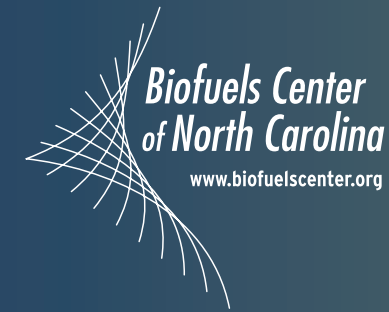


The Business of Biofuels, initially funded by the Golden LEAF Foundation as the "Strategic Crops Initiative," is a collaborative project led by the Biofuels Center of North Carolina. In partnership with the University of North Carolina's Kenan Institute and North Carolina State University, the project generated financial models for landowners/feedstock providers, biofuels producers, and retail distributors. The data from realistic agricultural and biofuels production models were used to assess the aggregate economic impact of 600,000,000 gallons of North Carolina biofuels production per annum. This is an executive summary of the economic impact analysis. The full report can be obtained at www.biofuelscenter.org.



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The **Biofuels Center of North Carolina** is a private, non-profit corporation headquartered on the 426-acre North Carolina Biofuels Campus in Oxford with the North Carolina Department of Agriculture and Consumer Services. The Center receives continuing funding from the General Assembly to implement **North Carolina's Strategic Plan for Biofuels Leadership** and to help make the state more energy independent.

The **Frank Hawkins Kenan Institute of Private Enterprise**, founded in 1985, pursues cutting-edge programming and research in the areas of entrepreneurship, economic development, and global competitiveness. The Institute's economic development program provides research and program outreach activities globally with a specific focus on Eastern North Carolina. Its mission is to enhance economic development activities in targeted areas. The Center for Competitive Economies (C3E) is part of the Institute and UNC's Kenan-Flagler Business School. The center brings the considerable resources of the University to help communities in North Carolina, the United States and beyond to address critical challenges of competitiveness and economic development.

The Business of Biofuels

This project, initially funded as the "Strategic Crops Initiative," received support from the Golden LEAF Foundation.



Economic Impact Analysis of Biofuels Production in North Carolina Executive Summary

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The Biofuels Center of North Carolina

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EXECUTIVE SUMMARY

THE BIOFUELS CENTER OF NORTH CAROLINA IS LEADING A STATEWIDE EFFORT TO DEVELOP A NEW ECONOMIC SECTOR—alternative transportation fuels derived from biomass and energy crops—to reduce dependence on imported petroleum fuels. The goal of North Carolina’s *Strategic Plan* is to produce 600 million gallons per year (MGY) of biofuels to offset 10% of the state’s liquid transportation fuels. Developing this new sector from locally-grown biomass promises to deliver thousands of new jobs to North Carolinians and increase the profitability of crop and forest land across the state. North Carolina is well positioned to gain a significant competitive advantage in the emerging alternative fuels market.

The Biofuels Center, in collaboration with the Center for Competitive Economies (C3E) and the Kenan Institute of Private Enterprise, presents an analysis that estimates the total economic impact of building and operating as many as seven biofuels processing plants to achieve the 600 MGY goal.

METHODOLOGY

This analysis estimates impacts of construction and full operations in 2010 dollars, and is useful for short-term projections. C3E calculated the estimated direct, indirect, and induced impacts of the construction and full operation for each of the seven proposed plants using IMPLAN (Impact Analysis for PLANners) professional software. IMPLAN is an input-output modeling program that permits researchers to estimate the projected effects of an exogenous increase in demand that results from new economic activity in a region. These types of analyses assume that any new spending resulting from the new economic activity in the region would not have otherwise occurred.

- **Direct impacts** are the changes in spending in a given industry that result from the increase in final demand for the products of that industry. The direct impact includes individuals that work at the biofuels plants and logging operations.
- **Indirect impacts** include the impact created by inter-industry spending. For example, **Figure 1** shows the economic relationship between the biofuels plants and its vendors.
- **Induced impacts** are the increases in spending by household consumers resulting from increases in income and population due to the new direct and indirect economic activity.
- **The total economic impact** of each plant is found by adding the direct, indirect, and induced effects.

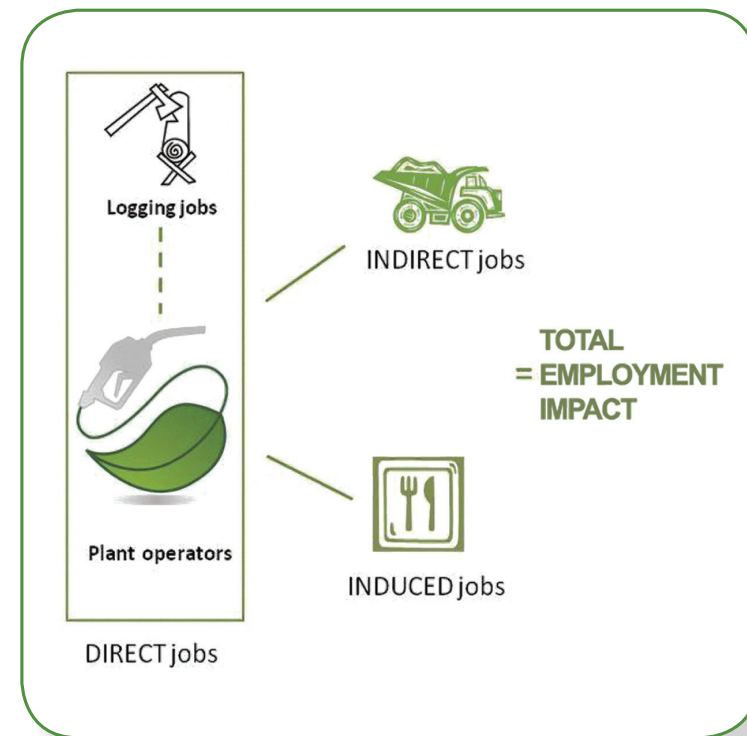


Figure 1

AGGREGATE RESULTS

Prospective locations for biofuels facilities were strategically selected by the Biofuels Center based on certain market-based criteria, including: adequate nearby feedstocks; proximity to terminals for fuel blending; and limited competition for existing wood stock from pulp, paper, and other private industries.

The proposed plants include:

- Four 110 MGY woody biomass-based bio-gasoline plants in Franklin, McDowell, Sampson, and Wilkes counties.
- One 50 MGY switchgrass-based ethanol plant in Anson County.
- One 50 MGY miscanthus-based ethanol plant in Randolph County; and
- One 50 MGY woody biomass-based ethanol plant in Bertie County.

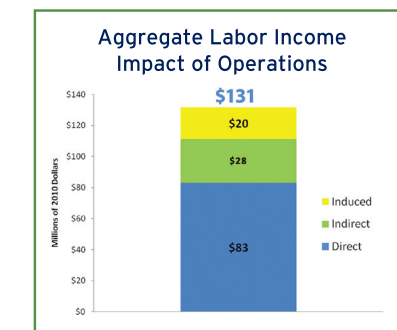
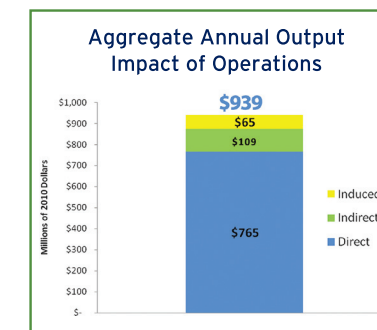
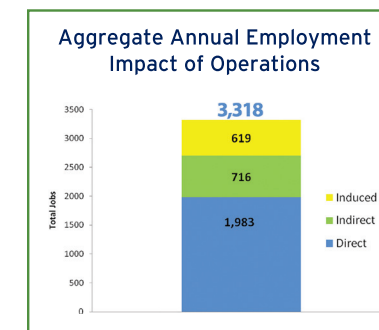
MGY: Million of gallons per year

The map in **Figure 2** illustrates the plant locations and the total job impacts estimated at each site.

The models provide a picture of the regional economic impact of building and operating these seven plants. C3E’s modeling results include employment figures, labor income (annual wages), and output (the value of increased production in one year).

The aggregate results on an annual basis are as follows:

- The estimated total new job creation to operate all of the sites is **3,318 jobs**.
- The estimated total new annual output of the seven plants combined is **\$939,968,875**.
- The estimated total annual wage impact of all seven plants is **\$131,677,909**.
- The estimated total job creation during the construction phase of the seven plants is **2,447 jobs**.
- The average annual income per employee is estimated at **\$39,700**.



CONCLUSIONS

The estimates provided represent the likely, yet conservative, estimation of the economic impact of seven biofuels facilities located in North Carolina producing 600 MGY. These facilities have the potential for economic development benefits beyond those modeled in the study. The study did not model the potential economic impact of, for example, fuel blenders and gasoline retailers purchasing from the new biofuels plants.

If all seven facilities proposed in this model are constructed, an “industry cluster” could form in the state due to the biofuels facilities and their associated demand for machinery suppliers and services. Clusters increase positive, economy-wide impacts by drawing external suppliers to North Carolina. C3E’s models conservatively assume that specialized equipment supplying these facilities would initially be purchased outside the study region. Broader purchasing from local suppliers, such as these specialized machinery purchases, would be part of an “agglomeration effect”; however, the cluster effect was not within the scope of the modeling conducted here. The Biofuels Center is positioning North Carolina as a potential industry leader in energy grasses and woody biomass fuel production based on existing agricultural advantages.

The location of these biofuels activities is important. They will likely occur in rural North Carolina counties that have suffered disproportionately from the loss of higher-paying, lower-skilled manufacturing jobs. The creation of over 3,000 jobs paying higher-than-average annual wage rates could have transformative effects on the state’s rural communities—even beyond those easily captured in economic modeling.

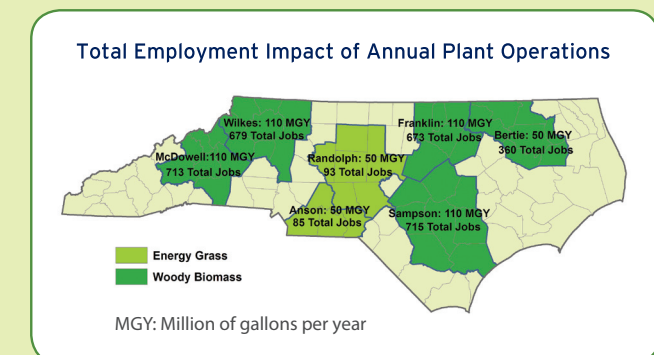


Figure 2