landfill gas to power facilities. The provision allows a manufacturing facility to claim up to 25 percent of the landfill gas energy costs starting in the 2006 tax year and unused tax credits may be carried forward up to ten years.

JW Aluminum

JW Aluminum recently signed a contract with Berkeley County to utilize landfill gas from the Berkeley County landfill to power its new smelter plant. The $5 million dollar project is among the first of its kind in the country according to the US Environmental Protection Agency.

The agreement is a win-win for the company and the state. The JW Aluminum smelter not only means better air quality and a reliable, local energy source of energy for businesses, but is also good news for the state's economy. The county can expect to be paid a quarter million dollars a year for the gas in addition to applicable property taxes.

Other environmental spin-off projects are also being developed. The county plans to use the heat from the aluminum plant to dry county sewage sludge to sell as fertilizer. Additionally, the county plans to expand its wastewater treatment plant to the landfill where treated water will be sent to Carolina Nurseries for irrigation. Additional methane energy will also power the Berkeley County Water and Sanitation Authority offices or be sold to other businesses.

Liquid Fuels Activities

Liquid Fuels in South Carolina

Alternative fuels are seen as a means to decrease the nation's dependence on foreign oil and increase energy security through

domestically produced products. At this time, alternative fuels are defined as any fuel that is substantially non-petroleum, yields energy security and demonstrates environmental benefits. In its efforts to displace conventional petroleum products, the SCEO has focused on biodiesel and ethanol.

Biodiesel is a clean-burning alternative fuel produced from domestic, renewable resources such as soybeans. Biodiesel can be blended at any level with petroleum diesel, such as B20, which refers to a common blend of 20 percent biodiesel and 80 percent diesel. However, biodiesel can be mixed in any amount or used in its pure form in some compression ignition (diesel) engines with no major modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics.

Ethanol burns cleaner than gasoline and is a completely renewable, domestic, environmentally friendly fuel that enhances the nation's economy and energy independence. Ethanol is commonly blended into E85, which is 85 percent ethanol and 15 percent gasoline. Vehicles that run on E85 are called flexible fuel vehicles (FFVs) and are manufactured to run on either gasoline or high ethanol blends. Any vehicle can run on smaller ethanol blends such as E10, which is 10 percent ethanol and 90 percent gasoline, and is also a common substitute for other fuel additives such as MTBE. There are over 50 makes and models of FFVs from major vehicle manufacturers such as Ford, General Motors, Daimler Chrysler, Mercury, Mazda, Isuzu, Mercedes Benz and Nissan.

Liquid Fuels Activities – Biodiesel

Carolina Biofuels

Carolina Biofuels, a new division of the Taylors, South Carolina-based company Carolina Polymers, rolled out their first load of biodiesel fuel on March 14, 2006. Carolina Biofuels manufacturing facilities are currently in full operation, and though starting at 10 million gallons of biodiesel fuel expect to grow to over 30 million gallons annually. A large percentage of the fuel produced at Carolina Biofuels is sold to World Energy Alternatives, LLC which is leading global supplier of biodiesel located out of Massachusetts. Carolina Biofuels supports South Carolina industry by using locally-grown soybeans to make their fuel, and as production ramps up, they will create between 20 and 30 jobs in the Taylors area.

Southeast BioDiesel

In May 2007, Southeast BioDiesel will begin commercially selling biodiesel made from refined waste cooking grease (yellow grease) in North Charleston. Southeast BioDiesel is contracting with companies that collect yellow grease for disposal to transport the grease to their biodiesel production facility. The company’s grand opening was October 27, 2006. Southeast Biodiesel expects to begin by producing six million gallons and eventually increase production once there is more demand in the Charleston area.

Carolina Soya, LLC/ Ecogy Biofuels, LLC

Carolina Soya, LLC is a soybean processing plant in Estill. Carolina Soya processes soybeans, extracts the crude oil and hulls, and produces soybean meal as feed ingredients in poultry rations and other animal feeds marketed throughout the Carolinas, Georgia, and Florida. The company processes one out of every three bushels of soybeans grown in South Carolina and Georgia. Currently the facility produces 15,000,000 gallons of crude soy oil, which is sold to Carolina

Biodiesel, Verde Biofuels, LLC, and Farmers and Truckers Biodiesel. Carolina Soya will invest $13 million to add a soybean oil refinery and a waste wood boiler to its existing soybean processing plant. The company has obtained all of the necessary permits and expects once the facility is complete to produce 25,000,000 gallons of refined soy oil annually.

In late 2006, Carolina Soya had a groundbreaking and announced plans to partner with Ecogy Biofuels, LLC – a division of Knightsbridge. The company will build a biodiesel plant across the street and pump soy oil in a pipeline under the road to produce biodiesel. Construction of the Ecogy Biofuels, LLC plant is expected to be complete by August 2007 and ready to begin testing. The plant will produce 30 million gallons of fuel annually. Ecogy Biofuels has begun research and development of alternative oils, including oils derived from algae.

Farmers and Truckers Biodiesel

In March 2007, Farmers and Truckers Biodiesel announced plans to start operations in South Carolina due to attractive production credits passed in June 2006. Farmers and Truckers will be permitted for 5 million gallons, but may eventually produce 20 million gallons of biodiesel a year in Aiken County. The company is converting a Warrenville clay warehouse for $1.4 million and will use feedstocks such as soy oil, cotton seed oil, and animal fats to produce the biodiesel.

Greenlight Biofuels

The Virginia based company plans to expand operations into South Carolina in late 2007 to build a 10 million gallon per year plant. The $8.5 million facility will generate 15 jobs. Company executives stated the primary reason they chose South Carolina is because of the friendly business atmosphere and the state tax incentives available for renewable fuels.

Renewable fuel production has increased rapidly in South Carolina due in part to the large demand and public availability of renewable fuels as well as significant state tax incentives passed in 2006 and 2007 which provide between twenty to thirty cents per gallon for biodiesel and ethanol and up to twenty-five percent of the costs of renewable fuel production equipment. Greenlight Biofuels will use vegetable oils, animals fats, and recycled restaurant grease to make the biodiesel which will be sold to local retail stations and also used for home heating oil and off-road motors.

International Bio Energy

International Bio Energy is considering a site in the Charleston area for a $450 million ethanol plant. Though the exact location is yet to be determined, the site would have to be at least 90 acres. Likely built in two phases, the Charleston plant could produce 216 million gallons of ethanol a year, requiring about 80 million bushels of corn a year. It would be among the largest facilities in the country.

SC Department of Education

The SC General Assembly approved a 15-year replacement cycle for school buses, which is expected to reequip South Carolina's aging fleet – considered to be among the oldest in the nation. Pollution, among other factors, was a large reason for replacing the older buses with newer vehicles with improved emission controls.

In a 2006 Union of Concerned Scientists school bus report, South Carolina's buses were given a "D" grade for soot pollution and a rating of "poor" in smog-forming pollution with thee state ranking last in major pollution categories. According to the report, each state school bus produced an average of 24.5 pounds of soot and 531 pounds of smog-forming pollution in 2005 - nearly three times more soot than a Delaware school bus, which has the newest and cleanest fleet.

In a move to reduce air emissions, next fall all South Carolina school buses will use a blend of biodiesel and ultra low-sulfur diesel fuel, effectively reducing soot emissions by about 10 percent from standard diesel fuel. The contract for biodiesel was recently awarded to United Energy Distributors out of Aiken, one of the largest biofuels distributors in the state. According to Don Tudor of the SC Department of Education, the department expects to use over 2.4 million gallons of biodiesel after the first year – nearly double the amount used by the entire state in 2006. The department is currently testing equipment and buses with lower blends of biodiesel and will eventually increase the blend to twenty percent.

The SC Department of Education is also utilizing $1.5 million in environmental protection funding from a $500,000 US Environmental Protection Agency Clean School Bus grant and a $1 million fine from Santee Cooper to purchase emission control devices that will reduce emissions from older buses until they can be replaced. Two of the new school buses that will be delivered in July feature plug-in hybrid diesel engines. This year alone over 700 school buses were purchased with better emission control technology, and in the 2008 fiscal year another 400 will be purchased.

Furman University

Furman University students are turning castoff dining hall grease into an environmentally friendly fuel that will supply about half the campus' diesel needs for its lawnmowers, backhoes and tractors. The students are making the fuel for about 60 cents a gallon and sell it at a mark-up to Furman's Services Department to raise money for their organization, Environmental Action Group (EAG). EAG can produce 55 gallons of fuel over two days with about three hours of student labor. Furman students will produce about 2,500 gallons a year. The main limitation is that they don't have more dining hall grease.

Liquid Fuels Success Stories

In order to have a sustained effort to promote alternative transportation fuels, the SCEO led the way in organizing the Palmetto State Clean Fuels Coalition (PSCFC), a voluntary partnership of stakeholders working together to reduce energy used for transportation and reduce the impacts of transportation on the quality of life and the environment of South Carolina. The PSCFC received its official designation as a Clean Cites program in August 2003, and currently there are almost 90 Clean Cities programs in the nation. There are currently over 75 stakeholders who have committed to expanding the use of alternatives to gasoline and diesel fuel and are promoting alternative fuels in the state. While the PSCFC has focused primarily on a nine county area in the past, demand from other counties has led the organization to begin outreach and education activities on a statewide level. When the Coalition requests redesignation in 2008, it will ask for statewide status.

SCEO, in partnership with the PSCFC, has aggressively marketed ethanol and biodiesel in the state. Successes in promoting ethanol infrastructure through education, outreach and funding opportunities mean that South Carolina currently has a total of 40 publicly accessible E85 pumps around the state and 42 publicly accessible B20 pumps.

Both E10 and E85 blends are available across the state, and over 15 million gallons of ethanol since 2004 have displaced conventional gasoline in South Carolina through private sector consumption as well as through government usage. Since 2004 nearly 2 million gallons of cleaner burning biodiesel displaced conventional diesel fuel. Below is a list of current E85 and B20 publicly accessible refueling stations in the state.

AIKEN	
United Energy Dist. #1 located at 1046 Toolebeck Road	E85 B20*****
Dave's Grill & Grocery located at 3286 Wagener Road	B20*****
ANDERSON	
Spinx 133 located at 2206 N. Main Street	E85 B20
COLUMBIA	
Spinx 149 located at 1619 Decker Blvd.	E85
Gervais Street Exxon located at 1421 Gervais Street	E85
Pitt Stop #35 located at Bluff Road	E85
Pitt Stop #40 located at 4800 Forest Drive	E85
Irmo C-Mart located at 7353 Nursery Road	E85
Corner Pantry #101 located at 1425 Bluff Road	E85
ELGIN	
Pitt Stop #28 located at 595 Spears Creek Church Rd.	E85
FLORENCE	
Breaker's #1 located at 2074 West Evans Street	E85
Breaker's #127 located at 4801 E. Palmetto Street	E85
FORT MILL	
Fairway BP located at 1010 Carolina Place Drive	E85
Fort Mill Conoco located at 160 Fort Mill	E85
GAFFNEY	
Gasland USA #9 located at 1121 Hyatt Street	E85
GREENVILLE	
Spinx 102 located at 1417 E. Washington St.	B20
Spinx 105 located at 3100 S. HWY 14	B20
Spinx 109 located at 7900 White Horse Rd.	B20
Spinx 112 located at 1103 Pendleton St.	B20
Spinx 116 located at 94 Allen Street	B20

Spinx 127 located at 1460 Roper Mountain Road	B20
Spinx 130 located at 1510 Woodruff Road	E85 B20
Spinx 138 located at 1519 White Horse Road	E85 B20*****
Spinx 140 located at 3556 Pelham Road	B20
Spinx 146 located at 1520 S. Pleasantburg Drive	B20
Spinx 179 located at 2901 N. Pleasantburg Dr	E85 B20*****
Spinx 181 located at 1000 E. Butler Rd.	B20
Spinx 197 located at 3825 White Horse Road	B20
Spinx 114 located at 941 Haywood Road	E85 B20
GREENWOOD	
Spinx 119 located at 102 ByPass 25 NE	B20
GREER	
Spinx 121 located at 2497 S. Hwy. 14	E85 B20*****
Spinx 128 located at 498 The Parkway	B20
Spinx 160 located at1599 Highway 101	B20
Spinx 166 located at 100 W. Wade Hampton	E85
Spinx 189 located at 3135 Brushy Creek Road	E85 B20
HARTSVILLE	
Family Mart located at 103 East Home Avenue	E85
HONEA PATH	
Spinx 225 located at 220 E. Greer St	E85 B20*****
IRMO	
Pitt Stop # 13 located at 7409 Broad River Road	E85
LANDRUM	
Spinx 165 located at 5598 North Highway 14	E85 B20*****
LEXINGTON	
Pitt Stop #41 located at 1005 Old Cherokee Road	E85
Pitt Stop #16 located at 5019 Augusta Road	E85
LIBERTY	
Spinx 199 located at 7252 Moorefield Mem Hwy	E85 B20*****
LYMAN	
Spinx 169 located at 107 Charlotte Hwy.	B20*****
MANNING	
East Coast Energy located at 488 West Boyce St.	E85
MARIETTA	

Spinx 148 located at 2921 Geer Hwy.	E85 B20
ORANGEBURG	
Smith 66 and Marine located at 1692 Columbia Road	E85 B20*
PENDLETON	
Spinx 157 located at 7605 Hwy 76	B20
PIEDMONT	
Spinx 125 located at 7395 Augusta Road	B20
SENECA	
Spinx 156 located at 507 ByPass 123	B20
SIMPSONVILLE	
Spinx 134 located at 1301 Fairview Road	E85 B20*****
Spinx 193 located at 697 Fairview Road	E85 B20
Spinx 201 located at 549 East Standing Springs Rd	E85 B20*****
SPARTANBURG	
Spinx 175 located at 1504 Boiling Springs Rd	B20
SUMTER	
Shell Corner Pantry #137 located at 501 North Guignard Drive	E85
TAYLORS	
Spinx 124 located at 3226 W. Wade Hampton Blvd.	B20
Spinx 190 located at 2601 Locust Hill Road	E85 B20*****
TRAVELERS REST	
Spinx 178 located at # 2 Tigerville Rd	E85 B20*****
UNION	
Bell's Exxon located at 101 North Duncan Bypass	E85 B20*****
WEST COLUMBIA	
Pitt Stop #42 located at 1928 Airport Road	E85
United Energy Dist.West located at 2470 Fish Hatchery Road	E85 B20*****
WEST UNION	
Spinx 152 located at 180 S. Hwy 11	B20
WESTMINSTER	
Spinx 155 located at 1008 E. Main Street	B20

* Indicates that B20 is available in the truck islands.

The PSCFC funded a total of nine of the aforementioned E85 stations with monies set aside by the South Carolina Department of Health and Environmental Control (DHEC) from an environmental fine against Willamette Industries.

In addition to publicly accessible refueling stations that both consumers and the government can use, a number of governmental entities have E85 and B20 infrastructure for restricted use by local, state and federal government entities. The first E85 station came about as a result of the partnership between DHEC, the South Carolina Energy Office and the PSCFC, as DHEC constructed the first ethanol refueling station in Columbia in 2001. This station, located at the DHEC refueling facility at 2600 Bull Street, allows state and local government fleets to refuel at the site. DHEC currently averages sale of about 60,000 gallons a year at this site.

In addition, the US Department of Energy's (DOE) federal installation at the Savannah River Site (SRS) has two 10,000 gallon, above-ground storage ethanol tanks outfitted with a key-card system. FFVs refueling onsite are required to refuel with ethanol 100 percent of the time. Usage at the site averages about 250,000 gallons of E85 a year. SRS has over 500 alternative fueled vehicles in their fleet of 1,400 vehicles.

Work on previous DOE grants in the area of alternative fuels is ongoing and includes the installation of an above-ground, 3,000 gallon ethanol storage tank at the University of South Carolina for its fleet, and the retrofit of four 65,000 gallon tanks at United Energy in Aiken to store and dispense ethanol and biodiesel. The SCEO also received a DOE grant award to promote E85 infrastructure in the Rock Hill area (York County), the state's only county that is in non-attainment for ground level ozone. York County is still constructing the ethanol pump.

Through the efforts of the PSCFC, about 3,000 Alternative Fuel Vehicles (AFVs) in government and private fleets are using alternative fuel in South Carolina. Through 2008, stakeholders representing both government and private businesses have committed to add additional alternative fuel vehicles to South Carolina's roads.

Recent Liquid Fuels Activities

GM Provides E85-Capable Pickup Truck for Use in South Carolina

For the second consecutive year, the SCEO is coordinating with the South Carolina Department of Agriculture for the use of an E85 capable Chevy Avalanche from General Motors for one year at no cost. The Department of Agriculture received the vehicle and is using it as part of its fleet. The 2005 vehicle leased to the Department of Agriculture was sold to the state and is now used by the SCEO to promote alternative fuels. South Carolina Agriculture Commissioner Hugh Weathers is promoting the brightly decorated E85 Avalanche in his day-to-day activities with the Department of Agriculture. Response to the FFV truck has been tremendous. It was a featured display at the South Carolina State Fair in October 2006 where over 200,000 people had the opportunity to view the vehicle. GM recently announced they would provide another free one-year least to South Carolina to use the vehicle through 2008.

Biomass Promotional Activities

2007 Alternative Energy Legislation

H.3649, the Energy Freedom and Rural Development Act, generated by the recommendations of the SC Biomass Council and the Strategic and Tactical Research on Energy Independence Commission, was attached to S.243, the Hydrogen Bill. It was clear that H.3649 would not complete its journey this year in the Senate after passing out of the House late in the session, so lobbyists worked hard with Senate leadership to attach H.3649 onto the Hydrogen bill. The Hydrogen Bill will increase research and development of hydrogen fuel cells in South Carolina through an extensive three-year grants and loans program.

The Energy Freedom amendment contains many of the key provisions of H.3649, but lacks the grants and loans program, moves the majority of the provision implementation dates to 2008, and caps each of the provisions at a certain amount of money for each fiscal year. Some of the highlights of the amendment include:

- Tax rebates up to $300 for the purchase or lease of a Flex-fuel vehicle, hybrid, electric, and plug-in hybrid, a fuel efficient vehicle with an EPA city fuel economy of 30 or greater mpg, and sales tax rebates for conversions of conventional to alternative fuel vehicles;
- Incentive payments available for retailers of alternative fuel such as biodiesel and E85 ethanol ranging from $0.05 to $0.25 per gallon;
- Incentive payments for biomass energy users ranging from $0.01 per kwh or $0.09 per therm;
- Income tax credit of up to $2,000 for plug-in hybrid vehicles purchases;
- Income tax credits of up to $100,000 for research and development of renewable fuel feedstocks best suited for South Carolina such as cellulosic ethanol and algae-based biodiesel;
- Redefines the solar system tax credit to alleviate confusion and includes electricity generation for the tax credit, not just solar water heating;
- Redefines the tax credit for renewable fuel dispensing equipment;
- Creates an additional $0.10 per gallon tax credit for non-soy and non-corn based biofuels to make South Carolina specific feedstocks more competitive;
- Income tax credit for the construction of a building and equipment used in the intermediate steps of renewable fuel production such as milling, crushing, distillation, and handling of feedstocks; and an
- Income tax credit for the purchase and installation of equipment to create power from a biomass resource including wood and wood waste, agricultural and animal waste, sewage, landfill gas, and other organic materials.

Other acts in the 2007 session include:

- H.3034, the Green Buildings Bill - would require all state-owned buildings worth more than $15 million to be ‘Green Buildings’ and meet certain nationally recognized building standards.

- H.3161, the School Bus Bill – requires that the SC Department of Education use biodiesel in school bus fleet wherever economically feasible.
- Budget Bill 73.12(29)(A)-(B) – the SC Department of Agriculture will receive $150,000 for a biofuels marketing program to promote public biofuel awareness and $250,000 for ethanol and biodiesel testing equipment to monitor alternative fuels sold in the state.

2006 Alternative Energy Legislation

Three pieces of legislation passed by the SC General Assembly in June 2006 significantly increased incentives for alternative vehicles, fuels, and renewable energies. In Act 397 (Alternative Energy Proviso in the Budget Bill for FY 2007) there are various incentives for individuals and businesses to purchase alternative fuels, including tax rebates which will provide:

1) $300 sales tax rebate for in-state purchases of all Flex-Fuel Vehicles (FFV), capable of operating on E85 motor fuel;
2) $300 sales tax rebate for in-state purchases of all hydrogen fuel cell vehicles;
3) $300 sales tax rebate for in-state purchases of plug-in hybrid gasoline-electric vehicles;
4) $500 for purchase of equipment that results in the conversion of a conventional hybrid gasoline-electric vehicle to a plug-in hybrid gasoline-electric vehicle;

Incentive payments provide:

1) a five cents incentive payment to the retailer for each gallon of E85 fuel sold;
2) a five cents incentive payment to the retailer for each gallon of B20 fuel sold;
3) a five cents incentive payment to the retailer or wholesaler for each gallon of B20 fuel sold as dyed diesel fuel for "off road" uses;

And tax income credits provide:

1) a business or personal income tax credit of twenty cents for each gallon of biodiesel motor fuel produced mostly from soybean oil and sold;
2) a business or personal income tax credit of thirty cents for each gallon of biodiesel motor fuel a majority of which is produced from feedstock other than soybean oil;

Act 386 added similar incentives for alternative fuels, solar energy, and landfill gas:

1) ethanol producers receive twenty cents for every gallon they produce above the original designed production capacity of the facility.
2) ethanol facilities receive seven and one-half cents for every gallon of ethanol produced before denaturing;
3) a qualified commercial facility for dispensing renewable fuel is allowed a tax credit equal to twenty-five percent of the cost to the taxpayer for constructing and installing pumps, storage tanks, and related equipment used for dispensing or storing renewable fuel;
4) a tax credit for twenty-five percent of the costs to install a solar energy heating or cooling system, or both, in a building owned by the taxpayer;
5) a tax credit for twenty-five percent of the costs incurred by a taxpayer for methane gas taken from a landfill to provide power for a manufacturing facility.

Act 312, the Hybrid Vehicle Bill, provides a state income tax credit for purchases of certain hybrid, fuel cell, alternative fuel or lean burn technology vehicles. Consumers who purchase one of these vehicles that are eligible for the federal tax credit on such purchases also qualify for the state tax credit if they claim the federal credit. The amount of state income tax credit a qualified vehicle purchaser and may receive 20 percent of the credit amount they receive for their federal income taxes, based on the combined city/highway metric or standard set by federal Internal

Revenue Code Section 30B. The state income tax credit for purchase of hybrid vehicles will remain in place permanently, and will not be phased out, like the federal credit.

South Carolina Biomass Energy Potential in South Carolina: A Conspectus of Relevant Information

The SCEO completed an inventory of existing publications, studies and reports relating to the actual or potential use of biomass energy in South Carolina. Over the years, a number of studies have been conducted covering some, but not all, of the information relevant to actual and potential use of various feedstock sources in South Carolina and the Southeast, and barriers found when initially converting to a biomass feedstock resource. *Biomass Energy Potential in South Carolina: A Conspectus of Relevant Information* identifies:

- Existing information useful for developing and implementing biomass energy projects in South Carolina; and
- Information gaps in the knowledge base for developing and implementing biomass energy projects in South Carolina.

The study indicates South Carolina has sufficient information regarding the availability of woody biomass for direct combustion, landfill gas, and soybeans, corn and other agricultural products that can be used to produce ethanol and biodiesel.

South Carolina Climate, Energy & Commerce Advisory Committee

Governor Sanford issued Executive Order 2007-04 on February 16, 2007, establishing the South Carolina Climate, Energy & Commerce Advisory Committee (CECAC), due to the recognition of potential implications of global climate change on the economy, environment and quality of life in South Carolina.

The Committee is composed of members representing a broad range of stakeholders including: industry, environmental groups, government agencies, academic institutions, agriculture, forestry, coastal interests, real estate, tourism, banking, insurance and other sectors. The non-profit Center for Climate Strategies (www.climatestrategies.us) will provide facilitation and technical support. Additional citizens in South Carolina compose five other working groups that will do additional work outside of the committee framework.

Among the technical working groups (TWGs) are the Agriculture, Forestry, and Waste Technical Working Group and the Transportation and Land Use Planning Technical Working Group which represent the interests of biomass energy and alternative fuels. For more information, please visit www.scclimatechange.us.

South Carolina Biomass Council

Another project of the SCEO is the formation of the South Carolina Biomass Council, which brings together stakeholders interested in achieving significant market penetration of biomass technologies and bio-based products. The Biomass Council used committees and working groups to develop and advocate a plan to increase use of biomass energy in South Carolina.

Each committee and working group analyzed feedstock availability, current energy production and use, economics of energy production from the feedstocks, and environmental costs and

benefits, and then determined the barriers to production and use, which culminated into the group's final recommendations. Many of those recommendations have since been incorporated into House Bill H.3649 introduced in March 2007 by Representative Billy Witherspoon.

To learn more about the SC Biomass Council, please visit www.scbiomass.org.

Strategic and Tactical Research on Energy Independence Commission (STREIC)

The Strategic and Tactical Research on Energy Independence Commission (STREIC), a panel created by state energy legislation in 2006, released its final report in January 2007 to the South Carolina General Assembly. The commission developed recommendations to foster alternative fuel development in South Carolina to help the state become less dependent on imported oil.

The final report titled, *South Carolina's Strategic Energy Roadmap: Breaking the Dependence on Oil and Fueling the Future through Economic Development*, was authored by commission members: Dr. Nicholas C. Rigas, Chair Director, of the South Carolina Institute for Energy Studies; Hugh Weathers, Co-Chair Commissioner, of the South Carolina Department of Agriculture; Ken Driggers, Executive Director, of the Palmetto Conservation Foundation; Neil McLean, Executive Director, of EngenuitySC; E. LeRoy Nettles, Jr., President and CEO, of Pee Dee Electric Cooperative, Inc.; Stewart Spinks, CEO, of the Spinx Company, Inc.; and Johnny Williamson, Managing Partner, of Carolina Soya, LLC.

A copy of the full report can be found on the SC Energy Office website at www.energy.sc.gov.

Biomass Energy Utilization in South Carolina

The SCEO has completed a project titled, *Biomass Energy Utilization in South Carolina – Filling the Information Gaps,* which provided additional research needed to maximize South Carolina's biomass energy potential.

The important missing information included data on sewage treatment plants, poultry manure, and yellow grease from food preparation. Additionally, a biomass economic assessment report provided an analysis of potential economic and environmental benefits of biomass energy utilization in South Carolina, therefore giving private and public decision-makers the rationale and motivation needed to make biomass-friendly policy and biomass-friendly investments.

The following studies resulted from the project:

- Bioenergy from Municipal Sludge Report – Determined the amount and locations of potentially recoverable useful energy from sewage treatment facilities in South Carolina, along with an analysis of economics and barriers of recovering and utilizing such energy.
- Poultry Manure as Bio-Fuel Feedstock – Determined the amount and locations of potentially recoverable useful energy from manure and litter at chicken and turkey operations in the South Carolina, along with an analysis of the economics of and barriers to recovering and utilizing such energy.
- An Assessment of Restaurant Oil and Grease Rendering in South Carolina – Determined the amount and locations of potentially recoverable useful energy from yellow grease produced in food service operations in South Carolina, along with an analysis of the economics of and barriers to recovering and utilizing such energy.

- A Cost-Benefit Metrics Framework on South Carolina Biomass Energy Resources – Determined the potential economic and environmental benefits of biomass energy utilization in South Carolina.

To read the full reports please visit the SC Energy Office website and look under "Publications" in the Public Information section.

Biomass Inventories

The SCEO has developed two web-based inventories relevant to biomass energy. One is an inventory of all known users of biomass energy in the state, and the other is an inventory of all known producers of biomass that can be used for energy production. According to these inventories, 55 industrial operations in South Carolina are annually using about 4 million tons of woody biomass for energy purposes. We have also identified 115 producers of waste wood products who can make available annually about 5.5 million tons of woody biomass for energy purposes. Additionally, there are five landfill-gas-to-energy projects with a combined capacity of 25 MW, producing over 183,000 MWH of electricity annually. The inventories can be viewed by going to www.energy.sc.gov and clicking on the Renewable Energy Overview. From there, click on the "Biomass" link.

Biomass Education in South Carolina

Biomass – Lesson Plans on Alternative Fuels

Biomass – Lesson Plans on Alternative Fuels were co-sponsored by the SC Farm Bureau Federation (SCFB) and the SCEO through a grant provided by the US Department of Energy's Special Projects Program.

Each lesson, authored by South Carolina teachers, focuses on biomass. Lesson plans are aligned to the South Carolina Curriculum Standards, and activities and extensive background information are included. Lesson plans were sent to every middle and high school in South Carolina with any combination of grades 7 through 12, as well as to every school district's Science Curriculum Coordinator. SCFB's Ag in the Classroom program offers free grade-specific lesson plans, related materials, and year-round in-service workshops to South Carolina teachers, schools and school districts.

In Conclusion

The SCEO continues to promote the production and use of biomass, and strives to monitor biomass activity in our state. For continued updates of these activities and more, please visit our website at www.energy.sc.gov and visit the Renewable Energy section.

Please help the SCEO keep this brief current. If you have any suggestions or updates to our list of biomass activities in South Carolina, please contact:

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