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A New Energy for the Future?

*by Lisa Novins**

The United States consumes over twenty million barrels of petroleum products each day, over half of which is imported.[1] Oil consumption is currently center stage in the national debate over how to address our oil addiction. Since almost half of our petroleum is used for automobiles, changing the way we power our cars is essential to any solution. A sustainable answer must combine vehicle efficiency, technological innovation, and clean renewable fuels.

One promising alternative to petroleum for gasoline is cellulosic ethanol made from switchgrass. Cellulosic ethanol is the same final product as corn or starch ethanol but made through another process from different raw materials.[2] These differences result in a product that replaces more renewable energy than corn ethanol with a more favorable energy balance.[3,4] In addition, using switchgrass also reduces both greenhouse gas emissions and fossil fuel use because a primary co-product of cellulosic ethanol production is lignin which is similar to coal and can be used to power cellulosic ethanol plants.[5,6]

Switchgrass is a fast-growing, cellulose rich, hardy grass native to the mid-western United States.[7] As an energy crop switchgrass offers many potential benefits because it thrives within our existing infrastructure.[8] First, switchgrass shows great promise for improving its yields in part because it is well-adapted to our climate and soils.[9] Second, switchgrass grows well, up to ten feet high in a single growing season.[10] Third, switchgrass does not require the extensive fertilizers and other chemicals that many traditional crops, such as corn, need.[11] Thus, switchgrass offers energy, environmental, and agricultural benefits over traditional crops.

As a result of its biological characteristics, switchgrass also offers additional benefits over other traditional energy crops. First, its robust root system can help prevent erosion and act as a filter for runoff from other crops, thus preventing water pollution.[12] Second, switchgrass has a superior ability to sequester carbon in the soil which has very positive implications for its carbon lifecycle.[13] Third, switchgrass absorbs nitrogen more effectively than corn and other crops.[14] Finally, using switchgrass will likely decrease coal, natural gas, and other fossil fuel consumption.[15]

The Energy Policy Act of 2005 included several provisions promoting increased ethanol use such as a $0.51 tax credit per gallon of ethanol used as motor fuel and a mandate for up to 7.5 billion gallons of renewable fuel to be used in gasoline by 2012.[16] Before those provisions can be implemented more research studying the environmental impacts of switchgrass must be done including: air pollution, energy efficiency, and viability of commercial cellulosic ethanol production. In addition, other types of ethanol should not be ruled out since their commercial viability is currently more advanced and their energy benefit might increase when manufactured in conjunction with cellulosic.[17] Overall, switchgrass promises to be an extremely viable energy crop that can help the United States reduce its fossil fuel consumption with a renewable biofuel that can be grown within its existing agricultural infrastructure.

Endnotes:

1 Energy Info. Admin., Where Does My Gasoline Come From?, http://www.eia.doe.gov/neic/brochure/gas04/gasoline.htm (last visited Mar. 2, 2007).

2 Environmental Science & Technology Online News, *How Green is Ethanol as a Renewable Fuel?* (Feb. 8, 2006), *available at* http://pubs.acs.org/subscribe/journals/esthag-w/2006/feb/policy/kc_ethanol.html (last visited Mar. 2, 2007).

3 Environmental Science & Technology Online News, *id.*

4 Roel Hammerschlag, *Ethanol's Energy Return on Investment: A Survey of the Literature 1990-Present*, 40 Environ. Sci. Tech. 1744 (2006).

5 Alexander E. Farrell et al., *Ethanol Can Contribute to Energy and Environmental Goals*, 311 SCI. 506, 506-07 (2006).

6 Environmental Science & Technology Online News, *supra* note 2.

7 Bioenergy Feedstock Information Network, Biofuels from Switchgrass: Greener Energy Pastures, http://bioenergy.ornl.gov/papers/misc/switgrs.html (last visited Mar. 2, 2007) [hereinafter Bioenergy Feedstock].

8 Natural Resources Defense Council, *Growing Energy: How Biofuels Can Help End America's Oil Dependence* (Dec. 2004), *available at* http://www.nrdc.org/air/energy/biofuels/biofuels.pdf (last visited Mar. 2, 2007).

9 Bioenergy Feedstock, *supra* note 7.

10 Bioenergy Feedstock, *supra* note 7.

11 Natural Resources Defense Council, *supra* note 8.

12 Bioenergy Feedstock, *supra* note 7.

13 Natural Resources Defense Council, *supra* note 8.

14 Natural Resources Defense Council, *supra* note 8.

15 Farrell et al., *supra* note 5, at 507.

16 Energy Policy Act of 2005, 42 U.S.C. § 15801.

17 Hammerschlag, *supra* note 4.

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