

ENERGY OUTLOOK

VIRGINIA CENTER FOR COAL & ENERGY RESEARCH

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The Tax Credit has given us a few more years. **BUT WHAT THEN?**

Let's face it. Mining is an extractive industry. When we take coal out of the ground it doesn't get put back - at least not in a time frame that is of any use to us. So we take the wealth out of the good earth, sell it, and move on. Right? **No, no, no.** That might have been the old style but now we recognize and embrace a whole spate of additional responsibilities - to the workforce, to the community, to the environment, to the local, state and national economies.

Mining generates substantial income while it is going on, directly and indirectly. The coal mining industry in the seven counties of southwestern Virginia - Buchanan, Dickenson, Russell, Scott, Tazewell, Washington and Wise Counties - is the dominant economic influence in that area. It employs over 9,000 people with an annual payroll of \$340m, providing state and local taxes of \$36m. The additional indirect and induced jobs created by the presence of coal mining account for some 35,000, providing personal income of \$1 billion. This represents over 40 percent of personal income in these seven counties.

But because it is an extractive process, mining will become uneconomic sooner or later in any given locality. The region will then take one of two paths. If a sufficient portion of the wealth created by mining has been retained within the area, to encourage the development of other industries and infrastructure, then that region will continue to grow and prosper. If, however, there has been insufficient local investment, then the area will become truly depressed or die completely. The nation and the world contain hundreds of examples of major cities and ghost towns, both of which groups commenced as centers of mining.

It is a recognition of those often-repeated lessons of history that has resulted in coal-tax moneys being utilized, in southwestern Virginia, to attract other industries. If we are to be absolutely sure that our coal counties do not fall into the depression that has, all too often, been the fate of coal communities after the coal is gone, then we must be sure that southwestern Virginia maintains a viable mining industry until the region reaches a level of guaranteed self-sustainability.

Of the 5 billion tons of coal that lay beneath Virginia at the beginning of the century, about half has been extracted. It is, primarily, the thinner seams that remain. Many of these are of high quality and low sulfur content. However, the market is changing, and low sulfur coal may no longer command the high premium that it once did. The result of all of this is that coal mining in southwestern Virginia is declining (see graph) - and so, also, are the economic benefits that accrue from it. Severance and other taxes generated from mining provide the income for the development of infrastructure, other industries and service companies not directly related to mining. That is how it should be - but this funding for alternative job opportunities and economic diversification will also diminish as coal output declines.

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Virginia



Tech

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

In the meantime, the world demand for power-station coal continues to increase. In the United States, 56 percent of our electrical energy is generated from coal, and the demand for that energy continues is rising. There also are good opportunities for exports of American coal, in particular, to Western Europe. However, Appalachian coal is in competition with inexpensively produced coal from shallow, thick seams in Western states and other countries. So the increasing demand is both good news and bad news: A growing market exists, but much of the easily mined coal has gone from Virginia. So what do we do? Roll over and die - or do what it takes to keep those curves on the graph higher and longer-lasting?

in the spring of 1996, the General Assembly of Virginia passed tax-credit legislation to encourage mining of the thinner seams in the state's coal fields. We have, maybe, a ten-year window that has been gained by this tax credit. Great. But what do we do with it? First, we realize that it has given us an opportunity to face up to reality. Which is:

Virginian coal can remain competitive only by means of improved technology.

These are the facts:

In Virginia, most of the thicker seams have been extracted.

We have high-quality coal in thin seams.

Current underground mining methods are limited by seam height.

If we are to benefit further from the good coal that lies beneath our feet, then the needed improvements in mining technology for Virginian conditions must address the following issues:

Flexibility

- to handle variations in geology, seam structure, depth and previous mining

Productivity

- to maximize the ratio of output to operating costs

Simplicity and Reliability

- requiring low maintenance, health monitoring of equipment, and minimum "production line" interdependence

Safety and Health

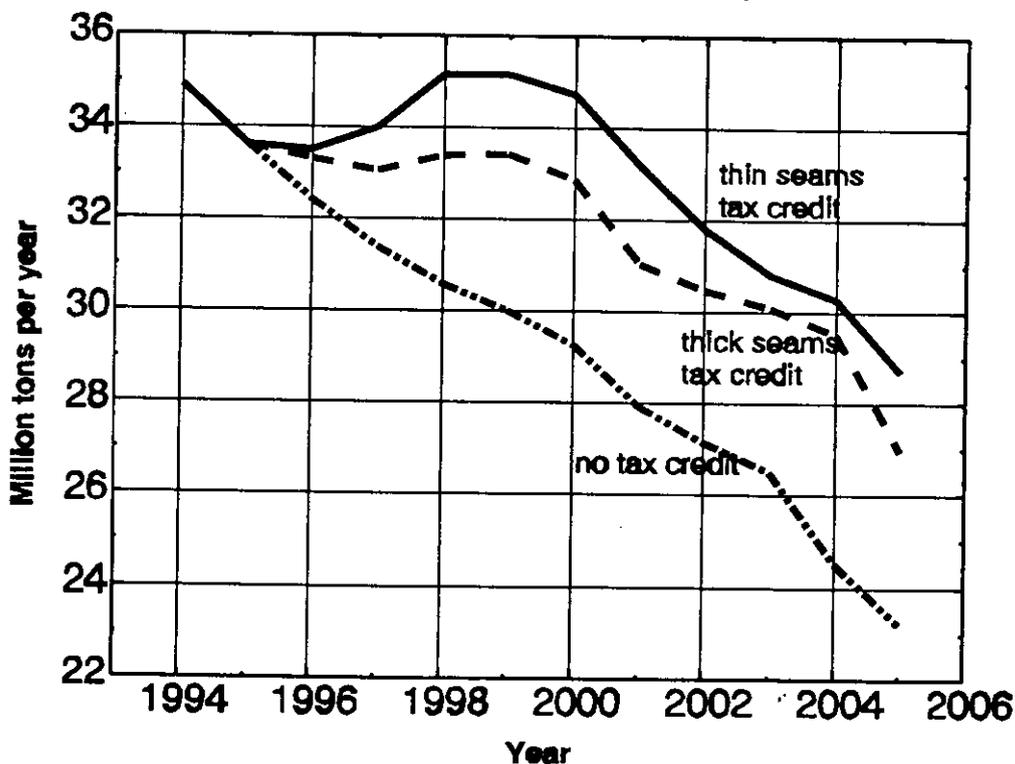
- face operations automated with good working conditions within the mine infrastructure

Environment

- mining methods must be environmentally benign in order to reduce or eliminate problems of subsidence, groundwater, methane emissions, spontaneous combustion, and to aim for zero effects on the surface environment

Coal Cleaning

- underground rather than on the surface



Projected output of Virginian coal, representing 90% of coal production in Virginia (from *Effects of Virginia Coalfield Employment Enhancement Tax Credit Legislation*, C. E. Zipper and S. M. Kambhampaty, VCCER Report No. 96-01). The increase between 1996 and 1998 is the effect of the coal-tax credit legislation passed by the General Assembly in the spring of 1996.

Can we achieve such improvements? Our manufacturers already market thin-seam mining equipment and it is being used. But we need more if we are to meet the productivity challenge, and if we are to overcome the innate conservatism that most mining folks share. (Who can blame us? It's a hard risky business we are in.) We need a new paradigm in thin-seam mining, to use that fashionable term - brand new ways of mining.

We are, though, further along than you might think. There are lots of ideas on the drawing board, and they are beginning to generate some interest. Of course, when you get down to the nitty-gritty, the old question arises. Who pays for converting ideas into practice? It is always someone else's responsibility. With the demise of the Bureau of Mines, federal funding for mining research and development has all but disappeared except in the areas of safety and health. Let's take a look at our neighboring coal mining states. We have a thin-seam problem. They have their own particular problems. The headache in Illinois is high-sulfur coal. They are spending \$3,350,000 a year on R & D. All right, coal is big business in Illinois. But closer to home, the West-Virginia-based National Research Center for Coal and Energy received \$930,000 from state sources in 1995, more than nine times the state funding for the Virginia Center for Coal and Energy Research. State input for research and development related to coal mining in Kentucky amounts to \$278,000 while state and federal funding for coal-related technologies approaches \$3.5 million; in Pennsylvania, however, all R&D funding ended in 1995, when the Pennsylvania Energy and Development Authority was abolished. Is this a fate that Virginia can afford?

But is the future of Virginia coal and the seven counties where it is mined purely a taxpayer responsibility? No way. The kind of technological development that we need depends upon cashing in on the skills, facilities and resources *that already exist* - but which can be unleashed only by a true partnership between our coal, transportation and energy companies, manufacturers of mining and plant machinery, and the State and its agencies.

We have the know-how. We have the people. The question is whether we can get everyone to pull together.

Mining, Jobs, and financing of Economic Development in SW Virginia WILL decline unless we develop Thin-Seam Mining Technology that is flexible, simple and competitive.

So to you, our readers, we pose these bottom-line questions:

How important is it that mining - which produces the basis for economic development - be maintained until true sustainability of the coalfield region and its heritage are assured?

Should we continue with our present mining methods until the time bought by the tax credit has run its course, and then just shut up the shop?

Does any of this matter to Virginia and, particularly, the Southwest?

Does it matter to YOU?

Write in. Let us know. One thing is certain - nothing will happen unless we speak out!

LETTERS

Dear *Energy Outlook*,

As a long-time reader of your newsletter, I was glad to see you address the subject of remining in your last issue ("Remining for Real," Summer 1996). It seems to me that remining is, right now, the most promising hope for the coal mining industry in Virginia, as there seems to be quite a universal agreement that there is only a limited amount of new coal left to be mined here. Perhaps the coal in the remaining narrow seams will be hard to reach, but doesn't it make more sense to develop narrow-seam technologies than to import coal from other states? The way that I understand it, this new legislation will encourage that kind of development, which is long overdue.

Above and beyond the economic aspects, I also know that I, for one, was unaware of the fact that so much abandoned mined land is still unreclaimed in Virginia. Given the reclamation efforts of nearby states like Pennsylvania, this is a complete disgrace. If remining can restore beauty and pride to our coal field regions, how could it not be supported? Remining is a win-win proposition, and one that needs to be encouraged in every possible way.

J. R. Sherwood
Radford University

Right on! We should pursue both remining and thin-seam technologies. - EO

Dear *Energy Outlook*,

Welcome to new director Malcolm J. McPherson! We look forward to working with Dr. McPherson and the VCCER staff, in the new year and beyond.

Dr. Michael Karmis
Mining & Minerals Engineering
Virginia Tech

Thanks, Mike. And thank you, also, for your hard work as Interim Director of the VCCER during 1995-96. - EO

Please address letters to Editor, ENERGY OUTLOOK, VCCER, 109 Femoyer Hall, Blacksburg, VA 24061-0411.

REPORT ON THE POWELL RIVER PROJECT, 1995-1996

Carl E. Zipper

Associate Director, Powell River Project, and
Associate Director, Virginia Center for Coal and Energy
Research

The Powell River Project (PRP) conducts research and education programs which benefit people, communities, and industries in southwestern Virginia. PRP's service region includes the Commonwealth's seven coal-producing counties (Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise) and the City of Norton. PRP is a program of Virginia Tech, conducted in partnership with educational institutions, industries, and public agencies in southwestern Virginia. Cooperative Extension is also an important partner in the PRP program. Following is a list of the activities pursued since the *Energy Outlook's* last "Report on the Powell River Project."

RESEARCH

Mine Reclamation and Environmental Protection

Use of Fly Ash as an Amendment on Coal Refuse Piles and Mine Soils. W. Lee Daniels, Crop and Soil Environmental Sciences.

Appalachian coal producers face pressure from electric utility coal buyers to accept "back-hauled" coal ash. This project is developing environmental management guidelines for use of alkaline ash products in acidic refuse fills and mine soils. (Co-sponsored by *Clinchfield Coal*.)

Reforestation of Surface Mined Lands. James Burger, Department of Forestry.

Dr. Burger has been working to develop improved land reclamation/reforestation guidelines since 1980. Use of reforestation guidelines developed by Dr. Burger have been demonstrated to be successful in meeting three primary goals: to improve post-mining forest productivity, reduce reclamation costs, and aid regulatory compliance. (Co-sponsored by *Pocahontas Land Corp.*, *Martiki Coal Corp.*, and *Georgia Pacific Corp.*)

Constructed Wetlands for Water Resource and Wildlife Enhancement. Robert Atkinson, Department of Biology, Chemistry, and Environmental Science, Christopher Newport University.

Conversion of wetlands to other uses is considered to be an environmental problem nationwide. Mine reclamation presents an opportunity for wetland construction at minimal cost. This project is developing guidelines for use in wetland construction on mined areas during reclamation. Wetlands can serve as water sources for wildlife, while retaining floodwaters and sediments and increasing groundwater recharge.

Aquatic Ecosystem Impacts of Abandoned Mines in the Clinch and Powell River Basins. Don Cherry, Biology.

Lands mined for coal prior to modern-day environmental protection practices are known as abandoned mined lands, or AML. Virginia's Clinch and Powell Rivers have received national prominence as biological resources, due to the diversity of life which they support. With the assistance of the Virginia Department of Mined Land Reclamation, Cherry and his research group identified a number of AML sites producing acid mine drainage (AMD) in the Clinch and Powell Basins. (Co-sponsored by the *Nature Conservancy* and *Virginia DMME*.)

Water Resources

On-Site Wastewater Disposal Systems on Reclaimed Mines: Feasibility Study of Alternative Technologies. Ray Reneau and Charles Hagedorn, Crop and Soil Environmental Sciences.

This project is developing on-site household wastewater disposal technologies (septic drainfield alternatives) that can be used safely and economically on reclaimed mines.

Regional Household Water Quality Testing and Information Program. Blake Ross, Biological Systems Engineering.

A program of household water quality testing and education was conducted in Virginia's coal-producing counties between fall, 1993, and spring, 1995. A publication describing results of this project for the full seven-county region is available from Virginia Cooperative Extension or PRP.

Water Supplies in the Virginia Coalfield: Status, Technical Options, and Assessing Rate Impacts. John Randolph, Urban Affairs and Planning.

The inadequacy of water supplies serving households and communities in Virginia's coalfield counties is a critical problem. Groundwater resources are generally limited in quantity and, in some locations, of poor quality, while terrain makes the extension of existing water lines expensive. This project developed an information base for use by public officials and citizens seeking to find solutions to the region's water-supply problems. (Co-sponsored by *Virginia Environmental Endowment*, with assistance provided through *Mountain Empire Community College*.)

Economic Concerns

Estimating Minable Coal Reserves in Central Appalachia. Christopher Haycocks, Michael Karmis, and Ertugrul Topuz. Department of Mining and Minerals Engineering.

This three-year research project was initiated in 1996. Depletion of coal reserves, and a resultant decline in mining activity, is having a significant impact on the economic health of communities in the Virginia coalfield and in adjacent areas of eastern Kentucky and southern West Virginia. This project seeks to quantify the remaining minable coals in these areas.

Future Coal Production Rates and Severance Tax Revenues. Ertugrul Topuz and Walter Crabtree, Department of Mining and Minerals Engineering.

This research provided a forecast of future Virginia coal production, using a mathematical model and county severance tax revenues. Results were consistent with general expectations that the coal-production decline which began in the early 1990s is likely to continue, and severance taxes are likely to follow a similar trend. This project was completed prior to the passage of legislation establishing coal-production tax credits in Virginia, and a final report is contained in *1995 Powell River Project Research and Education Program Reports*.

Developing Information to Attract Wood Processing Industries. Harold Wisdom, Department of Forestry.

This project addresses the potential for establishing additional wood-processing industries in southwestern Virginia. The region's abundant hardwood forests serve as a source of raw wood products for numerous manufacturing facilities located outside of the Virginia coalfield. Additional "value added" processing facilities established locally would translate to additional jobs. One concept being explored is a wood-products "industrial park" - several small manufacturing facilities clustered around a drying kiln and a business-development incubator unit. The project was initiated in late 1995, and is scheduled to conclude in 1998. (*Co-sponsored by American Electric Power.*)

Assessing Availability of Wood Byproducts and Markets in Southwestern Virginia. Bob Smith and Vijay Reddy, Department of Wood Science and Forest Products.

Sawmills and other wood-processing facilities located in southwestern Virginia develop large quantities of "wood waste" byproducts each year. Currently, major quantities of these materials are either landfilled or trucked to locations out of the region, at significant cost to the facilities that are generating the byproducts. These byproduct materials constitute a potential resource that may attract additional wood-processing industry to the area. This project is compiling an inventory of the wood-waste materials being produced in Virginia's coal-producing counties.

OUTREACH AND STUDENT RESEARCH

Re-Mining to Reclaim Abandoned Mined Lands. Carl Zipper, Crop and Soil Environmental Sciences.

Re-mining of abandoned mined lands offers the potential for reclaiming pre-1977 abandoned mine areas while producing marketable coals. In many cases, regulatory requirements arising from federal law prevent operators from engaging in economically viable re-mining operations, especially where pre-existing environmental problems are severe. PRP has been active in supporting establishment of a mechanism to encourage re-mining of abandoned mine areas so as to produce economic benefits (retention of coal-mining jobs) and environmental benefits (restoration of abandoned mine areas). Participation and support by the Nature Conservancy, Virginia Chapter, has been important to this initiative.

EDUCATION

The Powell River Project Education Center

The Powell River Project Education Center is a 1,700-acre area at the headwaters of the Powell River in Wise County. With the cooperation and support of the site owner, Penn Virginia Coal, the land has been used for research and education programs since 1980.

The Education Center contains a wide variety of land areas, and is a unique educational resource. Active mining operations, recently reclaimed lands, areas mined during the 1950s, '60s, '70s, and 80s, and mined areas reclaimed using experimental techniques are all visible at the site. A variety of mine-reclamation research areas, a demonstration area established in 1990, and undisturbed forest areas are also present.

Education Programs at the Site

Educational programs at the PRP Education Center range from general tours of the entire site to specific programs addressing the educational needs of a particular group. These programs are conducted upon request by Area Extension Agent Jon Rockett. Approximately 2,000 people have attended education programs at the Education Center site during each of the last two years. Most of these visitors are students from local schools who attend with their classes.

Reclaimed Land Use Demonstrations

The essential message being communicated to PRP Education Center visitors can be summarized as "Mined land has value, when it is reclaimed and managed properly." A variety of reclaimed-land-use demonstrations at the Education Center visually communicate this message. These areas include cattle production, Christmas trees, erosion control vegetation and forages, fruit and vegetable demonstration plots, quality turfgrass, reforestation, warm season grasses, and wildlife habitat.

ENERGY SCOUT: *Current Energy News*

In a unique effort to help homeowners reduce their energy bills, more than a dozen natural gas utilities have invested in a new company - the American Gas Finance Company (or "GasFinCo") - that will use capital from FannieMae to make loans to consumers for energy-efficient home improvements. Creation of the entity was authorized on October 19 by the American Gas Association (AGA) Board of Directors.

Owners of existing one- to four-family dwellings will be eligible for GasFinCo loans of up to \$15,000, and can take up to ten years to repay the unsecured loan. In addition to financing installations of natural gas heating systems and water heaters, the loans can be used for kitchen remodeling that will accommodate new, more energy-efficient appliances, a homeowner's share of extending a gas main to the house, or the cost of removing an oil tank when switching a heating system to natural gas.

GasFinCo has endeavored to make working with customers as simple as possible. First, homeowners will select a contractor to install appliances or to perform other work covered by a loan from GasFinCo. When the work is completed, GasFinCo or the utility will pay the contractor. The right to receive the customer's loan payments, including interest, is then transferred to GasFinCo. The utility can then bill the customer directly, or transfer that responsibility to GasFinCo.

Now, says AGA's president and CEO Michael Baly, "participating local natural gas utilities will have a time- and money-saving alternative to their own consumer loan programs that can also offer competitive rates. The environment will benefit, too, because natural gas is the cleanest fossil fuel." (Source: American Gas Association)

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