

Healing Our Land, Growing Our Future

Innovative Mine Reclamation in Southwest Virginia



A collaborative project from:

Downstream
Strategies

 **AppalachianVoices**
Protecting the Central and Southern Appalachian Mountain Region

COAL
MINing
Engineering
Services LLC

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FOREWORD

Central Appalachia is in the midst of unprecedented economic and social change. As a region, we are compelled by the downturn of the coal industry to diversify our local and regional economies. Most observers, including coalfield leaders, now agree that such diversification efforts are long overdue. It is time to take action, not just to replace lost mining jobs, but to create a healthier, more resilient economy that promotes greater prosperity and preserves our region's rich cultural heritage and vital ecosystems. This is more possible than it once seemed, as the current state of uncertainty has led to a never-before seen spirit of collaboration and creative endeavor that is built on the recognition of the fact that we're all in this together. There's a window of opportunity to set a new course for our region, but we must be open-minded and act fast to seize it.



This report is the result of a highly collaborative process that began in late 2015 as Appalachian Voices was considering strategic ways to support the proposed legislation that would later be introduced into Congress as the RECLAIM Act. As we discussed the concept of using Abandoned Mine Land funding specifically for economic development projects with elected officials, agencies, and other nonprofits, it became evident that there was a critical need for a clear justification of such funding. When viewed through the perspective of the growing Just Economic Transition movement, we felt there was also a need to develop a list of projects that align with our common values of environmental stewardship, renewable energy development, sustainable job creation, and creative approaches to the future of the Central Appalachian economy.

This analysis falls at the strategic intersection of Appalachian Voices' work to restore former coal mine lands, cultivate sustainable economic opportunities in the region—including in the renewable energy sector—and involve a diversity of people in solving the region's problems through community outreach and inclusion. It is also grounded in the principals of Just Economic Transition, an emerging concept that promotes the idea that a new economy must be rooted in equitable development that not only honors the past but also creates a sustainable future for generations to come.

As the project leader, it has been a distinct privilege to work with the team that put this study together and I'm very proud of the collaborative process that led us to this point. It isn't every day that a career mining engineer teams up with an environmental advocacy group and an economic analysis firm to put forward a new vision for the future. It's my sincere hope that this study, and that spirit of collaboration, can serve as a model for work to come.



Adam Wells
Economic Diversification Program Coordinator
Appalachian Voices

Introduction



The RECLAIM Act, a bill introduced to the U.S. House of Representatives in February 2016 by Congressman Hal Rogers (R-KY) and authored by a bipartisan group of coal-state legislators, is a bold initiative to reinvigorate coalfield economies by reclaiming and repurposing abandoned mine lands. The legislation would release \$1 billion over five years from the Abandoned Mine Land Reclamation Fund that will act as a catalyst for the reinvention of coalfield communities. Appalachian Voices and its partners, recognizing the tremendous potential of an injection of capital at this scale, seeks to empower communities, organizations, and other economic actors in Southwest Virginia and beyond to fully leverage RECLAIM funding.

This document profiles fourteen economic development projects on or adjacent to former mine sites in far Southwest Virginia that stand to benefit from RECLAIM monies. Reflecting a conscious effort to diversify the economy, these projects cover a wide variety of industry sectors including renewable energy, agriculture and agro-forestry, recreation and ecotourism, and brick-and-mortar commercial/industrial development. Some of these projects are quite advanced in their development—partners have been identified, plans and studies have been completed—but others are more conceptual and, while resting on a solid foundation, will require hands-on coordination if they are to be realistically implemented.

Because of the evolving nature of many of these proposals, it is difficult to project exact costs for both cleanup and development. We have provided estimates wherever possible,

though in some cases it is simply too early to make meaningful projections. Nonetheless, the projects profiled in this study are estimated to represent well over \$16 million in cleanup costs and \$52.7 million in construction investments.

Each of these projects represents concrete steps toward a positive, locally based strategy to transition Southwest Virginia's economy. The stakeholders identified by this assessment are residents of the region who are committed to these projects not just as economic actors and drivers, but as dedicated community members.

The selection of these sites was completed by the project team: Appalachian Voices staff, Coal Mining Engineering Services (CMES), and Downstream

Strategies. The initial investigations were undertaken by CMES, led by Gerald Collins, P.E. CMES utilized previous experience with Aban-

The projects profiled in this study are estimated to represent well over \$16 million in cleanup costs and \$52.7 million in construction investments.

doned Mine Lands (AML) and numerous data sources to identify lands that, to our understanding, may qualify for RECLAIM funding. Sources included the Office of Surface Mine Reclamation and Enforcement's AML features database, a list of potential economic development sites created by Virginia Department of Mines, Minerals and Energy (DMME), and a number of mine land mapping datasets from that same agency. CMES conducted numerous site visits and engaged local stakeholders, resulting in a catalog of historical and contemporary information sources for many sites and existing efforts.

To begin, the project team culled an initial list of approximately thirty AML sites down to fourteen. This process considered several factors, including the size of the sites, the presence or absence of existing development efforts, the current ownership status, and the general suitability of the site for various development types. Efforts were also made to ensure a distribution of sites across the seven county region. Following selection of the final fourteen sites, the project team developed conceptual ideas for new economic development opportunities at each site. In many cases, this involved working with stakeholders in the community to understand what they have already done, identifying their needs and gaps in those efforts, and preparing materials and a project vision that will lead to a RECLAIM-funded project. In other cases, we looked at the amenities of an individual site and set about imagining an alternative use.

For the purpose of evaluating the eligibility of these sites for RECLAIM funding, we utilized the federal Office of Surface Mining Reclamation and Enforcement (OSMRE) document "Guidance for Eligible Projects to be Funded Under the Abandoned Mine Land Reclamation Economic Development Pilot Program for FY 2016." We expect this guidance will be generally in line with the final guidance for RECLAIM funding, though that is subject to change. That guidance defines "Eligible Projects" as being those located on sites that are:

- Unreclaimed Priority 1, Priority 2 or Priority 3 sites (i.e., AML sites and polluted waters) listed in OSMRE's Abandoned Mine Land Inventory System.
- Previously reclaimed AML sites and polluted waters.
- Land adjacent to unreclaimed or previously reclaimed AML sites and polluted waters as justified by the State and/or the communities impacted by historic coal production.
- Please note: Currently permitted Title V active mine sites and former mine sites permitted and reclaimed after August 3, 1977, are not eligible to receive AML Pilot funds.

While these requirements are impressive for their openness, the mining geography of Southwest Virginia is such that the fourth requirement is surprisingly prohibitive. A significant percentage of pre-1977 mine sites were subsequently permitted and reclaimed under modern regulations, rendering many large mine sites ineligible. We have met this criteria where possible, but some uncertainty remains.

Each of the projects described here marks a beginning to the central task of transitioning the economy of a region that was instrumental to the rise of the United States as an industrial superpower. Southwest Virginia has the capacity to build a new economy that creates local prosperity, and the RECLAIM Act will be a vital tool to fuel the ambitions of its residents.

Devil's Fork

Scott County, Va.



The Devil's Fork Loop Trail is the primary access to Devil's Creek and Devil's Bathtub, two swimming, hiking, and sightseeing destinations in the Jefferson National Forest in Scott County, Virginia. The trail and parking lot are maintained by the U.S. Forest Service (USFS), along with volunteer contributions from local organizations. The site was quietly utilized—mostly by locals—for most of its existence, but thanks to some forward thinking promotion by the Scott County tourism office, the popularity of Devil's Fork has exploded over the past four to five years. The Devil's Bathtub—and nearby waterfall—is a stunning sight, and a unique place to spend an afternoon. The trail itself offers a challenging and beautiful day-hike, and exhibits at least one visible reminder of Virginia's coal mining history in the form of an abandoned and partially buried mine cart. Additionally, less visible but very near the trails are two pre-1977 underground mine portals in need of sealing.

Increased visitation to Devil's Fork has been a boon for local businesses and attractions. Natural Tunnel State Park, an already popular destination, has seen a large uptick in visitation and has incorporated a guided hike to the Devil's Bathtub into its activity offerings. Both Teddy's Restaurant of Nickelsville and the Hob-Knob Drive-In of Gate City have reported that their customer counts have more than doubled since Devil's Fork Trail became popular. Local gas stations and convenience stores now frequently find themselves offering directions to the trailhead alongside the usual fare of trail mix and bottled water.

Unfortunately, the massive uptick in visitors has several drawbacks. Most glaring is that the parking lot is very small and poorly equipped to handle the 800-1,000 visitors the

"The popularity of Devil's Fork has blessed Scott County with a strong baseline of tourists that we can build upon to expand business in the county, but ensuring sustainable access to this great site is of paramount importance."

Pam Cox, Director of Tourism for Scott County

area sees during peak season weekends. Numerous ideas have been floated to try and ease the stress of the high volume of traffic, such as a shuttle bus service, but thus far have failed to come to fruition. The U.S. Forest Service recognizes the issue and is eager to find a solution.

Our vision for this site is straightforward: pair the mitigation of the mine portal with development of a new parking lot and improvements to the trail. This will marry two important goals: (1) the repair of a dangerous abandoned mine land (AML) feature, and (2) the enhancement of a very popular tourist destination so that high volume visitation can continue in a sustainable manner.

■ Issues and Eligibility

This site is eligible for RECLAIM funding due to the presence of two abandoned mine portals, described by Virginia

Devil's Fork

DMME as “large enough to be entered.” They have “a roof consisting of slate shale which is deteriorating” and they “pose a serious threat to anyone who attempts to enter.” At the time of the AML report (1985), the site was considered to be popular, especially among hunters, but the current visitation levels far outstrip those described in the AML report.

The report also notes the presence of an abandoned coal loading platform, tipple, and coal car. In conversation with the USFS, the former two features (loading platform and tipple) have not been described or noted, but the coal car is actually of interest to the agency as a historical attraction and will most likely not be remediated.

Lastly, portions of Devil's Fork near this site are listed as impaired due to pH issues. The source of the problematic acidity is not noted and may or may not be related to historical coal mining impacts. An investigation into possible water discharges is a standard element of sealing AML mine portals and may aid in the remediation of stream impacts.



Current limited parking at Devil's Fork

■ Project Status

The Rangers of the Clinch Ranger District of the George Washington and Jefferson National Forests recognize that the Devil's Bathtub and Devil's Fork Loop Trail are very popular attractions and that the current visitation rate is far higher than the current facilities are able to host. The chief infrastructure need for this site is the construction of a parking lot to replace the haphazard roadside arrangement that is currently utilized. This parking lot will, in turn, necessitate the development of a new trailhead and connector trail. The Clinch District has conducted an engineering study and created a design to plan for the construction of said parking lot. Additionally, Clinch Ranger District personnel are engaged with numerous volunteer groups and anticipate that some level of participation by these groups (in trail construction, for example) will help this project be brought to life.

Important next steps to prepare for acquisition of funds for this project include:

1. Developing a general plan for the mitigation of the mine portal(s) on site including cost, personnel and time estimates.

2. Preparation of detailed plans and costs with construction of the new parking lot and access trail.
3. Obtain letters of support from key stakeholders including Scott County Tourism and the Clinch Coalition.
4. Establishment of a grant agreement between the RECLAIM funding applicant and the USFS.

■ Cost Summary

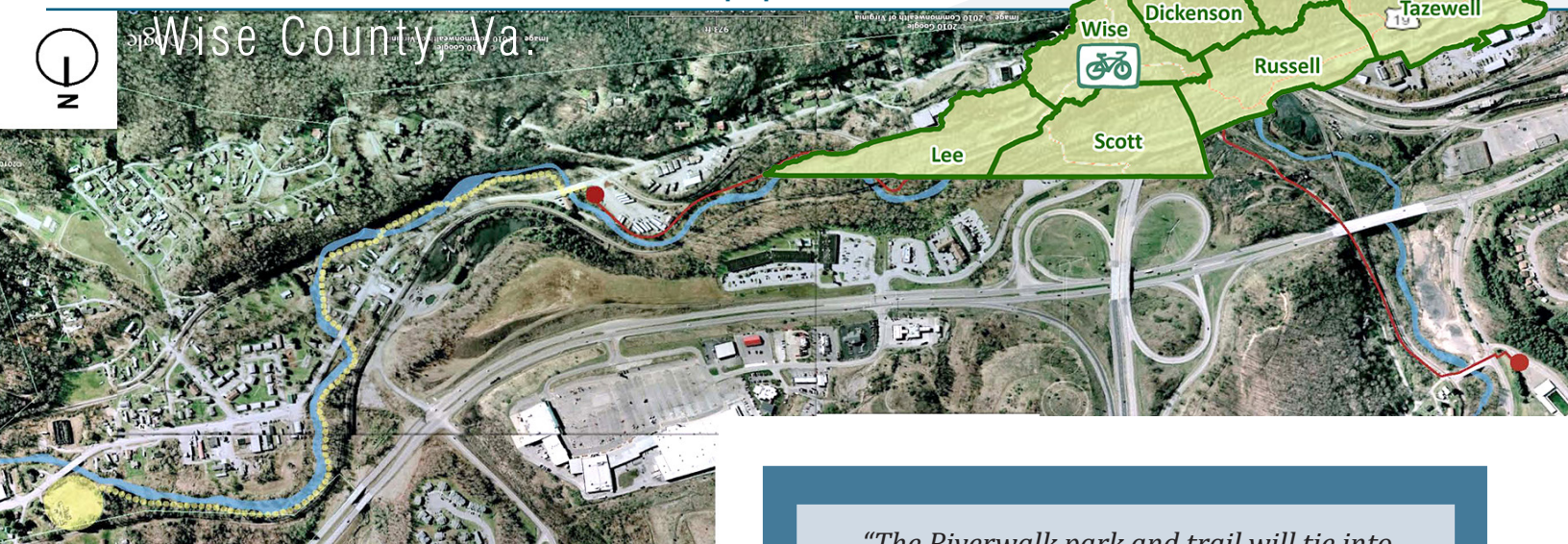
Remediation of the mine portals on this site will be somewhat unique, given that this site is part of a national forest, and the use of large equipment or trucks should be avoided if possible. Transportation of materials via power wheelbarrows is a viable option and will not significantly impact the cost of remediation. The portals are located very near one another and will cost approximately \$10,000-\$15,000 to seal.

The new parking lot will be located to the north of the current lot and will be a two-tier design that will accommodate fifty vehicles (twenty upper, thirty lower). The estimated cost of constructing these lots is \$92,350. The major shift in the location of the parking will necessitate the construction of a connector trail. The anticipated length of this trail is three-quarters of a mile. The USFS estimates that, in this area, on average, the cost of trail construction for a 36” tread is \$20,000, so the estimated cost of the proposed connector trail is \$15,000.

Estimated AML remediation costs	\$10,000-15,000
Estimated project cost	\$107,350

Norton Riverwalk / Tipple Hill Park

Wise County, Va.



The residents and leadership of Norton, Virginia, an independent city within Wise County, have lived through the ups and downs of the Appalachian coal industry and now seek to continue efforts to rebrand themselves as a 21st century city, with all the amenities and attractions that go along with that, with a particular focus on eco-tourism. The city is characterised by two main highways, US 58 and US 23, and two rivers, the Guest and Powell Rivers. Understanding that the Guest River—as a natural, cultural and aesthetic resource—is of great importance to the community, Norton and a group of passionate citizens have set about planning a riverfront trail, which will extend two miles, between a former sewage treatment plant site and Norton Elementary School. Flanking the trail at the northern end—very near the elementary school and utilizing some of the large amount of previously mined land in Norton—will be a park, overlooking the river, trail, and town.

Norton and its citizens understand that improving amenities are not only crucial to encouraging a climate that is attractive to investment, but that those same amenities provide intangible benefits to the spirits of residents: the oft cited “small town pride” component of civic success. The Norton Riverwalk will be an active and aesthetic asset to the community and will help spur economic development by, among other things, providing increased incentives for walk-up businesses to locate nearby. Tipple Hill Park, accessible via the trail, will raise the profile and value of nearby residential areas.

Last but not least, the Guest River stands to benefit from improved riparian conditions that will result from construction of the trail. Reforestation is a central component of the proposed trail corridor and will increase the buffering capacity of the river, which is listed as impaired by the Commonwealth of Virginia.

“The Riverwalk park and trail will tie into the growing trails system in Norton, which has always been envisioned as an economic engine for our city. We hope that by investing in recreation and eco-tourism infrastructure, we’ll create ripple effects to spur a regional ecotourism and outdoor recreational economy. Local residents will also be able to enjoy the area and benefit from the potential for health, fitness and quality of life improvements. “

-Shayne Fields, Trails Coordinator for City of Norton

■ Issues and Eligibility

The Norton Trail and Park qualifies for RECLAIM funding by way of being “adjacent to unreclaimed or previously reclaimed Abandoned Mine Lands (AML) and polluted waters ... and/or the communities impacted by historic coal production.” The Norton Trail parallels the Guest River, a 303d stream listed as impaired due to “Impacts from Abandoned Mine Lands (Inactive),” among other factors. The city of Norton contains or intersects at least fifteen previously identified AML features, clearly demarcating its status as a community impacted by historic coal production. The Norton Park site itself has been permitted since 1977, meaning cleanup of certain elements on that site will need to be funded from outside of RECLAIM. However, an acid mine discharge is welling up on the western end of the site, which is a Priority 3 AML feature from pre-1977 mining and eligible for RECLAIM funding. Any post-law mining features encountered during the mitigation of this acid mine drainage could also be eligible for RECLAIM

Norton Riverwalk and Tipple Hill Park

funding. The Norton Riverwalk Trail does not directly intersect any AML features.

■ Project Status

This project boasts a wide and well established group of partners. The work to date has been jointly led by the City of Norton and the Guest River Group, an informal coalition of local government, state and federal agencies, nonprofit groups, and concerned citizens. To date, a number of important steps have been taken, beginning with a feasibility study and plan executed in 2010. Since then, a number of plans have been developed, easements have been acquired and, parallel to this effort, funding has been secured which will allow a Phase I and II environmental assessment to be completed on the Tipple Hill Park site—making the site eligible for U.S. Environmental Protection Agency (EPA) Brownfields Cleanup funding.

■ Cost Summary

The primary AML feature in need of cleanup is the acid mine discharge located on the Tipple Hill park site. Cleanup of this discharge is largely dependent on the quantity and volume of water, neither of which has been officially documented at this time. However, informal observations indicate a steady, year-round flow of water and the telltale orange-colored residue associated with acid mine drainage. Remediation of similar features in the region has resulted in costs in the range of \$200,000 to \$300,000.



The most recent estimate for full construction of the Norton Riverwalk (dated July 2015)—including engineering, permitting, trail construction, pedestrian bridge construction, landscaping and signage—is \$531,680, which includes \$399,000 in construction costs.

The primary need at the Tipple Hill area is funding for cleanup. The acid mine drainage outlet on the site will cost \$100,000 to \$200,000 to remediate, though this estimate could fall very short depending on numerous factors, including rate of discharge and water quality. Elsewhere on the site, a Phase I environmental assessment is currently being performed, and a Phase II assessment is on the horizon. This will enable more detailed cleanup costs to be determined. The Tipple Hill Park project has not yet undergone a high level of planning and design, so construction costs of the final site are not yet available. The entire site (including the portion that will be utilized by the trail corridor) is approximately 11.1 acres. Costs for developing a park this size vary widely, depending on the level of development.



Estimated AML remediation costs	\$100,000-\$300,000
Estimated project cost	\$531,680

Norton Cloverleaf

Wise County, Va.



Just northeast of the proposed Norton Riverwalk and Tipple Hill Park, overlooking the city of Norton, Virginia itself, is a large area of former mine land, dominated by a west-facing highwall. This site is an outstanding candidate for industrial or commercial development. The area is flanked on two sides by major roads, US Route 23 in the west and US Route 58 Alt. to the south, and by a local road, Hawthorne Drive, to the east. The site boasts an impressive array of amenities including ready access to fiber optic internet, electricity, city water, storm water, and the aforementioned transportation corridors. Also notable is that the site is a short distance from Lonesome Pine Airport and the University of Virginia's College at Wise.

The site is also quite large, approximately 200 acres across four parcels, but the actual buildable portion is somewhat lower—around sixty acres. A portion of the area is not directly buildable due to the presence of electricity transmission lines, but it is important to note that this space could be utilized for parking, among other things. While difficult to estimate with certainty, a general rule of thumb for industrial land use employment is twenty-eight jobs per acre; meaningful use of this site by industrial or manufacturing entities could result in as many as 1,680 jobs.

The LENOWISCO Planning District Commission (LENOWISCO), of which the city of Norton is a part, is no stranger to successful industrial development projects, having pioneered a regional industrial park in nearby Duffield in the mid-1960s. That area has reached full occupancy, and LENOWISCO, along with a large number of other partners, has sought to identify other high-value sites within the Southwest Virginia region. A region-wide analysis conducted within the

"We envision development of the Norton Cloverleaf site as a boon for the entire Southwest Virginia region and as an economic driver that really gets at what makes Southwest Virginia great: a heritage of hard work and community."

Fred Ramey, Norton City Manager

last decade found this site to be the most attractive for a project of this sort.

Norton is well positioned to play host to a new, large-scale economic development. In addition to the city's proud history as a productive center of the coal industry, Norton boasts an active city government and citizenry, all of whom are eager to craft a positive future for the region.

SPECIAL NOTE: Due to the nature of the highwall, the likely remediation scenario for this site would involve incidental coal removal. While the remediation plan was not established through the process of our work for this report, Appalachian Voices recognizes the possible conflict of interest of an environmental advocacy organization promoting a project that involves removal of coal. Indeed, as our focus increasingly turns toward cleanup and reuse, this will be an ongoing issue that we grapple with.

Norton Cloverleaf

Appalachian Voices will never condone mining practices or remediation projects that we view to have a negative impact on neighboring communities or ecosystems. The deciding factors for us involve scale, location, and potential harm. In this case, there is a two to three acre area that exists within an already mine-scarred area that is far from homes and any intact/pristine ecosystems. Additionally, the coal reserves that would be recovered from this remediation operation would total as little as 2,000 tons. Thus, we view this specific operation as it is described here as bringing more environmental good than harm, though that view should not be construed as blanket support for this or other remediation projects and is conditional on the details of the specific remediation plan, should the project move forward.



High-wall mining at the Norton Cloverleaf site

■ Issues and Eligibility

The Virginia DMME's database of Abandoned Mine Lands (AML) features indicates that, despite re-mining since 1977, one dangerous highwall remains on-site. Additionally, the city of Norton contains or intersects at least fifteen previously identified AML features, clearly demarcating its status as a community impacted by historic coal production. This site plan very clearly fits the description of a "category B" project per the U.S. Office of Surface Mining and Reclamation's guidance for eligibility requirements for draft projects, as it is likely to create favorable conditions for the economic development of the project site.

■ Project Status

The principal partners for this project are the City of Norton, LENOWISCO Planning District Commission, and the property's current owner, J.W. Construction Company. Over the years, a number of plans have been developed for both the mitigation of the highwall and the development of a two-tiered site suitable for commercial or industrial development. The first step in making this vision a reality is to develop a full-fledged engineering plan for mitigation of the highwall and development of a buildable site.

Second, and in parallel, all partners must engage Old Dominion Power, the utility that owns and operates both the transmission and distribution electrical lines that cross the site. Mitigation of the highwall will very likely require re-routing the distribution lines.

Third, all parties should engage in a frank discussion about the ownership transfer of the site and of the coal reserves.

Development of this site will likely involve removal and sale of the coal, which will require a Virginia DMME permitting process. This would slow down the development of the site considerably, but that same development plan, per Virginia regulations, would be able to bypass much of the permitting process so long as the proceeds from the sale of the coal were directed to a government or nonprofit entity such as an Industrial Development Authority. This is known as a Government Financed Exemption (GFE) and is permitted under Virginia State Code 4VAC-25-130 section 700.11.

Lastly, LENOWISCO, the City of Norton, and other interested parties should begin to actively market the site to potential investors.

■ Cost Summary

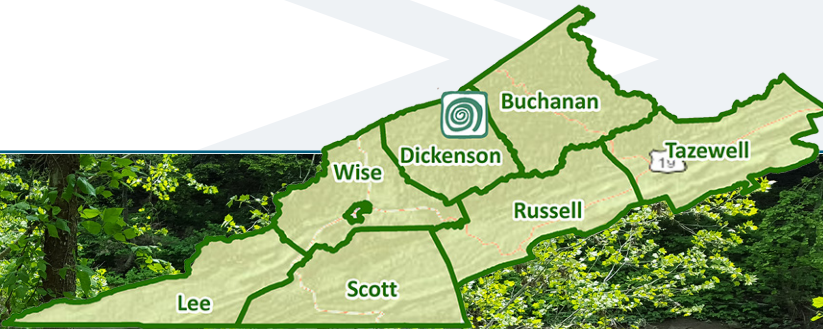
Final costs are, necessarily, very dependent on the final vision for the site and this discussion does not include costs, for example, of re-locating Old Dominion Power's distribution lines. Mitigation of the highwall by itself, with no consideration for future development, would cost \$200,000-\$300,000. This would involve extensive backfilling.

Creation of a two-tiered buildable site, however, would require more capital and would mitigate the highwall in a different manner. The entire site in the area of the highwall would be excavated down to the level of the coal seam, and crafted into two tiers by way of cutting and filling followed by removal of the coal. All told, this would cost anywhere from \$500,000-\$1,000,000.

Estimated AML remediation costs \$200,000-\$1,000,000 (depending on design)
Estimated project cost Not Available

Haysi Splashdam

Dickenson County, Va.



Haysi, Virginia, is a small community resting on the banks of the Russell Fork River, a popular waterway for summer recreation. The local government has been quite proactive in seeking opportunities to improve their town as a place to live and visit, including a notable restoration of a theatre. The town itself has an aesthetic charm that is unique among its neighbors. Currently, in deference to the attraction of the Russell Fork River, Haysi is envisioning redeveloping a small (approximately six acres) piece of riverside property known as the Splashdam Site into a picnic area, river access point, and trail system. The town owns the property.

Splashdam gets its name from the historic logging industry in the area. When large scale industry first came to the area in the first part of the 20th century, a temporary dam was constructed near the current site. Timber removed from the surrounding hillsides was stockpiled in the lake created by the dam, and during the spring floods, the dam was blasted away and the logs flowed down the river to sawmills in cities downstream. Later, an entire community complete with stores, schools and churches was constructed on the site to support several nearby underground mine works. The residual waste coal left from the coal processing facility is the primary source of pollution at the site, which is now totally abandoned after being repeatedly destroyed by flooding during the middle of the last century.

Haysi is located near a number of well-traveled recreation areas including Breaks Interstate Park, the Pine Mountain Trail, and the Russell Fork Gorge—an extremely popular

“The Splashdam site has a tremendous amount of potential to solidify Haysi’s role as an ecotourism destination and gateway to the Breaks Interstate Park. The Russell Fork River is one of our area’s greatest assets, and the development of the Splashdam site will allow local residents and visitors alike access to a beautiful spot along this scenic river.”

Larry Yates, Mayor of Haysi.

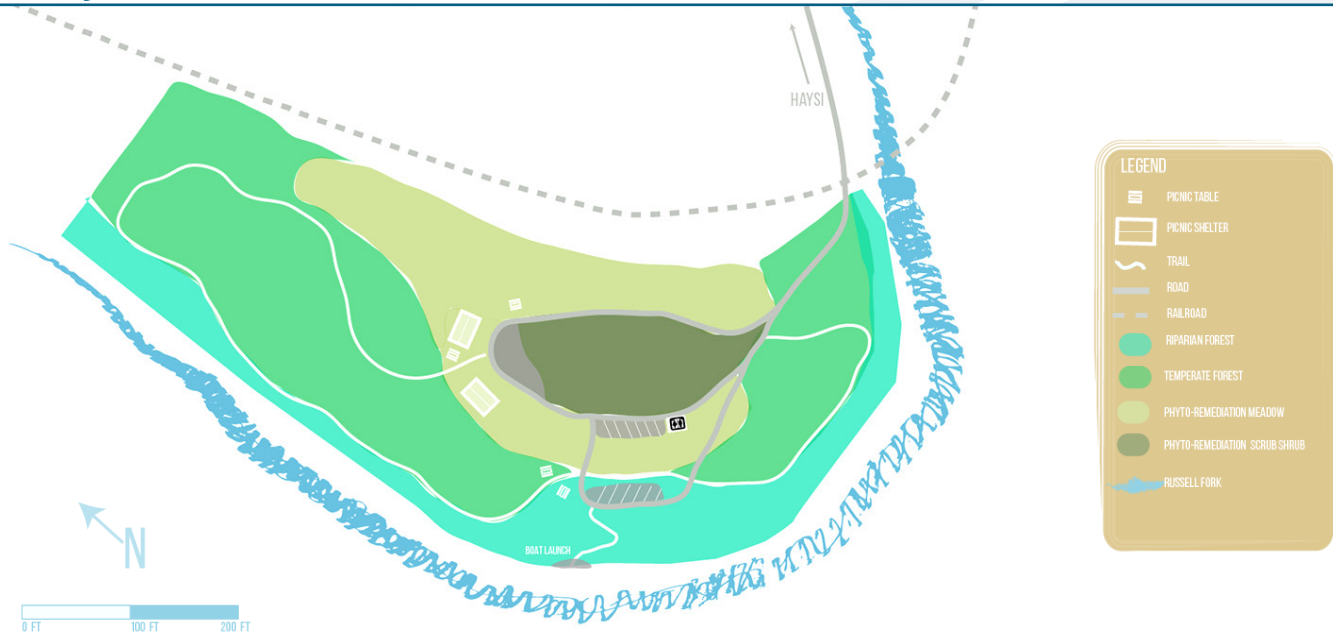
whitewater section of the Russell Fork River fed by releases from the John W. Flannagan dam. Creating a roomy, public boat launch area on the proposed site would improve access to a tamer section of the river for river enthusiasts of all stripes, including whitewater boaters, anglers, and families seeking a relaxing float.

The proposed design of the park includes a boat launch, parking area, picnic shelters, and a walking trail. The town envisions landscaping that heavily utilizes native plants and grasses, as well as signage and displays that describe the mining history of the site.

■ Issues and Eligibility

This site qualifies for RECLAIM funding because it is adjacent to Abandoned Mine Lands (AML) issues and is part of

Haysi



a community historically impacted by coal mining. The site (as well as the town of Haysi) is immediately adjacent to a large number of pre-1977 abandoned underground mine portals. Other nearby AML features include a gob pile, which consists of waste coal, just upstream and across the Russell Fork River. A large volume of gob exists on the site, as well, but it has not been determined whether the source of that material is pre-1977 activity. A portion of the site was permitted as a coal load-out facility after the passage of the Surface Mining Control and Reclamation Act (SMCRA) and this may explain the origins of the material. Whatever the case, the material has clearly never been properly reclaimed.

Project Status

The Town of Haysi will take lead on this project, with collaboration and assistance from the Friends of Southwest Virginia. This project is in very early stages and the material presented here is the first major attempt to document the vision for the site.

Cost Summary

The primary feature in need of cleanup on this site is a gob pile of uncertain origin. The pile is approximately 100,000 cubic yards in volume, and hauling and disposal of this volume of material will cost somewhere between \$200,000

and \$300,000. Since the source of the gob is uncertain, some level of study and permitting may be required prior to removal of the material, but the Virginia DMME has a process in place that will expedite this somewhat.

Construction of the proposed park—including a boat launch, parking lot, picnic shelters, landscaping, a walking trail, and signage—will cost approximately \$250,000 to \$300,000, excluding design.

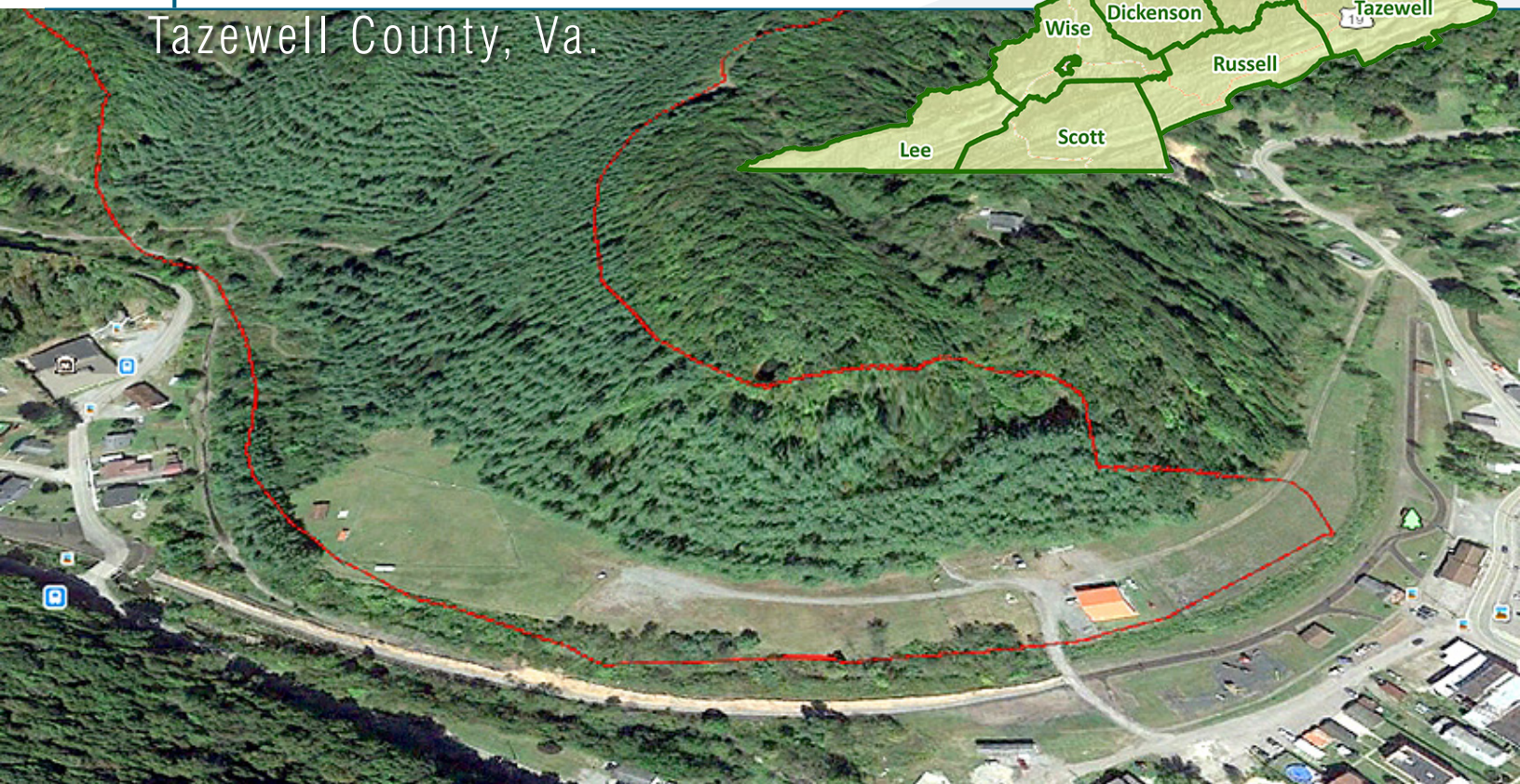


An abandoned underground mine portal

Estimated AML remediation costs	\$200,000-\$300,000
Estimated project cost	\$250,000-\$300,000

Spearhead Trails

Tazewell County, Va.



Spearhead Trails is the flagship entity of the Southwest Regional Recreation Authority (SRRA), a public corporation and government instrumentality first established in 2008 by legislation from the Virginia General Assembly. The group’s mandate is to establish and maintain “a system of recreational trails and appurtenant facilities, including trail-head centers, parking areas, camping facilities, picnic areas, recreational areas, historic or cultural interpretive sites, and other facilities.” To date, the SRRA, by way of Spearhead Trails, has developed four major motorized trail areas and one equestrian trail. Many of these trails cross or utilize former surface mines, and one section in particular, the “Original Pocahontas” section, crosses numerous Abandoned Mine Lands (AML) sites.

Spearhead Trails is an organization that finds itself in a unique and advantageous position to benefit from RECLAIM monies: the trail systems and facilities developed by Spearhead Trails are by and large already utilizing former coal mine lands, some of which are pre-1977 abandoned mine lands. The Original Pocahontas section in particular crosses numerous AML features and un-reclaimed abandoned mine lands. According to Charlotte Mullins, acting executive director and chair of the Spearhead Trails Board of Directors, monies are needed for a wide variety of applications within the trail system, but maintenance and

“Pocahontas had not seen new investment in their town in many years, but the OP trail has generated approximately \$1.5 million new investment since the opening in 2014.”

Charlotte Mullins, Acting Executive Director and Chair of the Spearhead Trails Board of Directors

development of new trails is at the top of the list. At present, many trails utilize existing features such as logging roads and many trails—especially those trails demarcated for beginning riders—are in need of improvement. Improving the quality and safety of these trails is an important step towards broadening the user base of the system.

The Original Pocahontas section, as the name suggests, lies on the north side of Pocahontas, Virginia, in Tazewell County. The current trail system here makes heavy use of several pre-1977 non-reclaimed or poorly reclaimed lands and runs near numerous known AML features including clogged streams, gob piles (waste coal), subsidence prone areas and 303b lands whose impairment is partially

Spearhead Trails

due to Impacts from Abandoned Mine Lands (Inactive). There are also a number of probable mine portals in the area in need of investigation and sealing. The Pocahontas Land Corporation is the primary lessor of lands to Spearhead, and also owns numerous other tracts adjacent to the existing trail system. Both parties have expressed interest in expanding trail opportunities in the area.

■ Issues and Eligibility

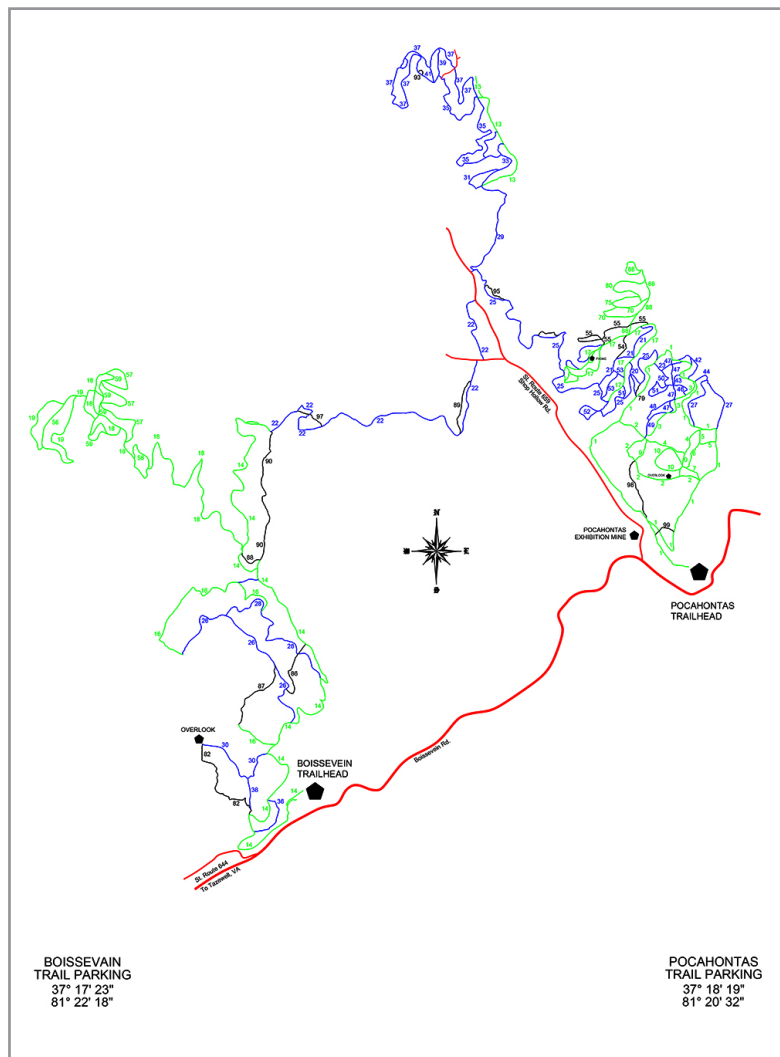
The Spearhead Trails sites are eligible for RECLAIM funding. There are a number of documented AML features on these sites, including two gob piles, numerous subsidence prone areas and large areas of un-reclaimed or poorly reclaimed pre-1977 mining. Additionally, Spearhead Trails personnel have identified at least one possible mine portal. Virginia DMME's data indicates that none of the areas in question have been permitted for re-mining since 1977.

■ Project Status

The primary partners for this project are Spearhead Trails and Pocahontas Land Corporation. The most important next steps for this project are identifying goals for both trail improvement and trail system expansion, as well as creating a workable inventory of AML features in need of remediation within the Spearhead Trail's area.

■ Cost Summary

Given the variety of AML features on site, remediation costs are difficult to estimate, but general guidelines are useful. The Virginia DMME has identified two gob piles. Remediation of gob piles involves removal, hauling, and disposal of the waste material to an off-site location. Costs vary widely depending on numerous factors, such as access to the site and the composition of the material. An accessible gob pile made primarily of material that can be burned in a coal-fired power plant can be disposed of for as little as \$200,000 per 100,000 cubic yards, but a less accessible, less useful pile may cost upwards of \$1,000,000. If any portals are found, sealing of each of those would cost between \$10,000 and \$15,000.



Spearhead Trails maintains careful records of trail maintenance and trail building costs. Currently, for planning and budgeting purposes, Spearhead Trails uses the figure of \$5,000 per mile for new trail construction. The following chart shows the annual maintenance costs for each of the three trail systems.

Mountain View, St. Paul.....	\$23,901.17
Stone Mountain, Pennington Gap	\$7,167.50
The Original Pocahontas, Pocahontas	\$20,092.50

Estimated AML remediation costs \$200,000-\$1,000,000
 Estimated project cost \$5,000 per mile for new trail construction

Wise Airport Solar Project

Wise County, Va.



The Lonesome Pine Airport site represents one of the most likely possibilities for a commercial scale solar installation in the heart of Virginia's coalfields. The proposed site lies in the midst of a growing Information Technology industry cluster, providing a ready user base for the energy generated.

The site lies northeast of the town of Wise, Virginia, to the west of Airport Road, and just south of the Lonesome Pine Airport. It is associated with tax parcels 010204 and 012058, owned by the Industrial Development Authority of Wise County, and tax parcel 034584, owned by the Town of Wise. Currently, the site can be accessed from Airport Road to the east or Jones Road to the west. Presently undeveloped, the land cover ranges from partially vegetated with autumn olive and white pine to nearly barren. Site elevation ranges from approximately 2,500 feet to 2,700 feet above sea level and the site itself is part of a larger plateau that extends northeast toward the airport.

A multitude of economic development efforts have been focused in the immediate vicinity of this site. The area is home to several startup companies including Micronic Technologies, Frontier Secure Call Center, and a Tier 3 co-location data center. Just down the road is the University of Virginia's College at Wise (UVA Wise). For this and other reasons, many see this site as an ideal location for the county's first large-scale solar development.

The three parcels total over 420 acres. Assuming four to five acres per megawatt (MW) of nameplate capacity, total site capacity could be as high as 105 MW, but this would require the removal of the baseball diamonds on the tax parcel owned by the Town of Wise, which is presumably unlikely to happen. In August, top executives from Energix, an Israeli renewable energy company, visited Wise County for a series of meetings with state and local officials. This

"If Wise County is to expand hosting of high-technology data centers, we must gain a commercial-scale solar developer. Then we have the potential to attract Amazon, Google, or other Fortune 500 companies to the region to store massive amounts of big data."

Jack Kennedy, Clerk of Courts, Wise County

visit came less than a month after these executives met with Governor Terry McAuliffe during his visit to Israel. Energix is exploring building 500 MW of renewable energy projects across Virginia and have expressed interest in this site.

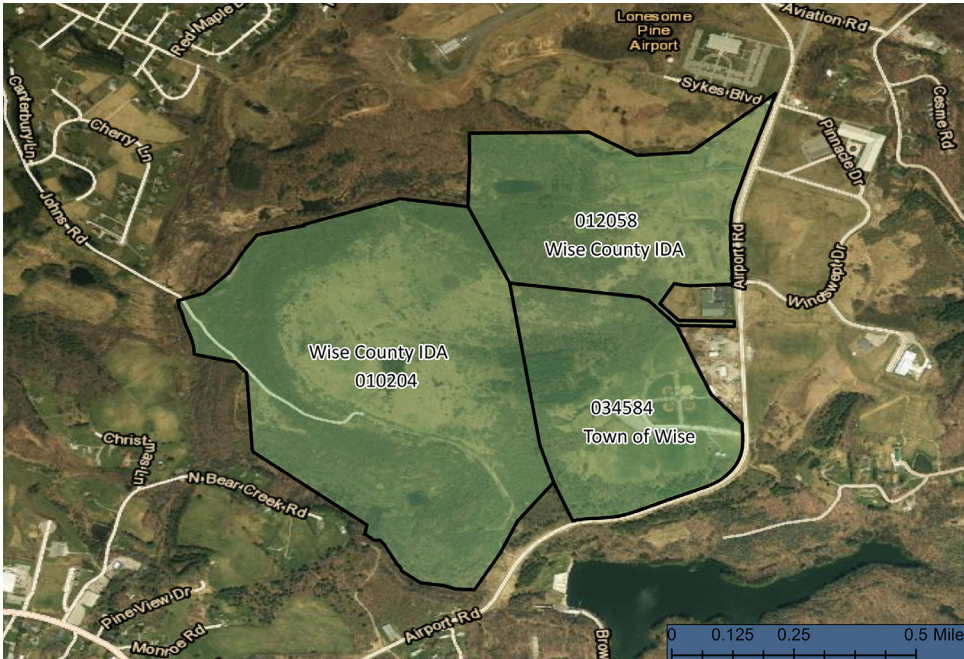
Energix has contemplated various system sizes for this site. A 20 MW system, which is the smallest size being contemplated, would only use 80 to 100 acres of land. When built, a system of this size could reasonably produce 50.1 gigawatt hours¹ per year, enough electricity to power over 4,500 homes², the Mineral Gap Data Center, or UVA Wise.

A 20 MW solar facility could support over 200 local full-time equivalent jobs during construction and 3 permanent positions post construction³. These numbers increase with facility size.

■ Issues and Eligibility

There are three released post-Surface Mine Control and Reclamation Act (SMCRA) mining permits covering the majority of the site. These permit areas were surface-mined in

Wise Airport Solar Project



Above, a data center under construction near the proposed solar project site.

the 1980s and the land was reclaimed. Virginia DMME mapping indicates that there is a Priority 3 Abandoned Mine Lands (AML) problem within parcel 012024. The problem, a slump, is the result of the caving in of an underground mine void, most likely a former mine entrance. A slump is differentiated from subsidence by the fact that it occurs on undeveloped land. Similarly, there is a mine opening portal within parcel 012058, also a Priority 3 problem. Both of these features are considered stable and not likely to cause loss of life, injury, or economic loss. Notwithstanding, they need reclamation, thus qualifying the potential solar facility site for RECLAIM funding.

■ Project Status

To date, Wise County Circuit Court Clerk Jack Kennedy, the Virginia-Israel Advisory Board, and various agencies within Wise County have collaborated to move this project forward. These partners recognize that as corporate and state commitments to renewable energy continue to increase, building a solar facility within Wise County could attract future investment.

It is vital that project partners engage Old Dominion Power, an arm of the Kentucky Utilities Company (KUC) that serves a customer base of nearly 30,000 in Wise, Lee, Russell, Scott, and Dickenson Counties. Recently, KUC added Kentucky's largest utility-scale solar facility to their generation portfolio. The 10 MW facility, located on the banks of

Lake Herrington outside of Harrodsburg, Kentucky, boasts more than 44,000 solar panels on fixed tilt rack systems. The facility is expected to produce roughly 19,000 MWh⁴. This large commitment to renewable resources by the utility bodes well for the fruition of the Wise County project. During its August visit, Energix held a private meeting with Old Dominion Power to discuss potential projects in the utility's service area. The contents of the meeting have not been made public.

■ Cost Summary

The Priority 3 AML features on this site would cost an estimated \$20,000 to \$30,000 to remediate. Remediation would involve filling in the slumped area and portal and routing any discharges to a stream.

The construction of a 20 MW solar facility carries an estimated cost of \$31,800,000 before any available incentives are factored in⁵.

[1] This assumes a capacity factor of 28.6 percent—the 2015 national utility-scale average. Given the advancement and wider deployment axis solar tracking technologies, we feel this capacity factor is appropriate and attainable. This generation estimate also assumes 8760 hours in a year.

[2] Assumes average household consumption of 911 kWh (EIA, 2014).

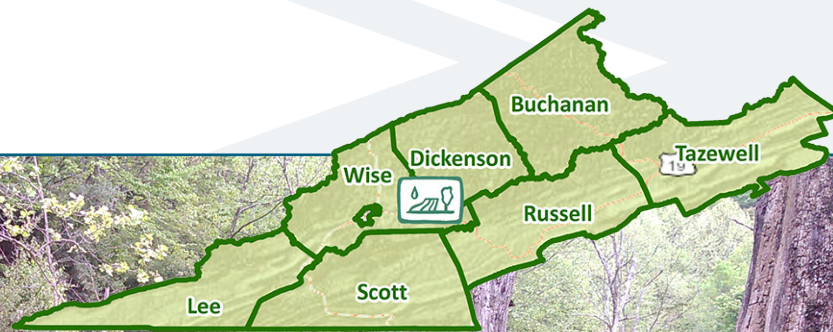
[3] Source: National Renewable Energy Laboratory Jobs and Economic Development Impact (NREL JEDI). This assumes 100 percent of the materials are purchased locally, but not manufactured locally. Precise construction/installation job creation is 208.3 and post-construction job creation of a 20 MW facility is 2.9.

[4] Kentucky Utilities [5] Source: NREL JEDI.

Estimated AML remediation costs	\$20,000-\$30,000
Estimated project cost	\$31,800,000

Tom's Creek

Wise County, Va



By exemplifying the integration of renewable energy, AML remediation, aquaculture, hydroponics, and entrepreneurship, this project could have far-reaching impacts into the future, providing a catalyst for innovative AML redevelopment.

Tom's Creek lies a few miles northeast of Coeburn, Virginia. The site is approximately twenty-two acres and presents an opportunity for an entrepreneur or local organization to expand or build a local food business.

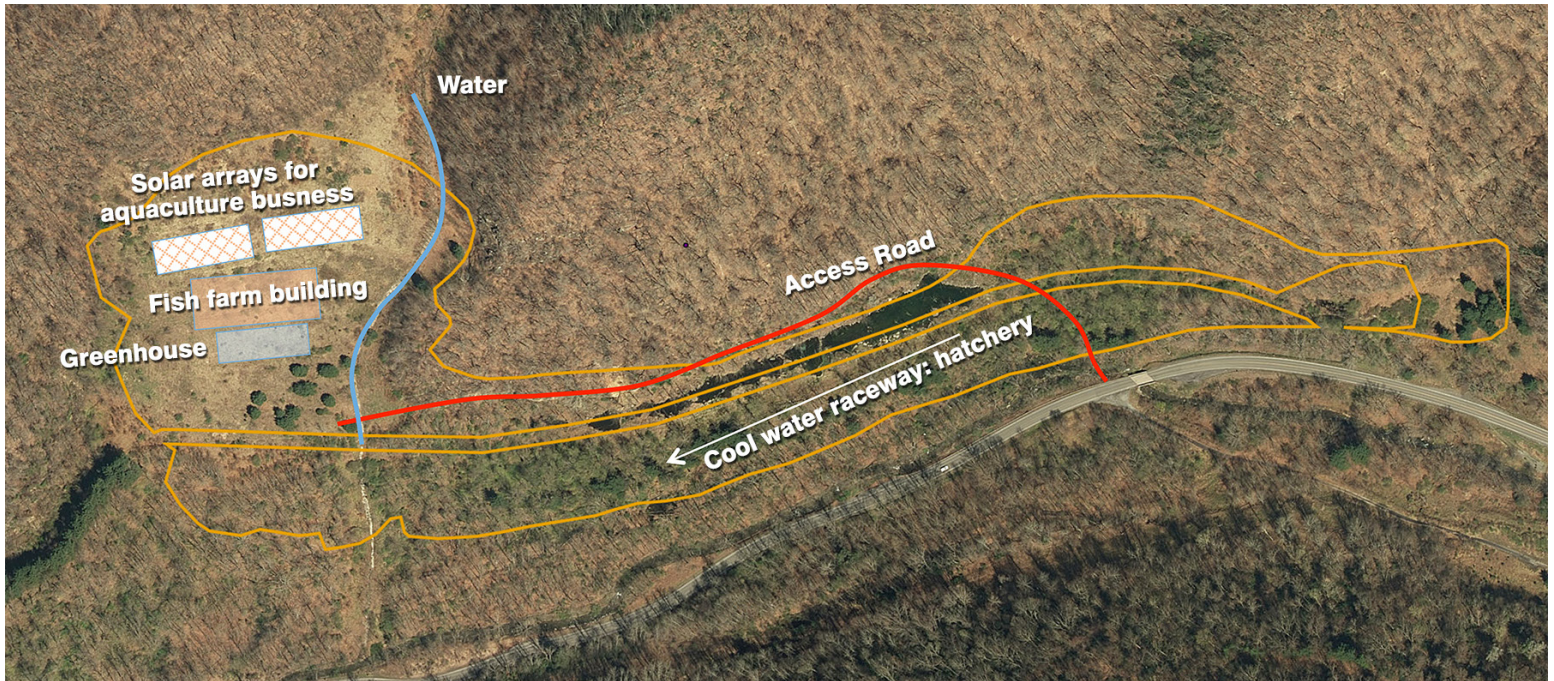
Blue Ridge Aquaculture, one of the world's largest sustainable indoor fisheries, has been operating near Martinsville in Southwest Virginia since 1993. This operation sells between 10,000-20,000 pounds of live tilapia per day priced between \$4 to \$6 per pound, placing sales at approximately \$75,000 per day. Based on discussions with the Virginia DMME staff, Tom's Creek has an underground mine portal that produces 300 to 400 gallons per minute of clean cool water to the surface. This is an ideal volume of water for an aquaculture or aquaponics facility which could help spur more economic activity in the food fish industry and contribute to local income and employment. In addition to food fish farming, an aquaponic system and enterprise could be supplemented with a hydroponic growing system for plants and vegetables.

The aquaponic system would require structures that are approximately 20,000 square feet, combining space for a vegetable greenhouse and a spec building to house fish tanks. The concrete floors of both structures could contain piping through which mine water could be circulated, helping to

maintain balanced cool temperatures. Electricity for the site could be provided through a combination of solar and micro-hydro generation. The project team assumes there are other discharges on site, including a raceway where a micro-hydro system could be integrated with a possible fish hatchery or holding pond. The integration of these systems could provide an opportunity for long-term employment in the operation and maintenance of the aquaponics system and distribution of fish and vegetable products.

The operation of the facility could provide direct employment for ten to fifteen full-time staff. Remediation and building of the facility would employ contractors and the site could serve as a successful pilot project in Southwest Virginia. This conceptual project, including staffing and operations, would range in cost of \$2 to \$4 million. There are numerous Abandoned Mine Lands (AML) sites across Appalachia that have similar site conditions. By exemplifying the integration of renewable energy, AML remediation,

Tom's Creek



aquaculture, hydroponics, and entrepreneurship, this project could have far-reaching impacts into the future, providing a catalyst for innovative AML redevelopment. The majority of the identified site lies on two parcels, both of which are owned by Paramount Coal Company of Virginia. The northernmost portion of the site may intersect with a parcel owned by Heartwood Forest Fund, a subsidiary of Forestland Group. Virginia DMME was unable to provide precise location information for the discharges and, as such, it is not known which parcels are associated with those.

■ Issues and Eligibility

This site is eligible for RECLAIM funding. The site itself is an area of poorly reclaimed or generally unreclaimed land due to pre-1977 mining. The Virginia DMME database of AML features notes the presence of a large gob pile, or coal waste area, and a dangerous embankment in the northwest corner as well as several clogged streams. Examination of the site via aerial imagery indicates that the gob area and dangerous embankment have likely been previously reclaimed, but this has no effect on the site's eligibility, as there is no indication that the clogged streams have been reclaimed. There are also numerous AML features very near the site, including portals and additional clogged streams. No area of the site has been permitted for mining since 1977.

■ Next Steps

This site is in Wise County, making the Wise County Industrial Development Authority a top-tier point of contact, along with LENOWISCO, the three-county planning district for Lee, Wise, and Scott counties and the City of Norton. Wise County is within the southwest service area of the Tobacco Region Revitalization Commission, an important and often utilized state-managed grantmaking institution. Given the agriculture-oriented nature of the proposed project, Wise County's agricultural extension agent is a potential collaborator, as is Appalachian Sustainable Development. Lastly, Blue Ridge Aquaculture's status as a regional industry leader make them a good fit for this effort.

■ Cost Summary

There are three AML problems in the inventory that directly impact the site: a large gob or coal waste area, a dangerous embankment, and approximately 1,000 feet of clogged streams. Preliminary investigation suggests that the gob pile and embankment have been reclaimed. Costs for remediation of clogged streams generally range from \$150 to \$200 per linear foot plus mobilization costs, bringing the bill for clogged stream remediation to \$15,000 to \$20,000 plus mobilization.

Estimated AML remediation costs	\$15,000-20,000 plus mobilization
Estimated project cost	\$2,000,000-\$4,000,000

Glamorgan Development Site

Wise County, Va.



The Glamorgan site is a 114-acre area of generally unreclaimed or poorly reclaimed pre-1977 surface mining in Wise County, Virginia, approximately four miles north of the City of Norton and one mile northwest of the corporate boundary of the Town of Wise. The northern portion of the site abuts U.S. Highway 23 and U.S. 23 Business toward the Town of Wise, which is near the site but not directly adjacent to it. The site is largely surrounded by residential areas, though the area to the north is dominated by large tracts of vacant land.

Current ownership of the site is divided between several entities. Twelve parcels intersect the site, five of which are owned by the Glamorgan Coal Company. The remaining seven parcels are owned by individuals or groups of individuals, with the exception of one that is owned by Knox & Sons Oil Company. The Glamorgan Coal Company holdings amount to forty-two acres of the Abandoned Mine Lands (AML) area, though this area does not include the one AML feature in Virginia DMME's database. This parcel adjoins U.S. Highway 23. The second largest section, which covers thirty-seven acres of the AML area, is owned by a private citizen.

Additional access to the site by existing roads is possible from local Route 1407, Taft Road, along the west central portion of the site. There is no known public road access

to the southern portion of the site, though numerous private roads are visible in aerial imagery.

The northern portion of the site is crossed by electrical transmission lines of unknown voltage. The site is in the service area of both cable and DSL internet services. The site is generally higher in elevation than the surrounding areas and includes a number of ridge tops. Elevation and slope is highly variable. Slope aspects are predominantly west and north in the northern section of the site and north/south and west in the southern portion of the site.

Investigations into the current use of the site have shed little light. Personal communication with residents suggests that the property is casually utilized by locals for recreation. There are several 4-wheel drive roads used for maintenance on nearby gas wells. Also of interest is anecdotal evidence of planned commercial development across U.S. Highway 23 on property also owned by Glamorgan Coal Company.

This site is suitable for a variety of potential projects. Its proximity to existing residential and commercial areas, as well as busy roads, makes this site an attractive area for commercial or residential development. The presence of transmission lines is both a positive and prohibitive aspect of this site, as those lines mean access to electricity as well as prohibitions on certain types of building within a certain distance of the lines.

Glamorgan Development Site



Possible uses of this property depend largely on the interests of residents and potential project partners.

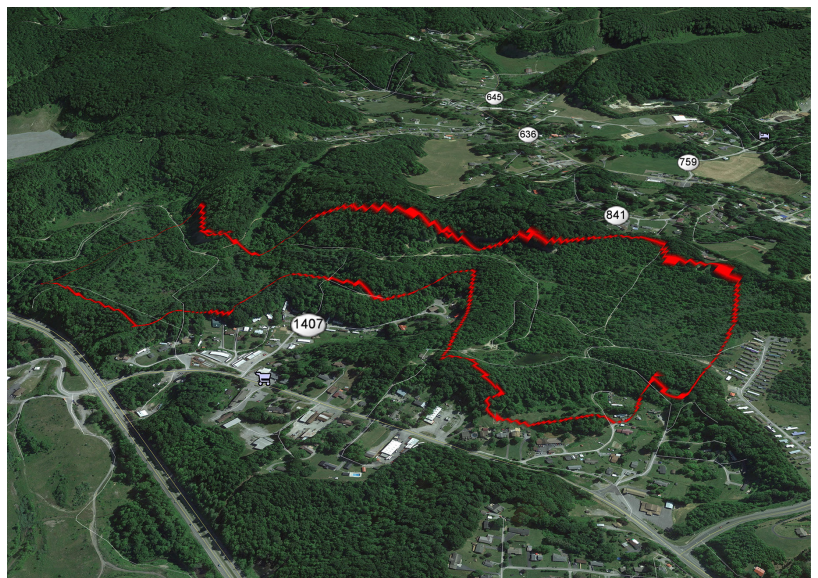
There is no significant proposal for this site. However, the characteristics outlined above make this a site of considerable promise.

■ Issues and Eligibility

This site is eligible for RECLAIM monies for several reasons. First and foremost, the entire area was mined before 1977 and was not reclaimed to modern standards. One AML feature—a clogged stream—is on the site. It is highly likely that other distinct AML features are on this site. Lastly, this area is generally adjacent to AML features and communities historically affected by coal mining. No portion of the site was re-mined or otherwise permitted for mining use after 1977.

■ Next Steps

There are no active partners for this site, but there are several key economic development entities within the area. The site is in Wise County, so the Wise County Industrial Development Authority is a top-tier point of contact, as is LENOWISCO, the three county planning district for Lee,



Wise, and Scott counties and the City of Norton. Lastly, Wise County is within the southwest service area of the Tobacco Region Revitalization Commission, an important and often-utilized state-managed grantmaking institution.

■ Cost Summary

Remediation needs are largely unknown and costs would depend on the end goal for the site.

Estimated AML remediation costs	Unknown
Estimated project cost	Not available

Route 606 Solar Facility

Lee County, Va.



The 124-acre Route 606 property lies northwest of Pennington Gap and just south of St. Charles. The property is owned by Midway Enterprises, LLC, a defunct Pennington Gap-based business entity. Primary access to the site is from Dandelion Drive, which is off of St. Charles Road/State Route 352. The site is to the southeast of St. Charles, one of three incorporated towns in Lee County and home to 954 persons as of the 2000 census. The site is approximately 1.5 miles south of U.S. Route 421.

The property is forested with an elevation range of more than 200 feet. Hillside aspect is predominantly north and south. The property is crossed at its center by Meadow Branch, a tributary of Straight Creek. Additionally, at its western edge the property is crossed by a transmission line that comes from the Pocket Substation, which sits 2,500 feet southeast from the property center.

The U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response and Center for Program Analysis established the RE-Powering America's Land Initiative to demonstrate the enormous siting potential that Abandoned Mine Lands (AML) sites and other contaminated lands provide for developing renewable energy projects in the United States. In far Southwest Virginia, the EPA identified 2,829 potentially contaminated sites that have renewable energy development potential. More than four hundred of these sites scored high for potential large-scale solar installation; Rt. 606 is one of these.

The Route 606 Site was identified by EPA's RE-Powering America's Land as a possibly contaminated area that has renewable energy development potential for a large scale solar installation.

After addressing the land cover and topographic constraints of the property, it is estimated that the site would be suitable for the construction of a 10-megawatt solar facility. This would require 40 to 50 acres of land and leave room for other types of development. A system of this size could reasonably produce 25 GWh¹ per year, enough electricity to power nearly 2,300 homes². The construction of a solar facility of this size would support more than 100 local jobs. Over the long term, this facility would support one or two local Full-Time Equivalent jobs³.

1. This assumes a capacity factor of 28.6 percent, the 2015 national utility-scale average. Given the advancement and wider deployment of axis solar tracking technologies, we feel this capacity factor is appropriate and attainable. This generation estimate also assumes 8,760 hours in a year.

2. Assumes average monthly household consumption of 911 kWh (EIA, 2014).

3. Using Appalachian Institute for Renewable Energy NC assumptions

Route 606 Solar Development



■ Issues and Eligibility

Rt. 606 is eligible for RECLAIM funding. The site hosts numerous dangerous highwalls, clogged stream lands, and a clogged stream, all considered Priority 1 AML problems. Virginia DMME mapping data indicates the presence of at least eight highwalls, three areas of stream clogging, and one section of clogged stream. Meadow Branch has not been assessed for impairments by the Virginia Department of Environmental Quality, however, the stream is a tributary of the Powell River, which is listed as impaired for Benthic Macroinvertebrate bioassessment. No area of the site has been permitted for mining post-1977.

■ Next Steps

There are no active partners for this site, but there are several key economic development entities in the area. The site is in Lee County, which is part of the LENOWIS-CO Planning District Commission, a key contact for large development of this sort. Also important will be the Lee County Industrial Development Authority. This site is also in Old Dominion Power's service territory. If grid-scale solar

development is desired for this site, coordinating with Old Dominion Power will be vital.

■ Cost Summary

There are at least eight highwalls on this site, a feature whose remediation costs can vary widely depending on size, slope, and final site design. Backfilling each of these highwalls would cost \$200,000 to \$300,000 each, for a total remediation cost of \$1,600,000 to \$2,400,000. Virginia DMME data identifies three clogged stream areas and one clogged stream segment. Estimating the cleanup costs of these features without site surveys is difficult, but Virginia DMME has previously utilized an estimated cost of \$150 to \$200 per foot, plus mobilization costs (no estimate available). Rt. 606 includes approximately 2,800 linear feet of clogged stream which would cost between \$420,000 and \$560,000 to remediate.

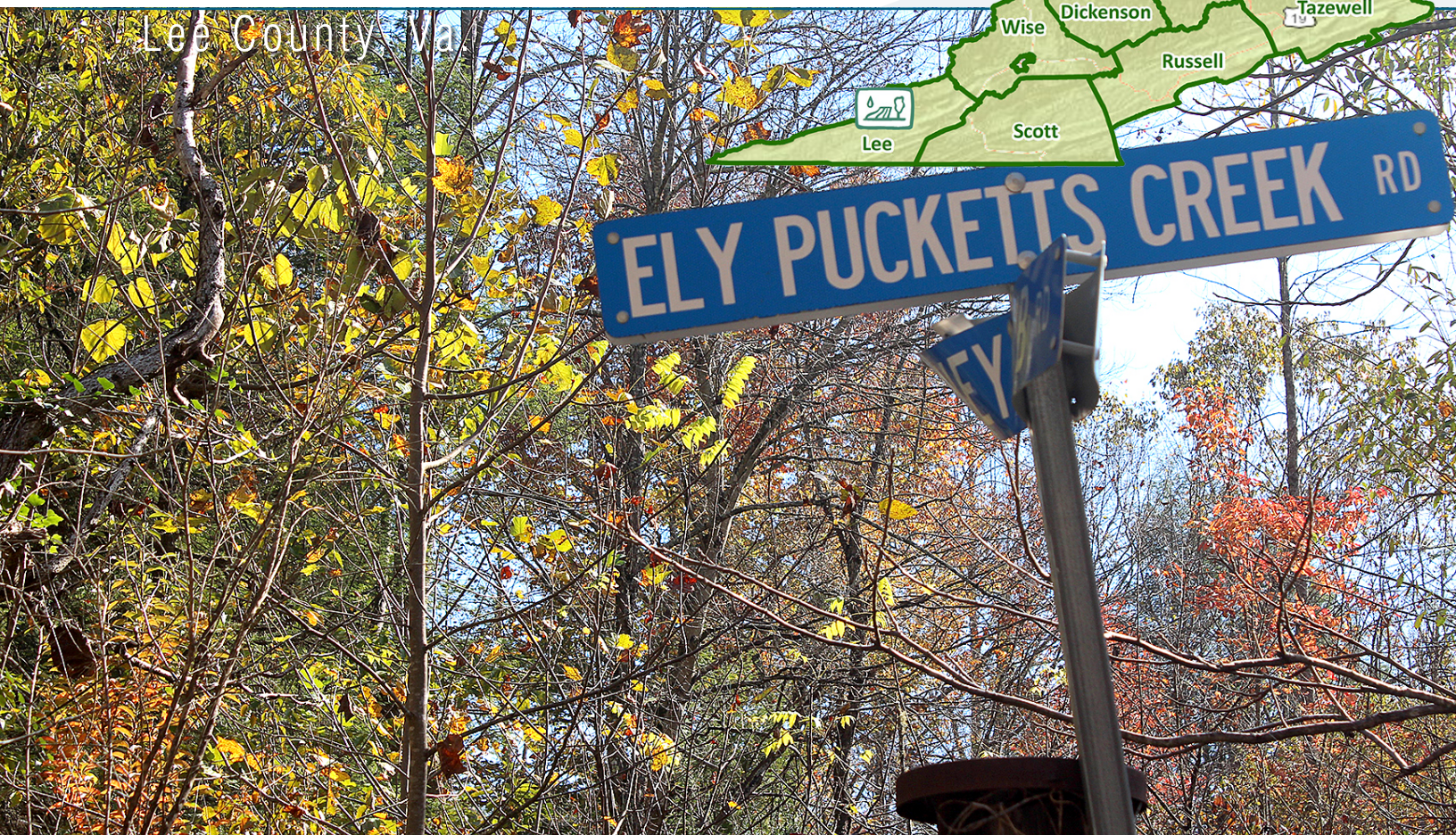
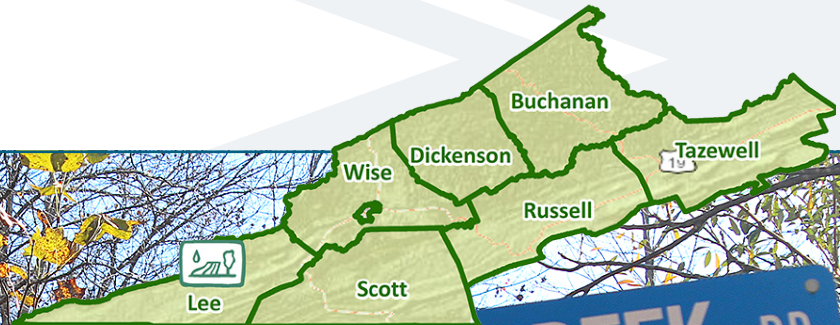
The total estimated cost of building a 10-megawatt solar facility is approximately \$16 million⁴.

4. Using Appalachian Institute for Renewable Energy NC cost assumptions.

Estimated AML remediation costs	\$2,020,000-\$2,960,000
Estimated project cost	\$16,000,000

Puckett's Creek

Lee County, Virginia



Puckett's Creek is a 167-acre area of pre-SMCRA mining in Lee County, Virginia, just to the west of the unincorporated community of Stone Creek. U.S. Route 421 runs through Stone Creek, 1.2 miles south of the site. Wolf Branch Road, a county route, runs very close to the site and, by way of old coal mine haul roads, could serve as a connection to U.S. Route 421. The site is also five miles from Pennington Gap, Virginia, the most populous town in Lee County, which provides an improved connection to U.S. Route 58 via U.S. Route 58 ALT.

The Puckett's Creek site is divided into two areas, a sixty-acre site to the west of Wolf Branch and a 107-acre site to the east. Detailed ownership information is not available for these parcels.

The overall site boasts a variety of topography and cover. Approximately 60 percent is in forest cover, 15 percent is cleared and the remaining area is in woody brush. There is a small (less than two acres) pond in the northwest corner of the site. The cleared portion may currently be used for grazing. The terrain is typical of the area, and the site includes valley bottoms, hillsides, and ridges.

The Puckett's Creek site is located within two miles of an

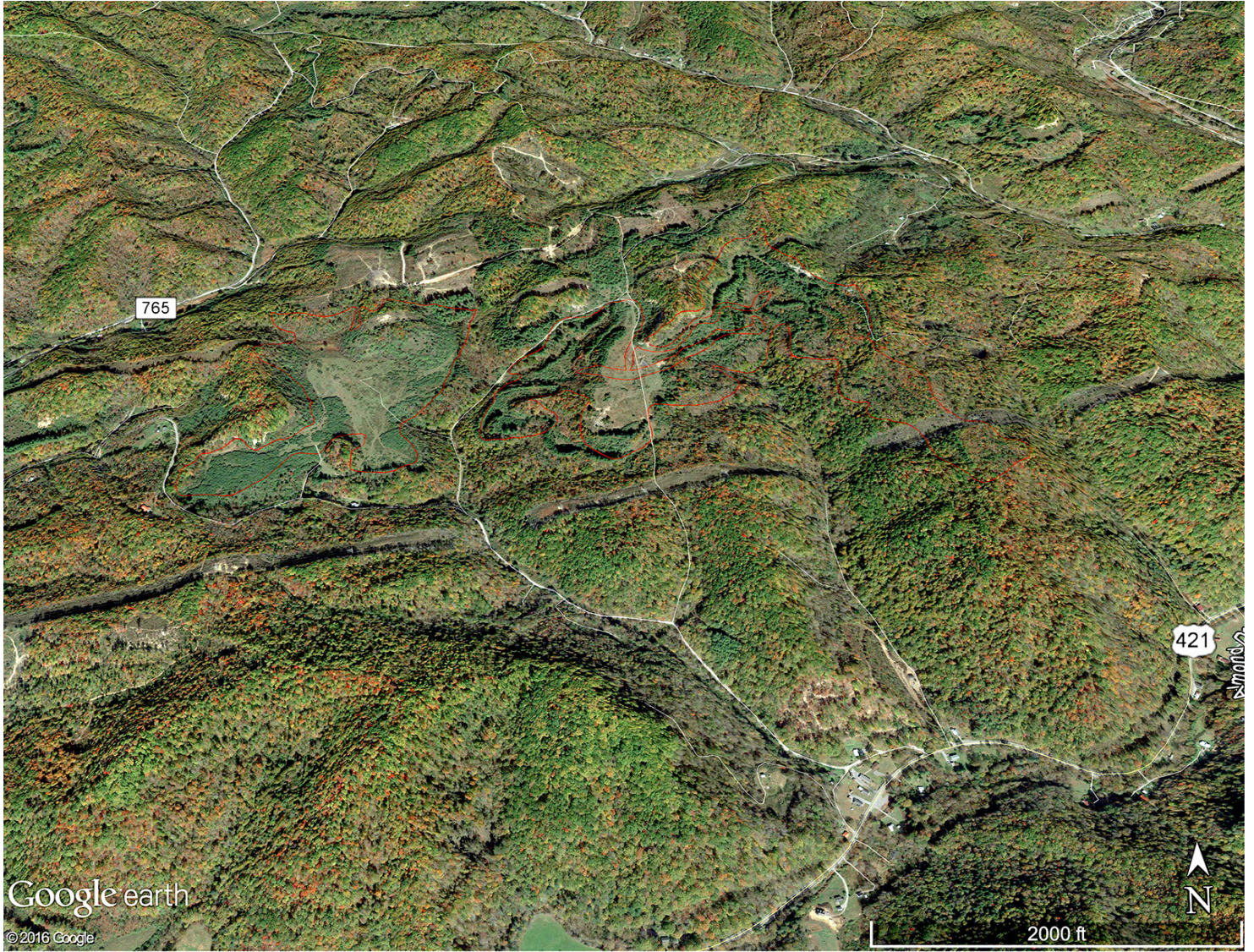
electric substation, and a transmission line runs along the southern edge of the site. The site's proximity to these features is desirable for solar development, but the highly varied topography could be a hindrance.

This site is on the edge of a fiber-optic internet service line, the only internet service available to the area according to the Commonwealth of Virginia's broadband map. Wireless 3G data is available.

■ Issues and Eligibility

The Puckett's Creek site is eligible for RECLAIM funding. In addition to being an area of generally unreclaimed or poorly reclaimed pre-1977 mining, the Virginia DMME documents the presence of ten dangerous highwalls. The site is immediately adjacent to modern mining, but no portion of the identified site itself has been permitted for mining since 1977. Access to the site would, however, likely require utilization of mine roads developed through a modern mining permit. The site intersects two streams, but neither have been assessed for impairment by the Virginia Department of Environmental Quality.

Puckett's Creek



Next Steps

This site is located in Lee County, so coordination with and input from the Lee County Industrial Development Authority as well as the LENOWISCO Planning District will be vital for any development to occur. Though the site is outside of the municipal boundary of Pennington Gap, the proximity to the town will likely garner interest from officials and residents.

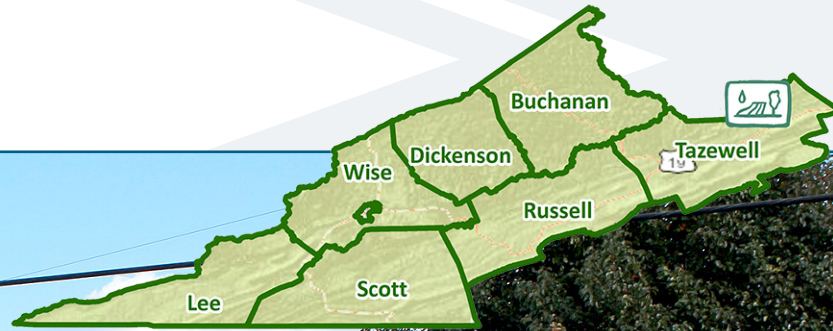
Cost Summary

The Puckett's Creek site includes or intersects ten dangerous highwalls totaling nearly 7,000 feet in length. Repairing these by backfilling would vary per highwall from \$100,000 to \$1,000,000 depending on numerous factors, including the height of the feature, ease of access, and final usage of the site. Because of the variety of features on this site, a full estimate is not available.

Estimated AML remediation costs	Not available
Estimated project cost	Not available

Abbs Valley

Tazewell County, Va.



Abbs Valley is a large, 152-acre area of pre-1977 mining in Tazewell County, Virginia, northeast of Abbs Valley, an unincorporated community. The site is north of County Route 644 and west of County Route 758. Other nearby communities are Boissevain, Pocahontas, and Horsepen, all in Tazewell County, and Jenkinjones in Buchanan County.

The Abbs Valley site crosses nine parcels, the largest of which is owned by Pocahontas Land Corporation. The second largest owners are listed as holding seven parcels that intersect the southern and southeastern portions of the site. A third landowner holds the northern portion. Due to its odd shape, the site covers a variety of terrain and intersects at least one addressable structure, which is presumed to be a residence.

The majority of the site is forested. The one exception is a twelve-acre section in the southeastern portion of the site that is cleared and evidently utilized for grazing. This area is dominated by a classic Abandoned Mine Lands (AML) feature—an “apple core” highwall, so named for its shape. The site is located near transmission lines and within cable internet provider service areas.

The eastern “apple core” section of the Abbs Valley site is accessible via an unimproved private road and, in

addition to being cleared for grazing, includes at least two ponds. No information on the water quality of these ponds is available, but the proximity of the cleared area and surface water is potentially favorable for an agriculture-oriented project.

■ Issues and Eligibility

The Abbs Valley site is eligible for RECLAIM funding. In addition to being an area of generally unreclaimed pre-1977 mining, there are seven highwalls and a number of clogged streams and clogged stream lands. Additionally, there are documented water quality issues relating to AML in the area. No part of the site has been permitted for mining since 1977.

■ Next Steps

This site is in Tazewell County, so the Tazewell County Industrial Development Authority and the Cumberland Plateau Planning District Commission are ideal collaborators. Given the land’s current use for grazing, agricultural entities including the county agriculture extension agent and Appalachian Sustainable Development may have interest in collaboration.

Abbs Valley



■ Cost Summary

There are approximately 3,300 feet of clogged streams on this site alongside seven highwalls totaling approximately 7,000 feet in length. Remediation of clogged streams costs \$150 to \$200 per linear foot plus mobilization costs, so mitigation here would cost between \$495,000 and \$660,000 plus mobilization costs. The largest highwall—the “apple core” structure in the eastern section—is an interesting case in that remediation of that feature by backfilling would most likely alter the current siting of fields and ponds. This is not a unique situation. There are numerous areas across Southwest Virginia and Central Appalachia as a whole

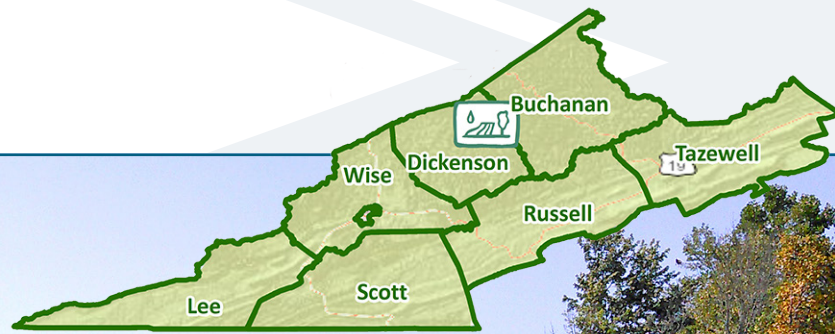
where benches created by highwall mining are now in use for agricultural and a variety of other activities. In these cases, remediating the highwall could negatively impact the current use of the land, while, on the other hand, leaving the highwall intact could continue to expose a sedimentation and possible public safety liability.

The “apple core” structure is by far the largest highwall (4,400 feet) and mitigation by backfilling would cost between \$1,837,700 and \$3,256,000. The remaining highwalls would cost between \$100,000 and \$400,000 each to mitigate by way of backfilling, for a total cost of \$600,000 to \$2,400,000.

Estimated AML remediation costs	\$2,932,700-\$6,316,000
Estimated project cost	Not available

Foxfire Farm

Dickenson County, Va.



Foxfire Farm is an approximately 110-acre farm in Birchleaf, Virginia, in Dickenson County. It is owned and operated by Tamela “Tammy” Owens and her daughter, who purchased the land in 2011 and have since been transforming the property into a sustainable farm. Significant portions of the property were mined and several areas were mined prior to the 1977 passage of SMCRA. Owens is a lifelong organic farmer and has been steadily working to improve soil quality, establish or improve farm infrastructure, and lay the foundation for a highly integrated permaculture operation that leans heavily on the production of cultivated and wild-simulated medicinal herbs. Owens and her daughter have recently received U.S. Department of Agriculture and Natural Resources Conservation Agency grants to support the establishment of their operations. One of the biggest challenges facing the venture is the poor soil quality that was created through inadequate reclamation of pre-law surface mining.

■ Issues and Eligibility

Portions of the farm and surrounding properties were surface mined throughout the 1960s and ‘70s and into the very early 1980s. Interestingly, mining operations were active after the passage of SMCRA, but before the

“My property is clearly representative of the mass majority of land that has been strip mined and reclaimed. Even after almost 50 years, the land is unproductive and nowhere near what it was before it was mined. It is my vision and goal to exemplify through intense cultivation and methods to transform this land into both viable multipurpose farmable land and forest farming.”

Tammy Owens

Virginia Department of Mines, Minerals and Energy was established, commonly known as the beginning of “State Primacy.” This time period between the passage of federal legislation and the establishment of the state agency responsible for administering the law is known as the “Interim Period.” Sites such as Foxfire Farm are currently eligible for regular Abandoned Mine Lands (AML) funding, but would not be eligible for RECLAIM funding unless OSMRE alters the wording of the existing guidance to include post-mined lands that fall under this interim period.

Additionally, while portions of Foxfire Farm are technically eligible for traditional AML funding, there are currently no

Foxfire Farm



officially listed AML features registered with OSMRE or DMME. This is not to say that there are no AML features altogether, just none that are listed in the inventory. In fact, Owens reports several occasions since purchasing the property when slumping or sinkholes have occurred. On these occasions, Owens addressed the issues herself without notifying DMME. Furthermore, much of the cleared area currently serving as pasture—as well as some reforested woodland where herbs are grown—consists of extremely poor quality soil left as a result of poor reclamation practices, which could conceivably be categorized as a Priority 3 AML feature.

■ Project Status

Foxfire Farm already serves as a model for utilizing post-mined land for sustainable agriculture in the heart

of Southwest Virginia’s coalfields. As mentioned above, grant funding has already been secured to support organic medicinal herb, fruit, and vegetable production, and much of the post-mined land is currently being used as pasture and hayland.

RECLAIM funding would primarily be used for a topsoil restoration project, which could be undertaken at any point should funding become available.

■ Cost Summary

Virginia DMME’s Division of Mined Land Reclamation currently uses the figure of \$2,400 per acre to re-establish twelve inches of topsoil on barren, post-mined ground. Foxfire Farm pastures consist of approximately seventy-five acres of post-mined land in need of soil improvement.

Estimated AML remediation costs \$180,000

Big A Mountain

Russell County, Va.



An example of a high tunnel that could be part of the Big A project

Big A Mountain is a 250-acre site in Russell County, Virginia, near the border with Buchanan County. The site is a mountain top, but because it has been mined, it is quite flat.

The Big A site is rural, lying approximately 2.5 miles from State Route 615, a two-lane highway. While there are several unincorporated communities surrounding the location, such as Dante, Trammel, and Hazel Mountain, the nearest municipality is Honaker, Virginia, population 1,410. Lebanon, Virginia, the county seat, as well as U.S. Highway 19, a four-lane highway, are approximately fifteen miles to the southwest.

The northwest corner of the site is crossed by 765 kV transmission lines. There are seven gas wells on or near the site, and an examination of aerial photography indicates that the northwest and far southern portions of the site are currently used for grazing. There is at least one barn on-site as well as two small ponds. The land cover of the site is dominated by shrub and grass, with white pine stands typical of Abandoned Mine Lands (AML) in areas around possible unreclaimed highwalls.

The site intersects at least twenty-eight land parcels.

Big A Mountain's size, topography, land cover, and proximity to transmission lines are conducive to the development of a large-scale solar facility. Existing gas infrastructure and water features would have to be avoided, but one could reasonably fit more than 10 megawatts (MW) on the site, covering forty to fifty acres of land and leaving room for other types of development. A system of this size could reasonably produce 25 GWh per year¹, enough electricity

to power nearly 2,300 homes². The construction of a solar facility of this size would support over one hundred local jobs. Over the long term, this facility would support one to two local Full-Time Equivalent jobs³. The total estimated cost of building a 10 MW solar facility is close to \$16 million⁴.

This site also exhibits a number of characteristics that are conducive to various types of agricultural development. The site is quite level and has existing roads, fencing, and access to water. The rurality of the site is less problematic in the context of agriculture, though that will vary with the final business model. The southern portion of the site boasts sufficient land area for the construction of a large number of agricultural high tunnels (typical dimensions of commercial high tunnels are 30' x 96'). High tunnels are often viewed as a season extension tool, but growing certain crops under high tunnels is a year-round endeavor that can increase yields over traditional growing methods. Additionally, high tunnels are well suited for growing on former surface mine lands, as they allow for the construction of raised or hilled beds, which may be a requirement

1. This assumes a capacity factor of 28.6%, the 2015 national utility-scale average. Given the advancement and wider deployment axis solar tracking technologies, we feel this capacity factor is appropriate and attainable. This generation estimate also assumes 8,760 hours in a year.

2. Assumes average monthly household consumption of 911 kWh (EIA, 2014).

3. Using AIRE NC assumptions.

4. Using AIRE NC cost assumptions.

Big A Mountain

depending on soil conditions.

Key factors for a successful high tunnel operation include a level building space and access to water, both of which are widely available on this site. A commercial high tunnel growing operation focusing on greens and other cool weather crops such as broccoli and cabbage for institutional or wholesale markets would start with three to four high tunnels and expand from there, based on markets. A facility of that size would be quite small compared to the real estate available on this site, leaving ample room for expansion. An operation of this size could support two to three year-round Full-Time Equivalent positions as well as some seasonal employment.



■ Issues and Eligibility

Eligibility of this site for RECLAIM monies is somewhat unclear. Virginia DMME data indicates that the site is both an area of pre-1977 mining and that it has been permitted since that time. Data on AML features suggests that there are several dangerous highwalls on-site as well as several clogged stream lands. Immediately adjacent to the site are two dangerous slides and a clogged stream channel. Some of these features—dangerous highwalls, in particular—do not intersect post-1977 mining permit boundaries, suggesting that they are still present and, as such, eligible for RECLAIM funding. Much will depend on the specific plan.

■ Next Steps

There are currently no active partners for this site, but there are several key economic development entities within the area. The site lies within Russell County, so the Russell County Industrial Development Authority is a top-tier point of contact, as is the four-county Cumberland Plateau Planning district, which serves Buchanan, Dickenson, Russell, and Tazewell Counties.

Lastly, Russell County is within the Southwest service area of the Tobacco Region Revitalization Commission, an important and often-utilized state-managed grant making institution. The Big A Mountain site's potential for agricultural development also lends itself to collaboration with and input from Appalachian Sustainable Development, an agriculture, forestry, and economic development entity headquartered in Duffield. Alongside numerous other partners, the nonprofit organization's efforts have resulted in a large expansion in market-oriented agriculture in Southwest Virginia.

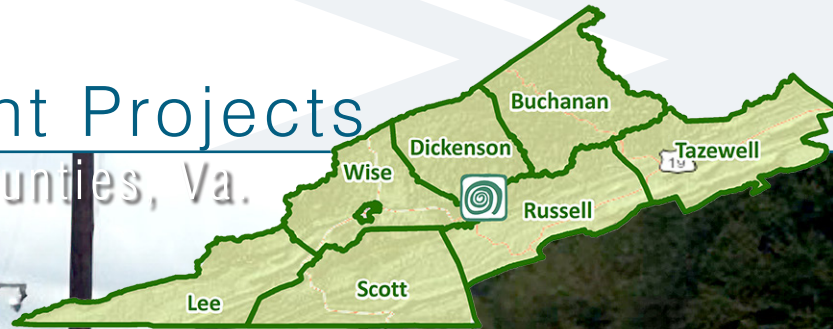
■ Cost Summary

Remediation needs are largely unknown and costs would depend largely on the end goal for the site. There are three dangerous highwalls on-site, according to the Virginia DMME AML inventory, totaling approximately 5,000 feet in length. Mitigation of these features by backfilling will be an expensive proposition, totaling well over \$2 million.

Estimated AML remediation costs	> \$2,000,000
Estimated project cost	Not available

Dante Development Projects

Russell and Dickenson Counties, Va.



The Town of Dante, Virginia, population 650, enriched by its history and culture, seeks a vision and path towards economic transition and vitality. The community came together to form the Dante Community Association, a group of residents, organizations, and business striving to transform the town. The community association is formed around five main themes: (1) cleanup and beautification, (2) infrastructure, (3) parks and recreation, (4) preservation, and (5) tourism and economic development. The vision of the Dante Community Association is as follows: “Compounded by robust partnerships with neighboring towns and counties, Dante will once again see values in the homes, visitors to the town, and a resurrected sense of hope and ultimately pride in this great community, all while preserving the extensive history and small-town values.” Reclaiming Abandoned Mine Lands (AML) sites is a natural fit for these visions.

The Dante Community Association is currently developing a strategic plan which outlines three phases for implementation: (1) pre-planning; (2) planning and design; and (3) implementation. Dante is part of the Clinch River Valley Initiative and lies within close proximity to St. Paul, Virginia. St. Paul is on the cusp of a major renaissance, seeing millions of dollars of investment in place-based development initiatives. One of the most progressive and interesting proposed concepts is the creation of the Clinch River Ecological Campus. The campus aims to be the ecological epicenter of Southwest Virginia, with direct ties to Dante and the project concepts presented in this profile.

“Compounded by robust partnerships with neighboring towns and counties, Dante will once again see values in the homes, visitors to the town, and a resurrected sense of hope and ultimately pride in this great community, all while preserving the extensive history and small-town values.”

Dante Community Association

Dante has already identified seven project sites and concepts for its own transition, two of which are aligned with possible RECLAIM funding opportunities. These project concepts present a regional approach to economic development, building on existing initiatives and regional factors, which will ensure success.

Arty Lee Environmental Center, Recreation Fields, and Spearhead Trails Trailhead

The Dante Ball Field is 100 years old as of 2016. It was built on the rock and soil excavated from the Sandy Ridge Tunnel, located within walking distance of the field. The ball field was built and used by a “semi-pro” baseball team from Clinchfield Coal Company. All the local coal companies fielded teams to compete against one another, and all the players were paid to work in the mines and play

Dante Development Projects



The former Arty Lee School (above)



baseball. In recent years, due to lack of interest and little funding, the field has fallen into disrepair. Adjacent to the site is the former Arty Lee School, constructed in 1953 and fallen into a state of disrepair since its closure decades ago. The Dante Community Association has worked closely with county officials and local residents to begin restoring this area. The group would like to see the ball field area converted into a recreational area and the school transformed into an Environmental Education Center—integrated with the Ecological Campus in St. Paul—as well as the Spearhead Trailhead.

The former school was used as storage for core drillings from mining explorations, which are still located onsite. This site, while not in the AML inventory, could be classified as adjacent to AML in a community affected by mining, and thus is eligible for RECLAIM funding.

Heartwood Forest Fund AML

The second site in Dante is owned by Heartwood Forest Fund, a subsidiary of the Forestland Group and, in

partnership with Kentucky nonprofit group Green Forests Work, presents an ideal opportunity for reforestation. The Heartwood site is approximately 120 acres and could take shape in a number of ways, possibly housing several synergistic economic development projects.

Two attributes make the Heartwood Forest site a candidate for an agriculture-oriented project: flat land and access to nearby food projects. Local parties have expressed interest in a farm training and business incubation center, which could be created in partnership with local food organizations. This would provide local employment as well as an expansion of entrepreneurship opportunities. The center would offer training for new and beginning farmers and provide access to resources and land. High tunnels and farming plots could be developed, providing growing and incubation space for new farmers. In addition, a research facility could be created to study and perfect methods for developing agricultural projects on former mine sites. This subject, as well as the overall theme of supporting

Dante Development Projects



agriculture entrepreneurship, aligns well with the vision of numerous regional agricultural organizations such as Appalachian Sustainable Development, the Hinterlands Coalition, and the Powell River Project, as well as institutions of higher education in the region.

A community connection between agriculture and the town could be developed through the rehabilitation of a dilapidated railroad depot in the center of Dante. Through the planning process, the Dante Community Association is advocating for a community-owned grocery store to be located in the old depot. Food grown on-site could be sold at this new town market, attracting residents and visitors. Funds have already been raised to begin the restoration of

the depot and Russell County is working with the depot's owners, CSX Transportation, to attain ownership.

Also of interest is the recent announcement by The University of Virginia's College at Wise to establish a cyber security accelerator in the school's Oxbow Center, which was formerly a conference center. This facility will house faculty, students, and corporate researchers working to develop software for the world's fastest-growing technology sector. Dante, located just six miles away, is positioned to capitalize on this training and business incubation center. Developing a technology company on the site could be a boon for the local economy and provide competitive, well-paying jobs for local and regional residents. Graduates, presumably mostly

Dante Development Projects

local, would have further motivation to stay in the area and develop a career in the new technology industry.

To create a more attractive site, a utility-scale solar project could be developed to power both the technology center and the homes of Dante. The Heartwood Forest's size, topography, and land cover are conducive to the development of a large-scale solar facility. Existing gas infrastructure would have to be avoided, but a developer could reasonably fit more than 5 megawatts (MW) on the site, covering less than twenty-five acres of land and leaving room for other types of development. A system of this size could reasonably produce nearly 13 GWh of electricity per year¹, enough to power more than 1,100 homes². The construction of a solar facility of this size would support more than fifty local jobs. Over the long term, this facility would support one local Full-Time Equivalent job³; however, it could provide electricity to thousands. The total estimated cost of building a 5 MW solar facility is close to \$8 million⁴.

■ Issues and Eligibility

The community of Dante is surrounded on all sides by a diverse array of AML issues, clearly qualifying the town as a "community impacted by historic coal production." There are numerous gob (or coal waste) areas, portals, mine openings, and hazardous equipment immediately adjacent to Straight Hollow Road, which connects a large residential area to Dante. The Dante Ball Field site itself is immediately adjacent to two large sections of clogged stream (Laurel Branch) and close to numerous other AML features.

The larger Heartwood Forestland Group-owned site, immediately to the south of Dante, is more nebulous in terms of eligibility. The most immediately usable portion of the site has been permitted and mined since 1977, most likely rendering it ineligible, but there are a wide array of AML features immediately adjacent to the site including portals, mine openings, and hazardous equipment. In fact, a more logical access to this site is to the east, a path which would require some road construction that would pass near numerous AML features in order to connect with an existing road. The entire site is clearly situated within a community impacted by historic coal production.

■ Next Steps

There are numerous parties at work within the community

of Dante, including the Dante Community Association and the Clinch River Valley Initiative. These entities are heavily engaged and invested in transitioning the economy of Southwest Virginia. The site lies within Russell County, so the Russell County Industrial Development Authority and the Cumberland Plateau Planning District would be powerful partners in any effort in this region. Lastly, this site's potential for agricultural development also lends itself to collaboration with and input from Appalachian Sustainable Development, an agriculture, forestry, and economic development entity headquartered in Duffield, Virginia. Alongside numerous other partners, the nonprofit organization's efforts have resulted in a large expansion in market-oriented agriculture in Southwest Virginia.

■ Cost Summary

Remediation of the clogged streams near the Dante Ball Field would cost \$150 to \$200 per linear foot plus mobilization costs. Given the very large quantity of clogged streams in the area, remediation costs could range significantly. Remediation of 1,250 feet of clogged stream near the project site would cost \$187,500 to \$200,000, while remediation of the entire clogged stretch of Laurel Branch (approximately 1.8 miles) would cost between \$1,350,000 and \$1,800,000. Remediation of this scale would most likely necessitate addressing a number of other features in the headwaters of the stream including dangerous slides, gob piles, and mine openings.

In the case of the Heartwood Forest site to the south of Dante, where an existing logging road could be improved and extended to the east to connect to Cigarette Hollow Road (County Route 820), approximately seven portals/mine openings (\$2,000 to \$4,000 each) and two hazardous equipment sites (\$5,000 to \$50,000 each) would need to be remediated, at a total cost of \$24,000 to \$128,000.

Project estimate costs are not available at this time.

1. This assumes a capacity factor of 28.6 percent, the 2015 national utility-scale average. Given the advancement and wider deployment axis solar tracking technologies, we feel this capacity factor is appropriate and attainable. This generation estimate also assumes 8,760 hours in a year.

2. Assumes average monthly household consumption of 911 kWh (EIA, 2014).

3. Using AIRE NC assumptions.

4. Using AIRE NC cost assumptions.

Estimated AML remediation costs	See above
Estimated project cost	Not available

Issues, Challenges and Recommendations

Based on our analysis, we propose the following recommendations to facilitate implementation of RECLAIM and Pilot Project funding and to improve the ability for regional entities to address issues around economic development of former coal sites:

1. AML areas that were mined after the passage of SMCRA should not automatically be excluded from eligibility for RECLAIM funding.

In Southwest Virginia, much of the AML inventory is criss-crossed with mining that occurred after the passage of SMCRA. In fact, according to the Virginia DMME, up to 80 percent of permitted surface mines in the commonwealth have included re-mining in or around AML features. While this has reduced the overall number of remaining AML features that must be addressed, it also creates a unique challenge in that many of those same features could be further reclaimed to higher standards while also creating a positive economic impact. The Wise County Airport project exemplifies this challenge.

2. State and federal AML inventories must be updated and modernized to reflect current mining status using new mapping and data sharing platforms.

Existing databases present immense challenges to determining location and potential eligibility of AML features for funding. Mapping technology has evolved significantly since the creation of AML programs, but in many cases certain mapping data have not been updated since the early 1980s. Sifting through old and new mapping information and manually cross-referencing data points to determine exact location of AML features and relationships to recent mining activity was a tremendous challenge to creating this analysis.

3. RECLAIM and Pilot Project funding eligibility guidelines should, at a minimum, mirror existing AML expenditure guidance.

Flexibility in implementation is critical to spur imaginative and forward thinking projects. Specifically, AML sites that fall within the Interim Period, such as Firefox Farm, should be eligible for RECLAIM / Pilot Funding.

4. Consideration must be given to coordinated funding efforts to address environmental and safety liabilities for mining areas that are not eligible for AML funding, but that have no other entity responsible for clean up. Examples include SMCRA-exempt coal processing facilities

and post-law mine sites that are in bond forfeiture status. While some funding sources exist, such as the Environmental Protection Agency's Brownfield Fund and their state counterparts, there is still a huge deficit in funding compared to the need to fully address environmental impacts from coal mining in Central Appalachia, including a growing number of post-1977 SMCRA permitted sites that have stalled or gone defunct in their reclamation process.

5. RECLAIM and Pilot Project funding should be directed to projects that prioritize local investments, attract and retain capital and wealth within communities, and that rest on a solid foundation of sustainable, forward-looking development principles.

Decision makers need to utilize the best data available and look to cutting-edge projects and ideas when planning for funding expenditures. Traditional development models in Appalachia, especially those focused on sprawling prison complexes and commercial developments that are typical in rural areas with abundant flat land, should be replaced with development models that take maximum advantage of Appalachia's unique natural and cultural assets.

6. Local and state tax structures must be revised to motivate landowning companies to either engage in forward-looking economic activity or sell their holdings, preferably to entities that will make sustainable investments in local economies.

Land ownership issues have presented challenges for well over a century in Central Appalachia. At the heart of the problem is the fact that significant portions of coalfield counties are owned by absentee landowners or coal and timber companies. Recent shifts in the coal industry have begun to create a sea-change in land use patterns, and while there have been significant transfers of ownership between different land owning entities, the actual pattern of ownership has largely remained intact.

Next Steps



There is much work ahead. The recommendations above lay out a broad-based to-do list relating to RECLAIM work. Accomplishing any of the objectives listed above will take real collaboration from many actors. Through our early support for RECLAIM and the creation of this report, Appalachian Voices has played a critical role in the discussion and action around the proposal, paving the way for implementation in Southwest Virginia. Looking ahead, we will focus our energy on the following:

- ▶ **Support RECLAIM and Pilot Project funding in Congress.** Our work in this area began by working in partnership across state lines to pass resolutions of support for the Power Plus Plan, an element of which eventually became the RECLAIM Act. We will continue to advocate for RECLAIM and Pilot Project funding in Congress, using this study to establish the wealth of opportunities for economic diversification and revitalization in Appalachia that such funding would make possible.
- ▶ **Invest in specific projects.** Within this list of fourteen projects there are a handful that we are especially committed to seeing come to fruition. In some instances, we'll rely on partner organizations to lead the way, while in others we'll be investing considerable time and energy to ensure they happen. In a few cases, we've already made significant investments and are already seeing results.
- ▶ **Act as a resource.** We've learned a lot through this process, as is reflected in the preceding pages, and have developed specific expertise in understanding how site eligibility plays out on the ground. One very important realization we made early on is that there is not a cut-and-dry, formulaic approach that will work to spend RECLAIM funding well. While data plays a central role, there's also significant room for a community-centered approach and a great need for creativity. We hope to freely share the insight we have gained, in Virginia and across the region, in all states that stand to benefit from RECLAIM funding.