Biofuels Center of North Carolina

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Information Submitted to Natural and Economic Resources Joint Subcommittee
From W. Steven Burke · President and CEO

1 · Overview

The Biofuels Center of North Carolina was established by the General Assembly in 2007 to implement a 10-year endeavor, *North Carolina's Strategic Plan for Biofuels Leadership*. Mandated by the General Assembly in 2006, the *Plan* sets a economic, strategic, and policy goal for the State:

> *By 2017, 10% of North Carolina's liquid transportation fuels will come from biofuels grown and produced within the State. Up to 600 million gallons will be required to meet this goal.*

Prior to the *Plan* and establishment of the Biofuels Center, North Carolina lacked the commitment, sustained framework, resource capabilities, and national reputation necessary to gain a significant biofuels sector and large corporate investment in production facilities.

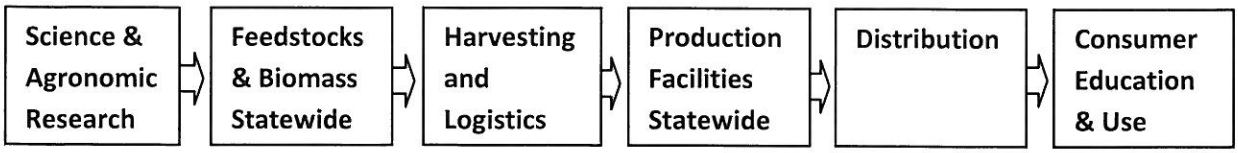
The Center is a private non-profit corporation with recurring funding from the General Assembly. Its work assists and funds the range of parties necessary to meet the 2017 State goal. Its work is shaped by six statewide imperatives:

- North Carolina will not base its biofuels sector on corn or other crops of more value for food.
- An economically *large* new sector can be created statewide, merging agriculture, forestry, technology, production, and distribution.
- The sector will be largely based in rural and agricultural communities often most in need of economic enrichment.
- The biofuels sector will be built on and strengthen North Carolina's largest resource capability: agriculture, both crop- and forestry-based.
- A new technology must be developed and applied to enable conversion of new biomass to fuels.
- Production facilities, some of 50+ million gallons annually, can be positioned statewide, each keyed to regional crop or cellulosic feedstock capabilities.

Few states are as well positioned as North Carolina to gain large biofuels capacity. Agricultural, forestry, and technological strengths are unparalleled. The land can support year-round, sustainable, statewide growth of feedstocks directed regionally to both mid-sized and multi-million gallon production facilities. Production companies nationwide, working with the Center, increasingly show interest in establishment of facilities in coming years.

Creation of an unprecedented new sector statewide is a demanding, long-term, and enormously complicated task.

To move North Carolina to large biofuels capacity by 2017, the Biofuels Center works in a logical and sequential framework – broadly the process of technology and sector development.



Capabilities and resources must be developed – often from scratch – at each stage and simultaneously dovetailed into a cohesive years' long process:

2007

No state plan and few resources.

REQUIREMENTS of a NEW SECTOR

- *New crop and forestry feedstocks*
- *Land and grower commitment*
- *Agronomic and economic verification*
- *New institutional and private capabilities*
- *Companies developed and recruited*
- *Production sites statewide*
- *New technology, investment, and policies*

2017

10% goal met.
Large new sector statewide.

2 · KEY ACCOMPLISHMENTS

Among key Biofuels Center accomplishments and activities to develop a new sector statewide:

Regional Projects Merging New Feedstocks and Production

The project *Eastern Gain: Biofuels Enrich Our Communities, Economy, and Security* brings military bases, state agencies, growers, and communities together in a five-year effort to gain in Eastern NC up to 50 million gallons of jet fuel annually. In partnership with North Carolina's Eastern Region, the project will protect working agricultural lands, strengthen county economies, and serve national military goals.

The project *Biofuels and New Value from Eastern Sprayfields* will trial plant energy grasses in Sampson, Wayne, and Duplin counties. Currently growing low-yield and -value coastal Bermuda grass, the fields can yield 10-20 tons per acre of high-yield and -value energy grasses, supporting multi-million gallon production facilities. The Center is working with companies prepared to locate in the region as a result.

Initial Economic Verification

Business of Biofuels Study · The Center commissioned the Kenan Institute of Private Enterprise at Chapel Hill to develop an IMPLAN study and modeling analyses for economic impact of seven possible production plants statewide, using energy grasses and wood to produce 600 million gallons of biofuels annually. Results verify gain for growers, producers and distributors. Among conservative estimations: 3,318 production jobs, annual wage impact of $131M, and over $1.4B in annual economic output.

Jobs Census · To be completed in March of 2011, the Center has commissioned a study of current and expected biofuels jobs in 128 organizations statewide. Preliminary data from 39% of respondents reveal 361 direct employees – an encouraging sign that biofuels is already yielding jobs sooner than expected from a newly developing sector.

Company Partnerships, Recruitment, and Production Facilities

A large biofuels sector cannot grow without development, support, or recruitment of varied companies – engaged in support, feedstock growing, technology, and production. Some work within the State already; others must be recruited to projects and eventual facilities. Bringing North Carolina's resources to the attention of national production and technology companies is a targeted Center activity; until recently, the state was not seen as a lead place for biofuels development.

For projects, data analysis, growing, site evaluation, or production facility establishment the Center works with: Clean Burn Fuels, Chemtex International, DuPont, DuPont Danisco Cellulosic Ethanol, ThermoChem Recovery International, Novozymes, Syngenta, GrassRoots Biotechnology, Mendel Biotechnology, Mendel Bioenergy Seeds, Agrivida, Domtar, Weyerhaeuser, ArborGen, HCL CleanTech, Rentech Inc., Catchlight Energy, IDEA Engineering, Piedmont Biofuels, Triangle Biofuels, Blue Ridge Biofuels, Alganomics, Paradigm Bioaviation, Coskata, Enerkem, Murphy-Brown, Prestage Farms, Goldsboro Milling, and the North Carolina Pork Council.

Among these, some prove already significant. HCL CleanTech, based in Israel, chose NC as US headquarters for very promising technology; its work with Domtar in Plymouth can increase jobs and return from the facility. Clean Burn Fuels in 2010 opened in Hoke County a 66M gallon per year ethanol plant, the nation's newest and only large facility east of the Mississippi. Chemtex International seeks to locate in Eastern North Carolina a 40M gallon per year facility to convert cellulosic materials to fuels; the Center is working with regional partnerships and the Department of Commerce to meet company needs.

Feedstocks and Biomass: Trial Growing and Data:

Data must be gained about growing and economic return of feedstocks to ensure appropriate crops in different regions and commitment by farmers and landowners. Working with partners and research stations, the Center is growing and studying a remarkable range of crops and trees with promise across North Carolina:

Counties with crop growing projects: Duplin, Granville, Henderson, Johnston, Lenoir, Montgomery, Rockingham, Rowan, Sampson, Washington, Wayne.

Counties with tree growing projects: Duplin, Granville.

Agricultural crops considered for biofuel production, grown and studied with partners: miscanthus, switchgrass, and arundo donax energy grasses; forage, grain, and sweet sorghum; soybeans, sugar beets, industrial sweet potatoes, canola, coastal bermuda grass, tropical sugar beets, and duckweed.

Trees considered for biofuel production, grown and studied with partners: eastern and western cottonwood; loblolly pine.

Growing project partners: North Carolina State University, NC Department of Agriculture, Solar Center, Barham Farms, Weyerhaeuser, Prestage Farms, Murphy-Brown, Goldsboro Milling, Arborgen, GrassRoots Biotechnology, Mendel Biotechnology, Greenwood Resources.

Strengthening Capabilities Statewide

- *2008-2009*: 31 grants and two loans totaling $5,298,218 were awarded.
- *2010:* No grants made, due to unavailability of state funds constrained by federal programs.
- *2011:* 12-14 grants totaling $1,608,506 will be awarded in March.

Funding has addressed: growing and evaluation of feedstocks, including duckweed, industrial sweet potatoes, energy grasses, and sweet sorghum; biodiesel production; feedstock breakdown process technology; regional and civic capabilities; education and training; and company technology. 2011 funding will target production site analyses with regional partnerships, production technology, and growing of energy grasses.

Development of North Carolina's Biofuels Campus, Oxford

The Center is located on a former federal tobacco research station turned over to the NC Department of Agriculture and Consumer Services. With the NCDA, the Center is developing a 10-year Master Plan for the 426-acre site. Nationally unique, it will yield a strong competitive resource for trial growing, pilot production, public education, and company location. Two companies, including HCL CleanTech, are located in the Business Incubator.

Public Education and Consumer Use

The public must be educated about and actively purchase NC-produced biofuels. Among communicational activities: three websites, targeting the Center, public information, and industry information; the newsletter *Biofuels Headline*; varied materials for information and branding; meetings and trade shows. The Advancing Public Education project, funded by the US Department of Energy, places 30-second public spots on television statewide 3,184 times from January until mid-March.

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