



### A. Background

Historically, the County has been dependent upon resource extraction, particularly coal, for jobs and the tax base. Resource extraction and energy production are extremely important to Greene County, therefore a separate section has been dedicated to these topics. The Energy and Extraction section of this comprehensive plan will be consistent with and may not exceed those requirements imposed under the following:

1. Act of June 22, 1937 (P.L. 1987, No. 394), known as "The Clean Streams Law"
2. Act of May 31, 1945 (P.L.1198, No. 418), known as the "Surface Mining Conservation and Reclamation Act"
3. Act of April 27, 1966 (1st SP.SESS., P.L. 31, No.1), known as "The Bituminous Mine Subsidence and Land Conservation Act"
4. Act of September 24, 1968 (P.L. 1040, No. 318), known as the "Coal Refuse Disposal Control Act"
5. Act of December 19, 1984 (P.L. 1140, No. 223), known as the "Oil and Gas Act"
6. Act of December 19, 1984 (P.L. 1093, No. 219), known as the "Non-coal Surface Mining Conservation and Reclamation Act"

### Existing Studies

Many reports and studies have been completed that investigate the environmental impact of resource extraction in Greene County. The following have been reviewed and summarized to include findings and recommendations that relate to any of the issues addressed under this section.

#### Greene County Comprehensive Plan: Part I - Background Analysis and Part II – Final Report (1979)

The comprehensive plan focused on regional location analysis; physical features and existing land use; population and economy; housing analysis; thoroughfares; and community facilities. The background analysis found that the County had 8.9 billion tons of coal reserves of which 5.9 billion is considered to be recoverable in 1979; mostly in the west and requires deep mining. The final report recommended that the County should locate new development in areas with suitable topography, access to utilities and access to employment; protect valuable county land resources including unique natural features, established neighborhoods, prime industrial sites and recreational areas; to foster coordination between various planning and administrative bodies in the county to avoid conflicts between land use, transportation, housing, utilities, services, conservation and community facilities.

## Water Resources and the Effects of Coal Mining: Greene County, Pennsylvania (1987)

The study investigated the effects of coal mining on Greene County's water resources. As 20 percent of Pennsylvania's mineable bituminous coal reserves are in Greene County, it was considered to be one of last major deposits of high-quality, high-BTU coal in the nation. The study found that Abandoned Mine Drainage (AMD) affected many of the sampled streams in eastern Greene County. In addition, the most productive water-bearing units are sandstones and coal beds in Washington and Waynesburg formations less than 200 feet below the surface. Major groundwater-quality problems are exhibited in high concentrations of iron, manganese, and hardness; minor problems include hydrogen sulfide gas, methane gas, and occasional high concentrations of chloride. Iron and manganese levels are above the Environmental Protection Agency (EPA) limits due to oxidation, not due to mining. The study recommended that well-depth be greater than 200 feet only in valley settings; wells should be installed, tested, and relative permanence determined during dry periods; and that wells should be drilled as wide as cost allows for more storage capacity.

## An Investigation of High Extraction Mining and Related Valley Fill Practices in Southwestern Pennsylvania (1998)

The study was completed for the Audubon Society of Western Pennsylvania to identify what is known and not known about the social, economic, legal, environmental, hydrogeologic consequences, valley fills and subsidence phenomena, as they relate to longwall mining. It contains a study of the perceptions of a sample of residents and mental health professionals from Washington and Greene Counties to determine what effects, if any, longwall mining has on the lives of residents who live near areas where longwall mining technology is utilized. The study found that coal tax revenues for schools are decreasing and that most comments in the physical/environment category were related to contamination and loss of water; second most comments related to damage to homes and buildings; most comments in economic category were related to financial impact, but also on property rights and values. The study contains no recommendations or alternatives proposed to eliminate or minimize impacts. It does recommend that Greene County broaden its economic base and that private/public investors should reinvest part of the profit that is due to quality of the energy resource – economists include investments in education as one possible response to sustainability.

## RAG Emerald Resources Corporation - Whiteley Creek Watershed Mitigation (2001)

The second annual report summarized two years of activities for Whiteley Creek watershed mitigation program. Thirteen farmers participated in restoration efforts. The study found that fecal coliform concentrations continued to be high near farm streams; nitrates declined in treatment farms; and streams improved with the exclusion of livestock from riparian corridor.



### Monongahela River Source Water Assessment Report (for Dunkard Valley Joint Municipal Authority, East Dunkard Water Association, and the Southwestern Pennsylvania Water Authority) (2002)

The study was conducted to meet the 1996 Safe Drinking Water Act that requires a Source Water Assessment and Protection Program (SWAP) to evaluate all drinking water sources that serve public drinking supplies and to provide a mechanism for development of local protection programs. Potential sources for contamination (PSOCs) include point (water and sewer treatment plants, wildcat sewers, mining, power plants, chemical plants and non-point sources (major transportation corridors and run-off from urban/developed areas). The most serious PSOC is the accidental release of materials along the transportation corridor. The studies found that Dooley Run and Dunkard Creek are affected by Abandoned Mine Drainage (AMD) and metals. The study recommended the development a community based source water protection program to safeguard the public drinking supply based on the threats identified in the assessment.

### Flow Measurement, Site Reconnaissance, and Proposed Remedial Action for Mine Discharges in the Lower Dunkard Creek Watershed (2002)

The study, conducted by Bruce R. Leavitt, Consulting Hydrogeologist, inventories Abandoned Mine Drainage problems from seven mine sites that discharge into Dunkard Creek and offers discharge remediation. Because of low pH values and/or topography (lack of suitable flat acreage), in situ neutralization is recommended, combined with mine sealing, wetlands, and open limestone channels.

### RAG Corporation - Cumberland No. 2 Refuse Site: Stream Mitigation Report (2003)

Quarterly report outlining proposed activities in Whiteley Creek Watershed. Several landowners have enrolled in streambank restoration and warm season grass program. Monitoring data indicated organic matter is entering agricultural streams and these pollutants may be negatively influencing the fish and macroinvertebrate communities at large. Water quality was lower at farm sites (NH<sub>4</sub>, NO<sub>3</sub> and fecal coliforms significantly higher at treatment farms than control sites; darter species of fish at control but not at treatment sites.

### RAG Corporation: Emerald No. 2 Refuse Site: Stream Mitigation Report (2003)

Quarterly report outlining proposed activities and progress, with proposed dates. Water quality (fecal coliform, turbidity) was cited as improving at treatment sites. For the most part, treatment farms were at levels comparable to control sites.

## Energy & Extraction Resources

### Pennsylvania Department of Environmental Protection (PA DEP)

Resource extraction activities are permitted and monitored by the Pennsylvania Department of Environmental Protection (PA DEP). The Bureau of District Mining Operations, California District Office (located in California, PA – Washington County) oversees all activities in Greene County and provides numerous resources and publications regarding resource extraction, abandoned mine land reclamation, abandoned mine drainage (AMD), and other mining related issues.

### Greene County Conservation District

The mission of the Greene County Conservation District is to "is to provide for the conservation of the soil, water and related resources of Greene County, and for the control and prevention of soil erosion, and thereby to preserve natural resources; assist in the control of floods; prevent impairment of dams and reservoirs; assist in maintaining the navigability of rivers and harbors; preserve wildlife; preserve the tax base; protect public lands; and protect and promote the health, safety and general welfare of the people of Greene County." The Conservation District sponsors programs that address impacts associated with resource extraction in Greene County, such as the Dunkard Creek Non-Point Pollution Project, Dunkard Deep Mine Assessment Project, and the Whiteley Creek Watershed Strip Mine Reclamation Site Project.



### Energy & Extraction Snapshot

The economy in Greene County was traditionally associated with coal extraction and agriculture. Agriculture, including crops and livestock, was the pre-dominant industry early in the formation of the county. However, the extraction of coal soon became the lifeblood of the County and its primary source of jobs. Coal mining served as the economic generator and source of municipal, school, and county revenues from the early 1900s to around 1980. Despite the abundance of coal and relatively high-wage earning opportunities afforded to miners, Greene County had low population levels and remained largely undeveloped.

The value of the coal-driven economy of Greene County declined by the late 1970's due to a nation-wide recession and shifts in global economies that changed energy demands. Coal driven energy became costly, as the extraction methods had depleted readily available resources and the environmental effects of extraction were realized. The County's economic and social welfare plummeted and the population was classified as distressed with low employment levels, high poverty rates, and poor social indicators such as minimal educational attainment, and high rates of drug use and teen pregnancy.

Recognizing that this is an over-simplification of the history of Greene County, it serves to raise several concerns related to the dependence upon a single industry. First, coal mining was a market that required minimal skills but significant hard labor and a willingness to work in a dangerous environment. For this, coal companies were willing to pay a higher wage to increase effort and therefore revenues. However, the shrinking of this large employment sector left Greene County with high numbers of unemployed workers who were considered "un-skilled" due to the manual nature of coal mining. Second, the environmental effect of coal mining left a physical scar on the landscape. Water supplies were polluted due to acid mine drainage or lost due to shifts in water tables. Coal remains or spoils destroyed once productive land and the pollution of coal-fired plants created negative health effects on residents. Third, a damaging externality was the reliance on one market sector without a method of diversifying industries to offer other opportunities for employment. Once the public sector began to assess fines through legislation passed to protect water supplies and restore lands, energy production costs rose and other energy sources became more desirable thereby reducing the desire to use coal as an energy source. Fortunately, over the years the energy industry has developed methods to reduce pollution and improve efficiencies of generation. Today, market demands and improved methods of coal extraction have increased the revenues generated from coal extraction.

# "Strategy for a *Greene* Tomorrow"



Coal Mine in Greene County (Mackin, 2006)

Greene County's dependency upon energy and extraction is evident in their top employers: Consol Energy is number one (1,537 employees), Foundation Coal Company is number two (1,187 employees) and Allegheny Power Service Corporation is number five (211 employees). Throughout the County, the presence of resource extraction is evident by either the active strip mines, abandoned mines, or mine reclamation areas.

Private and public forces have shifted their philosophies in relation to the coal industry. Coal companies now require skilled labor as extraction methods are no longer pick-and-shovel, but are now machine and computer driven. Public schools and colleges have developed specific courses to prepare young people to enter into the coal extraction industry. The County has responded by investing in industrial parks and business development strategies to attract a diversified industrial sector and initiated retraining opportunities to previously displaced workers. It is too soon to know if the historical reliance on coal will be relinquished in Greene County. However, many now see this as a necessity if the County is to avoid future economic fallout. In the meantime, the outlook seems promising to capitalize on a revitalized coal industry while investing in infrastructure improvements that will increase the likelihood of a diversification of employment sectors.



### B. Data & Analysis

#### Non-Renewable Resources

Mining in the Pittsburgh seam began in Greene County more than a century ago where the coal outcropped along the Monongahela River and its tributaries. The Pittsburgh coal seam is a single, almost horizontal bed, with a thickness of four to ten feet (average of six feet). Despite the extensive mining of the past, the bulk of Pennsylvania coal – more than 80 percent – is still mined from the Pittsburgh seam. Approximately 121,000 acres of the Pittsburgh Coal Seam have been previously mined in Greene County, leaving about 245,000 acres of unmined coal in the County; 99 percent of the coal recovered was from underground mining. Deep mining also occurs in the Sewickley coal seam in southeastern Greene County, but it is minor by comparison. The depth of the Upper Freeport Coal Seam makes it more difficult to recover and therefore makes it less valuable than Pittsburgh Coal. The Upper Freeport Coal covers the entire County, accounting for approximately 370,000 acres of unmined coal (PEC et al., 2005).

In Pennsylvania, oftentimes the mineral estate is separate from the surface (real) estate and ownership of the minerals may even be separated from each other on the same tract of land. For instance, the oil, gas, coal, minerals, etc. may all be owned by separate entities and separate from the owner of the actual land. Pennsylvania recognizes the mineral owner's rights to recover the mineral as well as the landowner's right to protection from unreasonable encroachment or damage. Ownership of both the surface and mineral rights are usually maintained by the county's Recorder of Deeds office.

Land use regulations, such as zoning, may not supersede existing state and federal laws that govern and regulate the extraction of subsurface and mineral resources, including the following:

- Act of May 31, 1945 (P.L.1198, No.418), known as the "Surface Mining Conservation and Reclamation Act"
- Act of December 19, 1984 (P.L.1093, No.219), known as the "Noncoal Surface Mining Conservation and Reclamation Act"
- Act of December 19, 1984 (P.L.1140, No.223), known as the "Oil and Gas Act,"
- Act of April 27, 1966 (1ST Sp.Sess, P.L.31, No.1), known as "The Bituminous Mine Subsidence and Land Conservation Act" which regulates the subsidence impacts of coal extraction

In addition, all zoning ordinances must provide for the reasonable development of minerals in each municipality. A municipality or landowner cannot restrict the mineral owner's reasonable access for production and development.

## Coal

Of the 12 most productive underground coal mines in the United States, five are located in Greene County, making the County one of the largest coal producers in the country (County Commissioners Association of Pennsylvania, 2007). Greene County is located within the Main Bituminous Coal Field of Pennsylvania (DCNR, 2004). Extensive areas of operating surface and deep mines, old stripping areas, and reclaimed areas are dispersed throughout the landscape. Coal that is or has been mined within the county is primarily high volatile bituminous coal, which is a soft, black or sometimes dark brown coal. Typically used for electricity production, high-volatile bituminous coal is known for its ease to burn and long burning characteristics (<http://www.answers.com/topic/bituminous-coal>).

Greene County has previously completed an assessment of coal resources and affects to the County's fiscal health. The last study completed was in 2000 by Resource Technologies Corporation, however, due to recent energy advances in Greene County, this report is considered out of date. According to information received from a representative of Resource Technologies Corporation (electronic correspondence, 2/27/06) the price increase of natural gas, which has tripled since 2000; oil, which has quadrupled; and coal; which has more than doubled, has so radically changed the economics of energy that there are no reports that have any real credibility in today's world. Recent technological advances have significantly changed coal mining practices and there is now more economically accessible coal. In addition, a significant market has developed for coal bed methane and the utility industry now has over 200 new coal fired power plants in the planning or permitting stage as compared to the two or three plants in 2000. Since 2000, the utility industry has moth-balled a significant number of gas-fired power plants. Nearly every coal fired power plant within 200 miles of the Greene County is slated for some form of pollution control upgrade -- in 2000 virtually none of them were. Coal, gas, and coal bed methane are major industries of Greene County. Greene County, alone, accounts for nearly 20 percent as much annual production as the entire state of West Virginia (RTC, 2006). Greene County is one of the primary producers of energy in the United States and will need to commission a study to ascertain the future of its energy production.



Underground Mines

All active mines in Greene County utilize either the room and pillar or the longwall method, which are both underground techniques. As of March of 2007, there are eight (8) active deep mines located in Greene County, as listed in Table 12-1. The location of each mine (when available) is noted on *Figure 12-1: Coal: Deep Mines*.

**Table 12-1: Underground Bituminous Mines Actively Operating in Greene County**

Municipality	Mine Name	Mining Company	Coal Seam	Permit #	Type of Mine
Richhill Twp, Gray Twp, Aleppo Twp	Bailey	Consolidation Coal Co.	Pittsburgh	30841316	Longwall
Jackson Twp, Wayne Twp, Gilmore Twp	Blacksville No. 2	Consolidation Coal Co.	Pittsburgh	30841312	Longwall
Center Twp, Greene Twp, Franklin Twp, Perry Twp, Wayne Twp, Whiteley Twp	Cumberland	Foundation Coal Co.	Pittsburgh	30831303	Longwall
Dunkard Twp, Perry Twp	Crawdad Portal B	Dana Mining Company of PA, Inc	Sewickley	30001301	Room and Pillar
Dunkard Twp	4-West Mine	Dana Mining Company of PA, Inc	Sewickley	30031301	Room and Pillar
Center Twp, Franklin Twp, Waynesburg Boro, Whiteley Twp	Emerald No. 1	Foundation Coal Co.	Pittsburgh	30841307	Longwall
Richhill Twp, Morris Twp	Enlow Fork	Consolidation Coal Co.	Pittsburgh	30841317	Longwall
Dunkard Twp	Titus	Dana Mining Company of PA, Inc	Sewickley	30841314	Room and Pillar

Source: PA DEP; last updated March 21, 2007

The room and pillar method involves the excavation of coal from large “rooms” but leaves intervening “pillars” of coal to hold up the roof. The disadvantage to this method is that only about 40 percent of the original coal is extracted; the rest remains in the mine as pillars and is essentially lost. The Dana Mining Company of Pennsylvania, Inc. (Dana) is the only active mining company in Greene County that utilizes this method. Dana operates three mines in the County: Crawdad Portal B, 4-West, and Titus, all of which can be found in Dunkard Township (World Coal Institute, 2005).

In contrast, the longwall method of coal mining is much more effective, and thusly, has become more commonplace for coal extraction. For longwall mining, a single block of coal, which can exceed 1,000 feet wide and 10,000 feet long, is isolated and mined along the short side, using equipment that continuously shears off the coal face across the entire width of the block. Following each pass across the operating face, the mining equipment is advanced forward in preparation for making a new cut. As forward progress is made, all of the coal is extracted and the mine roof is allowed to collapse in a carefully controlled manner. Longwall mining is especially efficient and can produce a large amount of coal in a short period of time in areas where the coal bed is sufficiently thick and continuous (World Coal Institute, 2005).

### Bailey Mine

The Bailey Mine is owned by Consol Energy, Inc. and is located in northwestern Greene County in Richhill and Gray Townships and crosses into Washington County. Coal is mined from the Pittsburgh Seam using two longwall systems and seven continuous mining machines. Continuous mining machines allow the coal to be mined in a continuous operation where one machine rips coal from the face and loads it directly into a hauling unit ([www.britannica.com/EBchecked/topic/122975/coal-mining](http://www.britannica.com/EBchecked/topic/122975/coal-mining)). Coal is transported to the surface and then processed in the Bailey Central Preparation Plant. Among the largest underground coal mines in the United States, Bailey produced 11.1 million tons of coal in 2005 (<http://www.consolenergy.com/main.asp?c=CNXCoal>).

### Blacksville 2 Mine

Blacksville 2 Mine is owned by Consol Energy, Inc. and is located in southern Greene County in Gilmore, Jackson and Wayne Townships and then spans across the border into West Virginia. Coal is mined from the Pittsburgh Seam using one longwall system and three continuous mining machines. Coal is transported underground by conveyor belts to the preparation plant, located in northern West Virginia. Blacksville produced 5.3 million tons of coal in 2005. (<http://www.consolenergy.com/main.asp?c=CNXCoal>)



Blacksville 2 Mine Entrance, Wayne Township (Mackin 2007)

### Cumberland Mine

Cumberland Mine is owned by Foundation Coal Holdings, Inc. and is located approximately 12 miles south of Waynesburg in Perry, Whiteley, and Wayne Townships and has been in operation since 1977. All of the coal at the Cumberland Mine is processed through a preparation plant before being loaded onto Foundation Coal's owned and operated railroad for transportation to the Monongahela River dock site. At the dock site, coal is loaded into barges for transportation to river-served utilities or to other docks for subsequent rail shipment to non-river-served utilities. The mine can also ship a portion of its production via truck. Cumberland shipped 7.0 million tons of coal in 2005. As of December 31, 2005, Cumberland had an assigned reserve base of 102.3 million tons. Cumberland has approximately 611 salaried and hourly employees (<http://www.foundationcoal.com/home.cfm>).

### Emerald Mine

Emerald Mine is owned by Foundation Coal Holdings, Inc. and is located approximately a half of a mile south of Waynesburg just north of the Cumberland Mine, in Center, Franklin and Whiteley Townships, and has been in operation since 1977. All of Emerald's coal is processed through a preparation plant before being loaded into unit trains operated by the Norfolk Southern Railroad or the CSX Railroad. The mine also has the option to ship a portion of its coal by truck. Emerald shipped 6.7 million tons of coal in 2005. As of December 31, 2005, Emerald had an assigned reserve base of approximately 98.1 million tons of coal reserves. Approximately 577 salaried and hourly employees work at Emerald (<http://www.foundationcoal.com/home.cfm>).

## Enlow Fork Mine

Enlow Fork Mine is owned by Consol Energy Inc. and is located in the northwestern Greene County in Morris Township, though most of the mine is in Washington County. Coal is mined from the Pittsburgh Seam using two longwall systems and six continuous mining machines. Coal is transported to the surface by conveyor belts and is processed in the Bailey Central Preparation Plant that can fully wash coal. Enlow Fork is one of the largest underground coal mines in the United States and, in 2005, produced 9.8 million tons of coal.

(<http://www.consolenergy.com/main.asp?c=CNXCoal>).

## I-79 Undermining

Beginning in September 2004, Foundation Coal Holdings, Inc. began conducting longwall-mining operations in the Cumberland and Emerald Mines in Greene County underneath segments of Interstate 79 south of Waynesburg. The undermining should be complete in 2009. PA DEP provides detailed information on the mining operations, including, regularly updated reports on the progress of the undermining, on their website at <http://www.dep.state.pa.us/dep/deputate/minres/Districts/homepage/California/I79-Home/I79-home.htm>.



## Surface Mines

Once known as strip mining, surface mining is accomplished by removing overburden from the coal seam and then blasting and removing the coal. As a method of coal extraction, surface mining accounts for about 60 percent of coal production in the United States, though it accounts for very little in Greene County. Surface mining is as much a land reclamation process as it is a method of coal extraction. In time, reclaimed sites can be returned to many productive uses such as recreation areas, golf courses, wildlife preserves, parks, farms, wetlands, housing developments and pastures. There are three active strip mines in Greene County, as listed in Table 12-2.

Table 12-2: Surface Mines Actively Operating in Greene County			
Municipality	Mine Name	Mining Company	Permit #
Greene Twp	Minor Mine	SBX Corp	30050103
Greene Twp	Keener Surface Mine	Patriot Mining Co. Inc	30030101
Morgan Twp	Mather Strip	CJ & L Coal	30960101

Source: PA DEP; last updated March 21, 2007

## Inactive Mines

### Dooley Run Mine

The Dooley Run Mine is owned by Dana Mining Co. and is located in Dunkard Township. The mine was shut down due to the rising Shannopin Mine pool, which flooded the reserves. The Dooley Run Mine was operating in the Sewickley coal seam about 100 feet above the Pittsburgh seam. The remediation of the Shannopin Mine will allow Dana Mining Co. to reopen the Dooley Run Mine and expand other mining operations in the area.

### Shannopin Mine

The Shannopin Mine is located near the village of Bobtown in Dunkard Township. The Shannopin Coal Company operated the Shannopin mine from the 1926 until 1993, when Shannopin filed bankruptcy and abandoned the mine. The Commonwealth forfeited and demolished hazardous surface structures and bridges and seal mine portal openings. Diversified Energy Ventures, Inc. bought the property out of bankruptcy in 1993. In 2003, through a combined effort of Pennsylvania state agencies and the Dana Mining Company, a plant was constructed to pump and treat the Shannopin polluted mine pool. The treatment plant prevented

mine water from discharging and polluting Dunkard Creek and the Monongahela River.

## Coal Production

Table 12-3 lists the reported production for the active underground mines from 2004 in Greene County. Altogether, over 37 million tons of coal were mined in 2004. Since 2004, Dunkard and Dilworth mines closed and 4-West Mine opened. Bailey and Enlow Fork remain two of the most productive coal mines in the United States. Each mine produced over 10 million tons of coal in 2004. While Bailey produced more than 11 million in 2005, Enlow Fork dropped to just under 10 million in 2005. Blacksville 2, Cumberland and Emerald mines each produced over five million tons of coal in 2004. Compared to 2005, Blacksville 2 remained consistent while both Emerald and Cumberland produced over 6 and 7 tons, respectively.

**Table 12-3: Greene County 2004 Bituminous Underground Mines Reporting Production**

Company	Permit	Site Name	Surface Permit Acres	Underground Permit Acres	Total Tons Production	Mineral	Avg # of Employees
Cobra Mining LLC	30841309	Dunkard Deep Mine	35	1,385	141,371	Sewickley	32
Consol Energy Inc.	30841316	Bailey Deep Mine	652	26,620	10,133,685	Pittsburgh	430
Consol Energy Inc.	30841317	Enlow Fork Mine	18,245	17,159	10,218,960	Pittsburgh	520
Consol Energy Inc.	30841313	Dilworth Deep Mine	123	11,336	19,075	Pittsburgh	1
Consol Energy Inc.	30841312	Blacksville #2 Mine	194	17,423	5,718,668	Pittsburgh	412
Cumberland Coal Resources LP (Foundation Coal Holdings, Inc.)	30831303	Cumberland Mine	213	22,532	5,194,971	Pittsburgh	503
Dana Mining Co of Pennsylvania Inc.	30841314	Titus Deep Mine	3	338	200,813	Sewickley	26
Dana Mining Co of Pennsylvania Inc.	30001301	Crawdad No 1 Mine	35	1,385	308,507	Sewickley	37
Emerald Coal Resources LP (Foundation Coal Holdings, Inc.)	30841307	Emerald Deep Mine	160	19,451	5,768,397	Pittsburgh	506
Greene County Total	9		19,660	117,628	37,704,447		2,467
Source: PA DEP							



Table 12-4 shows the 2004 production for surface mines in Greene County. There were six surface mines in operation, accounting for 485 thousand tons of coal and employing 61 people. The surface operations mined the Waynesburg coal seam.

**Table 12-4: Greene County 2004 Bituminous Surface Mines Reporting**

Company	Permit	Site Name	Permit Acres	Total Tons Production	Mineral	# of Employees
CJ & L Coal	30960101	Mather Strip	136	14,617	Waynesburg	2
Coresco Inc	30980101	Mathews Mine	148	1,797	Waynesburg	4
Coresco Inc	30010102	Gapen Surface Mine	169	73,851	Waynesburg	19
Patriot Mining Co Inc	30010101	Mt Morris Surface Mine	336	178,086	Waynesburg	15
Patriot Mining Co Inc	30030101	Keener Surface Mine	117	178,086	Waynesburg	16
SBX Corp	30010103	Minor Mine	18	39,363	Waynesburg	5
Greene County Total	6		924	485,800		61

Source: PA DEP

## Mined Areas

The Pennsylvania Department of Environmental Protection (PADEP) defines mine subsidence as the movements of the ground surface as a result of the collapse or failure of underground mine workings. In active underground mining methods, subsidence can occur concurrently with the mining operation in a predictable manner; however, in abandoned mines, it is virtually impossible to predict if and when subsidence would occur. Refer to *Figure 12-1: Coal: Deep Mines* for areas within the County that have been previously undermined.

## Coal Gasification

Consumption of coal is estimated to be the fastest growing energy source according to the BP Statistical Energy Review (June, 2005). The United States alone uses over 1,100 million tons, which is about one third of that used by the People's Republic of China. As experts estimate that the world's coal reserves have a remaining 300-year life under current technological capabilities, the tremendous dependence upon coal for energy production necessitates that methods of energy combustion become more and more efficient.

Coal is used throughout the world to produce electricity and heat through combustion. Traditional coal fired power plants typically pulverize coal to burn in boiler furnaces. Electric generation relies on coal as an energy source to power steam turbines that turn generators to produce electricity. This method results in an efficiency of about 40 percent

while more energy-efficient methods such as coal gasification can achieve a 60 to 85 percent efficiency.

Coal Gasification is the process whereby coal is subjected to high temperature and pressure to break the original matter down to a gaseous substance. The gasification of coal produces a more efficient energy source and reduces carbon dioxide emissions. The higher level of efficiency of gasification-based energy production leads to better economics, which in theory allows a cost savings for consumers.

Coal Gasification power plants are typically a combined cycle of power generation that allows two methods to produce energy. The coal gases are used much like natural gas to fire a gas turbine to generate electricity. The heat produced from the gas turbine is used to generate steam from a water boiler thereby powering the steam turbine generators, which also produce electricity.

### Aggregate (limestone, crushed stone, sand, and gravel) Deposits

No aggregate extraction areas are located within Greene County (SPC, 2005).

### Oil / Gas Wells

In accordance with the Oil and Gas Act of 1984 (effective April 18, 1985), the Pennsylvania DEP, Bureau of Oil and Gas Management, issues permits for oil and gas wells in the state. In order to qualify for a permit, the requesting party must show that the well will be planned in an environmentally responsible manner. It may be necessary to shift the exact position of the proposed well location in order to accommodate environmentally sensitive natural resources, such as streams and wetlands or endangered and protected wildlife areas. The distance from other producing wells can also be a consideration, since it is a safety concern not to position existing oil and gas wells too closely (Flaherty, 2002).

The DEP currently has information on more than 160,000 oil and gas wells in Pennsylvania; however, some active wells have yet to be registered, despite the established regulations of the Oil and Gas Act. Based on the number of DEP permits (as of April 2006), Greene County has approximately 1,164 gas and oil wells, of which 821 have active permits, while 305 have inactive permits. The remaining wells had submitted permit paperwork, but for a variety of reasons these wells were never permitted. Additionally, two wells currently have pending permits. There are approximately 140,000 acres of oil and gas fields in Greene County. Oil and gas wells, as well as oil and gas fields are identified on *Figure 12-2: Oil & Gas Wells / Fields*.

Once a well operating permit is acquired, the operator must bond the well (\$2,500 per well) as either a surety or collateral bond; plug an abandoned well (a well that has not produced in the previous 12 months); dispose properly of wastewater; submit an annual report on the production of gas, oil, brine, and waste disposed; and keep all official records / documents regarding the well. Landowners may file an objection with DEP to the



proposed location based on location restrictions described in the Oil and Gas Act. All surface owners, water supply owners, and parties with coal interests within 1,000 feet of the proposed well location must be notified as part of the permitting process.

### Coalbed Methane Gas

Coalbed methane (CBM) is primarily methane gas trapped within coal seams, created when plant material is converted into coal, and can be extracted from coal seams and used for energy. CBM is extracted by drilling wells and CBM wells are subject to the same requirements by law and regulation as are imposed on conventional gas wells. The owner of the coal rights on a property is also the owner of the CBM. The following steps are typical of CBM development:

- Exploration – consists of a company searching for gas deposits and determining if any deposits they find are economically viable. Exploratory drilling may be conducted, however before exploration can begin, the company must legally own, have leased the mineral rights, or have permission from the mineral owner to conduct the exploratory tests.
- Field organization – occurs once the gas deposit is determined to be economically viable and the company must obtain a permit from PA DEP.
- Production – includes installation of a well, CBM and water extraction and regular well maintenance.
- Site abandonment – occurs when the well is no longer economically viable. The company must plug the well, remove the pumpjack and restore the site. Access roads may be left in place if the surface owner wishes or if the road was in existence before the well was developed, otherwise, access roads should be a part of the restoration process.

A typical CBM well is roughly 150 feet by 150 feet, not including underground piping. Wells are required to be spaced at least 1,000 feet apart, however a waiver may permit the CBM producer to reduce this spacing to 900 feet. This averages to approximately six wells on a 100-acre property. Unless a waiver is received from PA DEP, a well may not be closer than 200 feet to a residential home. CBM wells operate 24 hours per day and produce a constant mechanical noise. Companies are permitted access 24 hours a day and often use lights at nighttime for inspections.

The oil and gas act requires any operator who affects a water supply by reduction or pollution to restore or replace that water supply. There is a "Presumption of Responsibility" which assumes that an operator is responsible for any pollution of any water supply within 1,000 feet of the gas well that occurs within six months of the completion of drilling, unless the operator can prove CBM activities was not responsible for the water pollution. It is recommended that property owners have their water tested prior to any CBM drilling in order to provide a baseline to determine if the water has been polluted by CBM drilling. If the landowner suspects pollution, they should contact PA DEP Oil & Gas Management Program (PADEP's Oil & Gas Management Program, 2006).

## Energy

### Power Plants

Allegheny Energy owns and operates two power plants in or near Greene County—Hatfield's Ferry Power Station in Monongahela Township and Fort Martin Power Station in Madsville, West Virginia. Allegheny Energy is an investor-owned utility consisting of Allegheny Energy Supply and Allegheny Power. Allegheny Energy Supply owns and operates electric generating facilities, while Allegheny Power delivers electric service to customers in Pennsylvania, West Virginia, Maryland and Virginia. The company's headquarters are located in the City of Greensburg, Westmoreland County ([www.alleghenyenergy.com](http://www.alleghenyenergy.com)).

According to a study conducted by the Environmental Integrity Project (EIP) in July of 2006, the Hatfield's Ferry Power Station ranks number 20 of the fifty dirtiest power plants in the United States. The EIP is a nonpartisan, nonprofit organization dedicated to more effective enforcement of environmental laws and to the prevention of political interference with those laws. EIP's rankings of the nation's dirtiest power plants are based on data from the U.S. Environmental Protection Agency and the U.S. Department of Energy. Additional data are from Argus Media's Scrubber Report 2006. The rankings are based upon a composite score of measured emissions of sulfur dioxide, carbon dioxide, nitrogen oxide, and mercury. Sulfur dioxide and nitrogen oxides emissions contribute to formation of fine airborne particles and soot, which trigger asthma attacks and cause lung and heart disease. Carbon dioxide gases contribute to the gradual warming of the planet and mercury is a deadly neurotoxin, especially dangerous to developing fetuses.



Hatfield Power Plant (Mackin, 2006)



In 2006, the Department of Environmental Protection approved a plan to install three wet-flue gas desulphurization systems at the Hatfield's Ferry Power Station. The installation of these systems, commonly known as scrubbers, will reduce the amount of particulate matter and sulfur dioxide emitted from the Hatfield's Ferry Power Plant. The scrubbers remove harmful contaminants through a process that in turn creates a gypsum by-product. The gypsum can then be sold to a third-party customer or trucked to a landfill to be disposed of properly. Mercury emissions should decline as a co-benefit of sulfur dioxide controls at power plants, but EPA's new power plant mercury rule is unlikely to have any measurable benefit in the short-term.

### Trans-Allegheny Interstate Line

The proposed Trans-Allegheny Interstate Line is a 240-mile 500-kilovolt transmission line that extends from southwestern Pennsylvania south to Virginia. PJM Interconnection manages the Trans-Allegheny Interstate Line, or TrAIL as it is also called. PJM Interconnection is a Regional Transmission Organization (RTO) that manages electricity transmission services for 13 states on the Eastern Seaboard. The role of PJM is to coordinate the movement of electricity, ensure the reliability of the transmission grid, and plan transmission expansion in 13 states and the District of Columbia.

The exact route for the transmission line, while not finalized, is anticipated to run through Pennsylvania, Maryland, West Virginia, and Virginia. Both Greene County and Washington County would host proposed substations along the TrAIL. The Greene County substation is located at 502 Junction east of Mt. Morris and the Washington County substation is just northeast of Eighty Four.

## Greene Energy Resource Recovery Project (Wellington Development)

On June 21, 2005, the Pennsylvania Department of Environmental Protection issued an Air Quality Plan approval for the Greene Energy Resource Recovery Project in Cumberland Township, Greene County. The Greene Energy Resource Recovery Project is an electricity generation facility that will reclaim 1,500 acres of formerly mined industrial property. The proposed facility is a resource recovery project that will provide environmental benefits for local air and water quality, generate local economic benefits, and serve as a power generation source thereby alleviating rising fuel costs from outside sources.

The facility's operator, Wellington Development, is proposing to reclaim over 100 million tons of refuse waste coal. These coal-mining wastes are commonly referred to as Gob Piles and are essentially by-products of mined coal. The Gob Pile at the LTV Nemaquin mine dump is a result of over 80 years of coal mining. The existing refuse is causing significant local environmental impacts such as acidic runoff into the surrounding soils and nearby waterways including the Monongahela River. The gob pile occasionally ignites and combustion emits air pollutants creating air quality concerns.

While the removal of the gob pile will certainly benefit the overall environmental condition of the site, the energy generation facility itself will have corresponding environmental threats created from the boiler combustion. This cause and effect of the remediation effort has created significant concerns from members of the public and other stakeholders such as the Sierra Club, United States Department of Agriculture Forest Service. Specific concerns are related to the health risks created from the combustion process used during the resource recovery and energy generation.

However, there are also favorable economic benefits to be considered beyond the environmental benefits caused by the removal of the gob pile. The corresponding economic benefits generated from the construction and operation of the facility has been found to be sorely needed in Greene County. Many members of the public, elected officials, and other organizations submitted letters of support in favor of the facility including, United Mine Workers of America International Union, the Plumbers & Pipefitters Union, Local 354, Senator Barry Stout, Cumberland Township Supervisors, Greene County Commissioners, and Carmichaels School District.



### C. Development Strategies

#### **GOAL: Ensure that landowners know their rights regarding coalbed methane gas (CBM) extraction**

**Strategy:** Owners of private wells or springs should have their water tested for quality and quantity and keep a log to document disruptions in water quality or quantity. Any disruptions in water quality or quantity should be reported immediately to PA DEP's Oil and Gas Management Bureau at (717) 772-2199.

**Strategy:** Educate landowners about their rights regarding the extraction of coalbed methane.

- If a proposed location of the well is in the middle of prime farmland (or right next to a house, or barn, or on a site for planned development and the company won't negotiate a new location, the landowner can go to court and challenge PA DEP's permit to allow a well on this specific site. Landowners should contact attorneys familiar with oil and gas law.
- Landowners should ask for compensation based on a percentage of the gas extracted, or compensation on a per year basis rather than receiving a flat fee.
- Landowners have a right to timber the site prior to the company installing the well if the site is forested.
- All water bearing aquifers should be cased, including and especially the one used for private water supply. Also, any non-coal strata that the company does not have the right to extract from should be cased.
- As soon as a well is proposed, the landowner should contact PA DEP to let them know they require a casing plan. Insist that flake cellophane be used in construction of CBM wells on private property. This prevents cement loss into the aquifer, and is vital to protect water supply, especially if that supply is a spring.
- Request a copy of the permit application from PA DEP for a well that is to be installed on the property.
- Fencing should be paid for and constructed by the company to keep livestock out of the permit area.
- Access roads should be gated and landowners should have keys. All roads should also have erosion and sedimentation controls both installed and maintained by the company.
- If the well is to be located in a field used for farming, landowners should insist that all pipes be buried below plow depth, which is 36 inches.
- Negotiate how drilling fluids and wastewater will be collected and treated and how the producer will dispose of it.
- If surface property owners own the rights to coal seams, the company may not drill to access gas in those seams without paying for that right (a royalty). Landowners should beware of sell and buy-back situations and sign nothing without review by an attorney.

## GOAL: Mitigate environmental impacts from resource extraction

**Strategy:** Develop a comprehensive inventory and a reclamation plan with resources for abandoned mine sites.

**Strategy:** Develop reclamation and abatement strategies with resources for treatment of abandoned mine drainage (AMD).

**Strategy:** Provide support to watershed organizations undertaking AMD mitigation efforts.

**Strategy:** Create and maintain an accurate GIS layer mapping all permitted active and abandoned wells.

**Strategy:** Work with landowners to cap / plug orphaned wells.

**Strategy:** Identify and map all sites where resource extraction activities are occurring or expected to occur and establish communications and partnerships to encourage best management practices and remediation upon closing of all sites.

**Strategy:** Establish a countywide model ordinance for bonding local roads.

**Strategy:** Maintain lines of communication on TrAIL project and continue to inform residents of plans.

## GOAL: Increase the economic benefits associated with the energy & resource extraction efforts

**Strategy:** Lobby for state and federal mining organizations, such Bureau of Mine Safety, National Energy Technology labs, including PA DEP offices to be located in Greene County.

**Strategy:** Actively engage with taxing legislation that focuses on coal, minerals, and gas resources.

**Strategy:** Investigate opportunities to receive revenues from gas and oil extracted in the County, such as implementing a severance tax on coal, oil, and gas exports from Greene County, and Pennsylvania

**Strategy:** Inventory all potential brownfields, redevelopment sites, etc. that contains detailed information about the site (such as ownership, acreage, environmental issues, etc.) and prioritize for redevelopment potential.