

# “What keeps you up at night?”

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## Biofuels and Pennsylvania

By Joel R. Burcat

Transesterification? Use of sugar, starch, cellulose and algae (!) as energy sources? Turning solid waste into energy? This is not science fiction. This is today's emerging world of biofuels, and Pennsylvania is uniquely situated to become a leader in this low-carbon technology.

### WHAT ARE BIOFUELS?

Biofuels are made from biomass which, in essence, is any recently-living plant material. Biofuels are desirable in today's market due to their low environmental footprint compared to fossil fuels (coal, petroleum, natural gas). There are three main types of biofuels today that are referred to generally as the “first-generation” biofuels: Biodiesel: Biodiesel is made from the chemical transformation (transesterification) of oils. The oils are mixed with ethanol or methanol to generate the fuel. Bioalcohols: Ethanol currently is the most common biofuel. Bioalcohols are made using microorganisms to ferment sugars, starches and cellulose. Biogas: Biogas is derived from the anaerobic digestion of organic material. A common example is landfill gas.

Biofuels also include solid biomass, also known as the combustion of waste wood, sawdust, lawnclippings. In addition, bioethers are used as octane enhancers. Thanks to ongoing biotech research, the industry will see future growth in the so-called “second generation” biofuels, which are biofuels derived from nonfood crops and from algae.

### THE DEMAND FOR BIOFUELS

The biofuels industry is growing and Pennsylvania has room to expand into this rapidly growing field. As of 2008, 176 biofuel production plants were operating in the United States. As of January 2009, Pennsylvania had eight operating biofuel production plants. Of those, five are in Central Pennsylvania – York, Middletown, White Deer, Shiremanstown, and New Oxford. Other biofuel plants in Pennsylvania are in development.

The increasing demand for biofuels is attributable to a national movement to reduce greenhouse gases and become less independent on foreign energy.

Pennsylvania has two laws that promote the development of biofuels. The Alternative Energy Portfolio Standard, enacted in 2004, requires that Pennsylvania's electricity producers provide

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18 percent of their electricity from alternative sources by 2020. Of that amount, 8 percent must come from a combination of biomass, wind, solar, coalmine methane, small hydropower projects, and geothermal sources. This type of law is commonly known as a “renewable portfolio standard” or “RPS.”

In addition to a renewable portfolio standard, in June 2008, Pennsylvania passed the Biofuel and In-State Production Act, which requires increasing biodiesel content in diesel fuels that are sold in Pennsylvania. As the amount of biodiesel and ethanol produced in the state increases over time, the percentage of biodiesel content also must increase, starting with 2 percent biodiesel content when in-state biodiesel production reaches 40 million gallons, and reaching 20 percent content once production reaches 400 million gallons. Pennsylvania reached the first threshold in the summer of 2008. Thus, by the end of 2009, all diesel fuel sold in Pennsylvania must have 2 percent biodiesel content.

The demand for biofuels goes well beyond Pennsylvania. Today, 28 states (including all of the Northeastern states) have renewable portfolio standard laws on the books. Other states have set goals for increased usage of renewable energy. The federal government has not yet enacted a renewable portfolio standard law, but one may be coming soon. In February 2009, U.S. Rep Todd Platts (R-Pa.) co-sponsored a bill that would require 25 percent of electricity from renewable sources (including biomass) by 2025. It is too early to tell whether there is momentum behind such a federal RPS bill.

## THE FUTURE OF BIOFUELS

There has been criticism that the increasing global demand for biofuels has lead to reductions in the global food supply, increased food costs and inefficient production methods. Biotechnology firms should see opportunities for growth as they will lead research and development in technologies to increase crop yields, enhance the efficiency of fermentation techniques, and develop efficient “second-generation” biofuels.

To support development of biofuels, Pennsylvania will provide up to \$5.3 million annually through 2011 in grants under the Alternative Fuels Incentive Grant Program. Grants are available to entities that produce and sell at least 25,000 gallons/month of

biomass-derived diesel for transportation or home heating. In addition, Pennsylvania will provide up to \$7.2 million in grants to nonprofit organizations, counties, municipalities, schools, colleges, and watershed groups for alternative energy projects (including biogas and biomass) under the Energy Harvest program. While private businesses are not eligible for grants, some businesses may be indirectly eligible for grant money through sponsors.

Pennsylvania provides other support for the biofuels industry. The Penn State University College of Agricultural Sciences supports focused biomass energy research at its Biomass Energy Center. The College also operates Steel City Biofuels, a program that promotes public awareness, research and marketing of biofuels. The Penn State Cooperative Extension supports research and deployment of biofuels technologies. In addition, Pennsylvania is home to the U.S. Department of Agriculture’s Eastern Regional Research Center (Wyndmoor, PA), where USDA researchers team with biotechnology firms in cutting-edge biofuels research. Universities and colleges throughout Pennsylvania provide a steady-stream of highly-skilled workers for the biofuels industry.

## CONCLUSION

Pennsylvania is establishing itself as a leader in biofuels research, development and production. The state has demonstrated a commitment to support the growth of the biofuels industry. In addition to support from the state and private biotechnology firms, Pennsylvania’s biofuel industry may also stand to benefit from monies available from the American Recovery and Reinvestment Act of 2009 (the economic stimulus law).

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