Renewable Energy and Agriculture Demonstration Projects on Surface Mine Lands – 2010 to Present

2015 Governor’s Energy Summit
West Virginia: A National Energy Resource

October 27, 2015

PRESENTED BY MARSHALL UNIVERSITY CENTER FOR ENVIRONMENTAL, GEOTECHNICAL AND APPLIED SCIENCES (CEGAS)
Project Funding Details (Two funding cycles)

Appalachian Regional Commission - $650,000
West Virginia Division of Energy - $250,000
Matching Grant Cost Share - $425,000

Three Main Initiatives:

1. Wind Energy Resource Studies on Surface Mine Land Properties
   - conducted by Marshall University’s Center for Environmental, Geotechnical, and Applied Sciences (CEGAS),
     with assistance from Marshall University’s Center for Business and Economic Research

2. Renewable Energy and Agriculture-based Sub-grants on Surface Mine Land Properties
   - Projects administered by CEGAS, in conjunction with the WV Brownfields Assistance Center at Marshall University

3. Surface Mine Land Property Evaluations for New Use
   - Performed in conjunction with the WV Brownfields Assistance Center at Marshall University
Approximately 400,000 acres
Covers ~2.6% of total land area of the State

Blue = Surface Mine Lands (from WVDEP mining databases)
Initiative 1

*Wind Energy Resource Studies on Surface Mine Lands*

Sonic Detection and Ranging (SODAR) Equipment used for studies

Locations identified for evaluation based on elevation, available wind data (AWS Truepower), and landowner interest/participation

8 locations analyzed for wind energy production potential (7 complete, 1 current)
SODAR measures wind speed and wind direction from 40 to ~200 meters above the ground surface.

*Note*: SODAR study compared to meteorological tower show >98% correlation factor.

Studies performed in Mingo, Wyoming, Kanawha, Raleigh, Fayette, Webster and Grant counties. Collected data was loaded into Windographer™ software for analysis, using small, medium and large-scale wind turbines for potential energy output.

*Towers >60 meters require FAA permitting.*
Results

- Grant County sites have excellent wind resource potential
- Webster, Kanawha, Raleigh, Fayette sites are marginal
- Mingo and Wyoming sites have poor wind resource potential

(Reports are available on the WVDOE website)
Initiative 2

Renewable Energy and Agriculture Demonstration Sub-grants

Projects must be located on former or current surface mine land in West Virginia

14 projects total (8 complete, 6 current)
- Demonstration projects include 3 solar, 1 micro-hydro, 6 tree/grass biomass-biofuel, 2 agriculture, and 1 combined solar/agriculture

Project Partners (project grantees, landowners, and direct project support):
West Virginia State University, McDowell County EDA, Arch Coal, Randolph County EDA, Appalachian Hardwood Center, Webster County EDA, Plum Creek Timber Company, WVU Research Corporation, McDowell County Schools, Regency Gas / PVR Partners, Monongalia County Schools, Morris Creek Watershed Association, WV Brownfields Assistance Center at Marshall University, Prichard Mining, WV National Guard, Williamson Health and Wellness Center, Ming County Redevelopment Authority, Central Appalachian Empowerment Zone, Natural Resource Partners, Consolidated Coal, WVDEP-Division of Land Restoration, WV Department of Agriculture, U.S. Department of Agriculture, and multiple private contractors.
Soil ripping prior to tree planting (Bolair site, Webster County)

Miscanthus planting (McDowell County EDA property)
Planting tree seedlings
Randolph County biomass site

Weed spraying application around tree seedlings - Plum Creek biomass site
AMD Treatment, Buffalo Coal, Grant County

System operated by WVDEP

Installing solar panels/battery power storage pack for off-grid power use
Micro-hydro turbine
Morris Creek Watershed

Uses water discharge from former deep mine for power source

1.3kW unit for demonstration, education and Morris Creek Watershed Association use
WV Turnpike Tunnel site, location of high tunnel with solar panels (currently under construction) for aeroponic towers, under direction of WV State University - Extension Service

ARC / WVDOE funds being used for solar panels and battery bank for off-grid power use (low-flow pumps and lighting)
Re-introduction of the Golden Delicious Apple Tree in Clay County, conducted by Central Appalachian Empowerment Zone, in partnership with Consolidated Coal and Natural Resource Partners (plantings to occur in 2016)
Veteran Agriculture project involving Growing Warriors for locally grown produce (being conducted by Williamson Wellness Center)
Initiative 3

Surface Mine Land Property Evaluations for New Use

Some surface mine lands have infrastructure components that could be utilized for new use.

Based on specific site features, new business, industry, housing, agriculture and/or recreational opportunities may exist.

Sites are reviewed based on location, infrastructure, land owner interests, reclamation status and associated positive features.

Property marketing packages are compiled for use by the land owner(s), WV Division of Energy, WV Brownfields Assistance Center, and/or local EDA’s (7 packages compiled to date; others pending)
Recent Site Evaluations Include Deep Mine Pools Associated with Surface Mine Lands

*Example: Twin Branch Site*

**Surface Owner:**
Mingo County Redevelopment Authority
Contact: Leasha Johnson
304/235-0042

**Site Comments:**
- Water and Sewer on-site.
- Active Redevelopment Interest.
- Large mine pool (Island Creek No. 27 mine) beneath; may have some iron problems, but historically used by a small PSD

*(surface mine and deep mine pool information compiled from WV Geological & Economic Survey and WVDEP datasets).*
Deep Mine Pools Associated with Surface Mine Lands Research

Mingo County Redevelopment Authority interested in using site for future agriculture-related developments
THANKS