Appendix F – SEP Fact Sheet

Sustainable Energy Parks
on Former Surface Mined Land in Appalachia

Researchers at West Virginia University are assisting Appalachian communities in West Virginia realize the potential for turning former surface mined lands into sites where biofuels can be grown, wind turbines and solar panels installed providing alternative energy sources, economic development and new jobs.

Project Description

West Virginia University received a Training, Research, and Technical Assistance Grant from the USEPA to construct a framework for developing Sustainable Energy Park (SEP) opportunities on former surface mined land in Appalachia. Citizens of Appalachia have historically borne the human health and environmental cost of extracting the region's natural resources without receiving equitable return to repair the scars left from coal mining.

This project provides a catalyst to foster a companion "green" energy industry to coal in Appalachia. The result will be an environmentally and economically sustainable reuse of brownfields. SEP's have the potential to generate local economic growth, decrease or offset greenhouse gases through carbon sequestration, promote renewable energy technologies, and create a replicable model for communities nationwide to apply to former surface mined land.

Former surface mined land could provide the large acreages necessary to establish solar power generating arrays.

Paul Ziemkiewicz, Ph.D., WV Water Research Institute Director, examines a test plot of switchgrass on a former surface mine.

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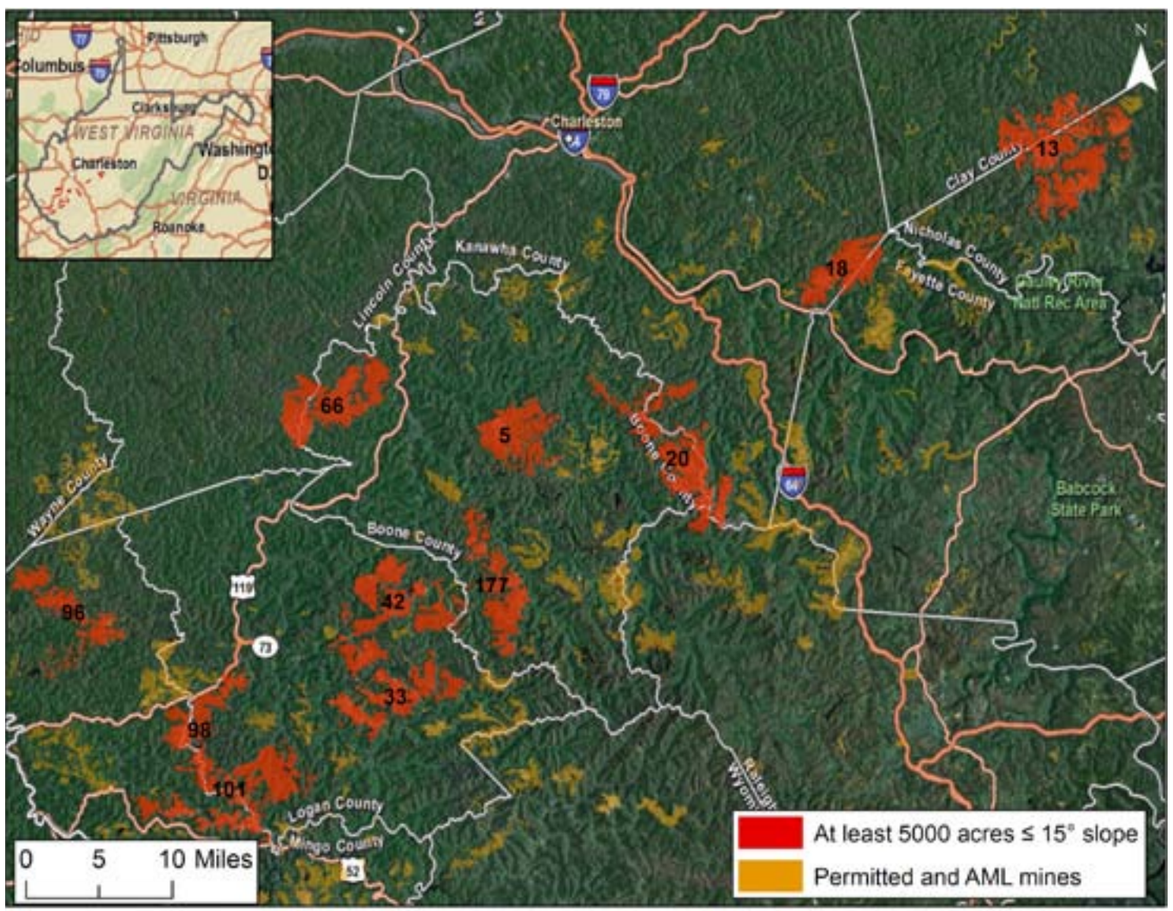
Project Activities

An inventory of former surface mined land throughout West Virginia is being created which, when blended with assessment data and community engagement, will produce a portfolio of lands that are positioned as viable biofuels and other types of alternative energy production areas. Using criteria to determine which of these lands are suitable for SEP's, a prioritization tool has been developed to classify sites, perform site assessments, and engage and educate communities on the potential for redeveloping mined lands into SEPs.

One site will be selected for a feasibility study for reusing mined lands. This will be accomplished through a request for proposals to be released in the fall of 2011. The community selected will receive a Comprehensive Development Plan for a SEP, which in turn will be showcased as a pilot SEP project. The pilot project showcase and reports documenting the project can be used as a framework for other communities in Appalachia that are pursuing the redevelopment of former surface mined land.

Conceptual drawings and 3D maps have been created and are available for use in community meetings and planning workshops to educate communities about renewable energy projects on former surface mined land.



Sites in southern West Virginia with high potential as Sustainable Energy Parks based on physical characteristics.

Results or Benefits Expected

This project will have positive outcomes by benefitting the environment and the human condition through the development of a framework in which former surface mined land may be used for SEPs. These benefits also address several areas of the US EPA's strategic plan as well as strategic objectives for energy development of the Appalachian Regional Commission which include:

- identifying alternative energy sources such as biomass, solar, wind, and geothermal power for implementation on these abandoned mine lands.
- providing new economic opportunities and jobs for landowners and citizens adjacent to these mined lands.
- a reduction in sediment and mine drainage due to the substantial root system of switchgrass reducing the cost of water treatment.
- measurable carbon sequestration.
- reduced greenhouse gas emissions.
- brownfields sites redeveloped and revitalized.
- energy efficiency increased.
- tying the State economy to the regional/national 'green'economy by reusing mine lands for green energy production.
- serving the population by creating jobs to develop and sustain the SEP.
- providing an economic base for other ancillary green energy businesses and services.
- increasing the market and availability of green energy.
- reducing the use of greenfield sites for energy production.
- providing the potential to change the economic and environmentally degraded landscape of small communities over a large region.

Project researcher, Rick Herd, examines an established switchgrass plot at a former surface mine site in southern West Virginia.

Alternative Energy

Reclaimed mine sites are ideal for alternative energy production, such as solar, wind and biofuels, because they are generally far enough away from population centers not to be a nuisance and the land has already been disturbed by mining activity, thus minimizing habitat destruction. In addition, the sites are often linked by roads, railroads, and electric transmission lines.

Biomass Energy

Biomass energy is generated from organic feedstocks. Sources of feedstock include wood, food crops, grassy and woody plants, residues from agriculture or forestry and the organic component of municipal and industrial wastes. These feedstocks can be used as a solid fuel, or converted into liquid or gaseous forms, for the production of electric power, heat, chemicals or fuels.

Why Switchgrass?

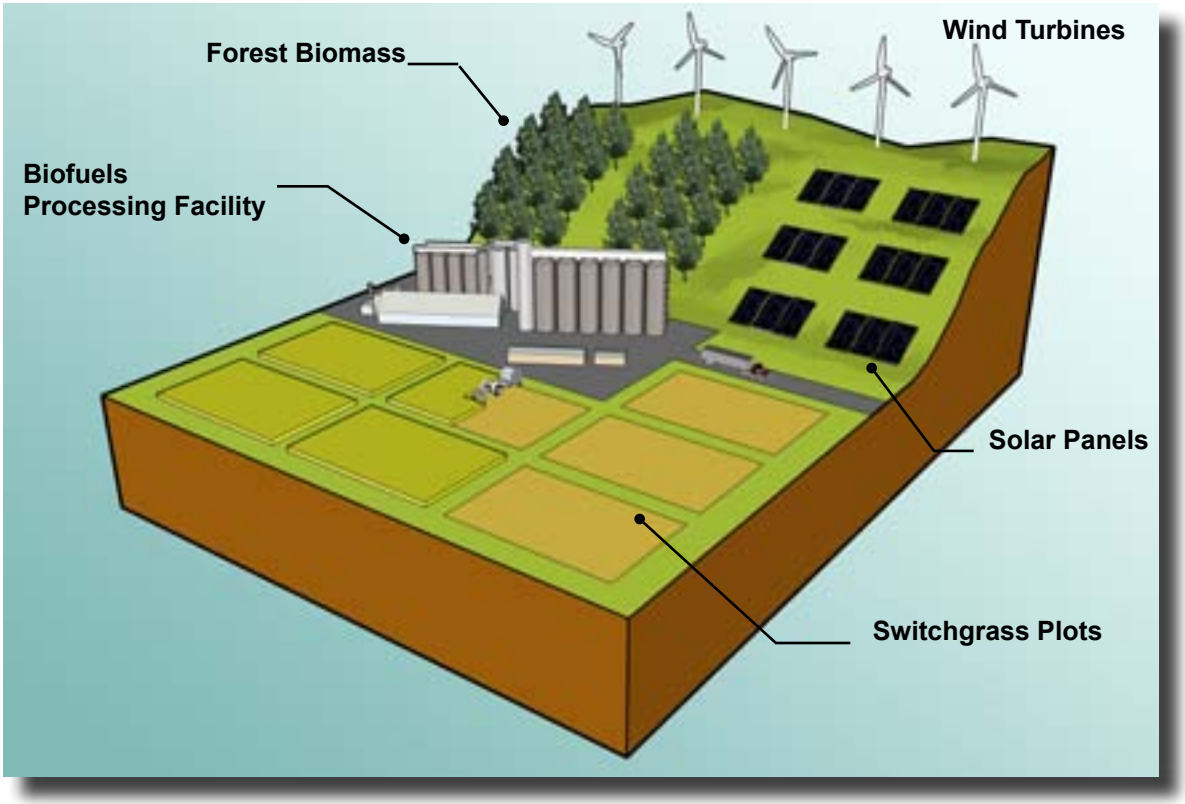
Switchgrass production on former surface mined land in West Virginia is a good choice because of proximity to major markets, abundant water supplies for ethanol processing, abundant rainfall and a long, warm growing season, the conditions where switchgrass grows best. Large contiguous fields, which former surface mined land provide, with local processors are attractive and efficient. Switchgrass offers high yields and nutrient use efficiency. It is a perennial, supports multiple harvest schedules every year, and can be grown in virtually every state east of the Rocky Mountains with no irrigation required. Switchgrass captures carbon from the air and sequesters it into the soil as its deep root systems grow. Switchgrass can be pelletized and burned directly, or converted to ethanol. Switchgrass ethanol returns 5.5 times more energy than is input into the process. It is established using conventional planting techniques and harvested with common farm equipment. Switchgrass produces more biomass than other grasses, and enhances wildlife habitat for species such as deer, turkey, small mammals and songbirds.

Wind Energy

Wind energy is captured by wind turbines with propeller-like blades mounted on a tower. The force of the wind causes the rotor to spin and the turning shaft spins a turbine to generate electricity. Wind technology is scalable; based on site conditions, different turbine designs can be used to meet different electricity needs. Utility scale projects use large turbines at the megawatt (MW) or multi-MW scale on sites with the greatest wind resource and acreage availability. Electricity generated is typically exported to the grid.

Solar Energy

Solar power converts sunlight into electricity. Utility-scale solar energy projects require access to large, open sites. The size of many of the former surface mined land in Appalachia would allow for large solar arrays to be developed at a single property.



For More Information

West Virginia Water Research Institute staff are available to meet with regional development authorities and communities to further explain how SEPs can enhance economic potential through local revenue and jobs. If you are interested in learning more about how a Sustainable Energy Park can increase revenue and jobs in your community, contact:

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The Northern WV Brownfields Assistance Center is a program of the West Virginia Water Research Institute. Founded in 1967 WVWRI is the premier water research center in West Virginia serving as a statewide vehicle for performing research related to water issues.

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