



Economic Impact of the Coalfields Expressway in the CFX Corridor in Virginia and West Virginia

The construction and ongoing existence of the Coalfields Expressway (CFX) will inject hundreds of millions of dollars into the CFX Corridor and provide jobs for workers in construction, retail, service, and warehouse industries. The annual economic impact is estimated to be \$215.3 million that sustains 1,067 jobs in 2035 after construction is complete.



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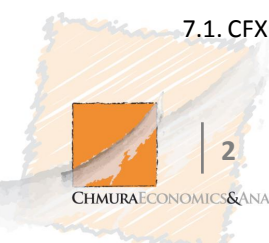
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1. Executive Summary

The Coalfields Expressway (CFX) is a highway project located in the states of Virginia and West Virginia.¹ The aim of CFX is to provide improved highway access for regional businesses and residents in the regions of those two states. In Virginia, the Coalfields Expressway will be located in the counties of Wise, Dickenson, and Buchanan. In Buchanan County, the highway will connect with West Virginia's portion of CFX, which is located in Wyoming, Raleigh, and McDowell Counties.² This study evaluates the economic impact of the proposed CFX on all six counties that make up the CFX Corridor. Economic impacts are also segregated into both the Virginia and West Virginia portions of the CFX Corridor. The findings of this study are summarized below.

Economic literature indicates that highway networks are beneficial to regional economies. The following sustainable economic benefits are generally associated with a highway network:

- **Travel efficiency.** The construction of a highway can reduce travel time for area businesses and residents alike. Trade, manufacturing, and construction sectors will benefit more from a new highway than other sectors such as healthcare and education.
- **Attraction of service businesses.** Oftentimes, businesses such as hotels, gas stations, retail stores, and restaurants cluster around interstate interchanges to serve motorists and local residents.
- **Economic development benefits such as improved market access, firm relocations, and expansions.** Highways can reduce travel time and transportation costs, thus expanding market reach for regional businesses. Case studies have found that rural counties with an interstate highway enjoy faster population and employment growth than similar counties without an interstate highway.

The CFX Corridor region has slow population growth, an aging population, and an economy that relies heavily on coal mining.

- The population in the CFX Corridor declined at a 0.5% annual pace from 2000 to 2010, compared with statewide growth of 1.2% for Virginia and 0.2% for West Virginia.
- The CFX Corridor has a smaller share of younger individuals below age 30 than the state averages of Virginia and West Virginia.
- The CFX Corridor has a much higher percentage of whites and a much lower concentration of minority groups, such as African-Americans, compared with the Virginia average. However, the racial distribution of the Corridor is similar to that of the West Virginia average.
- From 2000 to 2011, overall employment in the Corridor expanded at an average 2.0% per year, higher than both the 0.4% rate for Virginia and the 0.2% rate for West Virginia. Job growth in the Corridor outperformed the state averages due to the expansion of the mining industry.

¹ CFX has been designated as U.S. Route 121 in the national highway system.

² These six counties are referred as the CFX Corridor region in this report.

- The CFX Corridor has a higher unemployment rate than both the averages of Virginia and West Virginia. The latest data indicate that in September 2012, the unemployment rate for the region was 7.9%, higher than the Virginia average of 5.6% and the West Virginia average of 6.9%.
- Regional employment is heavily concentrated in the mining sector. Based on 2011 employment data, 15.1% of regional employment was in mining, compared with 0.3% and 4.7% in Virginia and West Virginia, respectively.
- The CFX Corridor has little presence of high-tech industries. The percentage of high-tech employment in the CFX Corridor was below 2% during the past eleven years. For the same period, the percentage of high-tech employment in Virginia was around 16%, while West Virginia averaged over 7%.
- Educational attainment of the CFX Corridor is below state averages. Based on U.S. Census estimates, 11.6% of regional residents age 25 and over from 2006-2010 had a four-year degree or higher. Over the same period, 33.8% of Virginia residents, and 17.3% of West Virginia residents, age 25 and older, had a four-year degree or higher.
- The CFX Corridor has a higher percentage of individuals living in poverty compared to the state averages of Virginia and West Virginia. The Census Bureau's 2006-2010 American Community Survey (ACS) estimated that 20.4% of individuals in the Corridor were in poverty compared to 10.3% in Virginia and 17.4% in West Virginia.
- Due to the high concentration of coal mining employment in the region, the CFX Corridor also has a higher percentage of individuals with disabilities. Based on the 2000-2011 Census ACS, an estimated 25.0% of individuals in the Corridor were disabled, compared to 10.9% in Virginia and 18.9% in West Virginia.

The one-time economic impact of the Coalfields Expressway construction is expected to reach \$5.3 billion in the Corridor from 2013 to 2029.

- The estimated total cost of CFX in Virginia is \$2.8 billion in 2013 dollars, taking into consideration significant cost savings from public-private partnerships. The 2012 cost estimate for the West Virginia portion of CFX was \$822.2 million.
- From 2013 to 2029, the construction of CFX is projected to generate \$5.3 billion in cumulative economic impact in the Corridor. Of this total, \$3.7 billion will be direct construction spending while \$1.6 billion will be the ripple economic impact of the construction.³ Construction can support 38,055 cumulative jobs (both direct and ripple) in the Corridor.
- On an annual average basis, CFX construction can generate an economic impact of \$313.0 million that can support 2,239 jobs per year in the CFX Corridor from 2013 to 2029.

³ The direct impact is economic activity generated by a project or operation. For construction, this represents activity of the contractor. The indirect impact is the secondary economic activity that is generated by a project or operation. An example is a new office building generating demand for parking garages. The induced or household impact is economic activity that occurs when households employed by the construction firm or its suppliers spend their income in the region. The ripple effect is the sum of induced and indirect impacts.

- The Virginia portion of the CFX Corridor is expected to receive over seventy percent of the construction impact due to larger construction spending projections for Virginia.

In 2035, CFX can provide \$96.5 million in annual user benefits for regional businesses and residents, as a result of improved travel efficiency and cost savings.

- On average, CFX can provide 50% time savings for businesses and residents traveling the entire length of the road, with time savings reaching 49% in Virginia and 50% in West Virginia.
- The total user benefits for the region are estimated to reach \$96.5 million per year in 2035. Among those, \$49.6 million is the estimated value of time saving for motorists. The estimated savings in vehicle operation costs is \$31.2 million, while \$15.7 million is the estimated cost savings in accident reduction.
- Over seventy percent of user benefits are expected to take place in the West Virginia portion of the Corridor due to higher traffic volume and more significant time savings in West Virginia.

In 2035, CFX can support 77 service businesses and 880 jobs in the Corridor, with a total annual economic impact (both direct and ripple) of \$118.8 million that can support 1,067 jobs.

- Based on traffic projections and patterns, it is estimated that CFX can support approximately 77 businesses in the Corridor in 2035: 22 motels/hotels, 28 gas stations, and 27 restaurants.
- The direct output of these businesses is estimated to be \$86.8 million in 2035, with ripple effects of \$31.9 million. In terms of job creation, service businesses will directly employ 880 workers with a ripple effect of an additional 178 jobs per year in 2035.
- In 2035, about 35% of the economic impact from service businesses is expected to occur in Virginia's section of the CFX Corridor, and 65% of the total economic impact will occur in West Virginia.

The cumulative economic impact of CFX, during its 50-year life span, is estimated to be \$10.5 billion in 2013 dollars.

- Each dollar of investment in CFX can result in \$2.9 dollars in economic impact in the Corridor during its life span.
- The potential payback period for CFX is estimated to be 30 years after the road completion.

After CFX is completed, it is estimated that Virginia will receive \$1.9 million in annual tax revenue while the fiscal benefit for West Virginia's state government will be \$4.9 million per year.

- After construction is completed, both state governments are expected to collect corporate and personal income taxes from service businesses along CFX, in the amount of \$1.9 million per year for Virginia, and \$4.9 million per year for West Virginia.
- For local governments, those in Virginia can collect an estimated \$0.5 million in annual tax revenue, from sales, meal, and lodging taxes. West Virginia's local governments can collect an estimated \$0.9 million in annual tax revenue from lodging and business and occupation (B&O) taxes.

- During the construction phase, Virginia’s state government can receive \$62.8 million in cumulative tax revenue, while West Virginia’s government can receive \$19.9 million in cumulative tax revenue from 2013 to 2029.

The economic impact of CFX in the CFX Corridor is summarized in Table 1.1.

Table 1.1: CFX Economic Impact Summary

	Total Economic Impact (\$MM)	Total Job Creation	State Tax Revenues (\$MM)	Local Tax Revenues (\$MM)
Average Annual One-time Construction Impact (2013-2029)				
CFX Virginia	\$241.4	1,727	\$3.7	\$0.0
CFX West Virginia	\$71.5	512	\$1.2	\$0.7
CFX Corridor	\$313.0	2,239	\$4.9	\$0.7
Ongoing Impact (2035)-CFX Virginia				
Total Use Benefits	\$28.3			
Roadside Services	\$41.4	372	\$1.9	\$0.5
Total CFX Virginia Corridor (2035)	\$69.8	372	\$1.9	\$0.5
Ongoing Impact (2035)-CFX West Virginia				
Cost Savings (Productivity)	\$68.1			
Roadside Services	\$77.4	695	\$4.9	\$0.9
Total CFX West Virginia Corridor (2035)	\$145.5	695	\$4.9	\$0.9
Ongoing Impact (2035)-CFX Corridor				
Total User Benefits	\$96.5			
Roadside Services	\$118.8	1,067	\$6.8	\$1.4
Total CFX Corridor (2035)	\$215.3	1,067	\$6.8	\$1.4

Source: Chmura Economics & Analytics

Other benefits of CFX are better market access, increased appeal for business expansion and relocations, faster population growth, increased tourism, and improved quality of life.

- While the Coalfields Expressway would enhance long-term economic development efforts for the eventual replacement of lost coal mining employment, the new highway also would serve the short-term needs of the mining industry that remains an important part of the local economy. CFX would improve vehicular access to and from existing mines.
- CFX provides benefits to regional agricultural and manufacturing industries, increasing their market access to the District of Columbia, North Carolina, Maryland, and Ohio.
- CFX will have a positive effect on regional tourism as it can improve access to tourist attractions such as the Appalachian Trail, New River Gorge, and Jefferson National forest.
- CFX will also have a positive effect on population growth in the region.

Benchmark analysis of rural highways identified economic success stories of highway projects across America.

- A study by Chandra and Thompson examined historical data on interstate highway construction and economic activity in the United States from 1969 to 1993. New interstate highways raised earnings in counties that directly benefitted from new construction compared to counties without new construction. Benefits of new highway construction varied according to each sector, with services and retail fairing particularly well.
- One case study examined ten rural counties in Georgia that benefitted from the Governor's Road Improvement Program (GRIP). In general, it was found that the "ten nonmetropolitan counties in the study group experienced pronounced economic improvements in comparison to their nonmetropolitan counterparts."
- A strong highway system is a crucial piece of infrastructure for regions looking to attract prospects. Many cities from Chico, California to Danville, Virginia provided examples where lack of direct access to interstate highways prevents those cities from being competitive in the attraction and recruitment of new businesses.

2. Background

The Coalfields Expressway (CFX) is a highway project located in the states of Virginia and West Virginia. The aim of CFX is to provide improved highway access for businesses and residents in the regions of those two states. In Virginia, the Coalfields Expressway will be located in the counties of Wise, Dickenson, and Buchanan. It will run from Route 23 near Pound, Virginia to the West Virginia state line east of Slate, Virginia. There, the highway will connect with West Virginia's portion of CFX, which is located in Wyoming, Raleigh, and McDowell Counties. CFX in West Virginia starts at the Virginia/West Virginia border and runs northeast to Beckley, West Virginia, where it links with Interstates 64 and 77.⁴

Currently, traveling in this area involves two-lane roadways, such as Route 83 in Virginia, and Routes 83 and 16 in West Virginia. Steep slopes, geometric constraints, and heavy truck traffic make traveling on those roadways both time-consuming and sometimes difficult. There is no major four-lane divided highway in this region. The lack of safe and efficient access to a national highway network is often cited as a major impediment to the economic development in the region.⁵

The Coalfields Expressway has been twenty years in the making. In 1991, the U.S. Congress defined West Virginia's portion of CFX and appropriated \$50 million for the design and construction of the project.⁶ In 1995, Congress designated CFX in Virginia as a Congressional High-Priority Corridor and included it in the National Highway system.

In Virginia, the General Assembly passed three resolutions supporting the project in 1999. Also, local governing bodies overwhelmingly supported the project. In 2001, the Virginia Department of Transportation (VDOT) completed the Final Environmental Impact Statement (FEIS) for Virginia's portion of the CFX. In November 2001, the Federal Highway Administration (FHWA) issued its Record of Decision, selecting the preferred route for the expressway.

In 2006, VDOT announced that it had formed Public-Private partnership with both Pioneer Group and Alpha Natural Resources, under the Virginia Public-Private Transportation Act (PPTA), to advance the project. Since forming PPTA, the selected route location approved by FHWA in 2001 has been modified, and the Corridor has been divided into five sections: Section I, II, IIIA, IIIB and IIIC. Each section is of sufficient length and will provide a serviceable facility regardless of whether or not other CSX sections are constructed.⁷ Since forming the PPTA in 2006, state funding has been appropriated to start site work on certain sections (Hawks Nest and Rockhouse) of the roadway. VDOT is still in the process of securing funding for the remaining construction of CFX.⁸

In West Virginia, the WVDOT initiated the Coalfields Expressway project with a location study in 1992. The location study included an environmental inventory, corridor development, a cost analysis, and public informational

⁴ Source: Coalfields Expressway Final Environmental Impact Statement (FEIS). VDOT 2001. Available at:

http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp

⁵ Ibid.

⁶ Source: Record of Decision, Coalfields Expressway Location Study, Federal Highway Administration, 2001. Available at:

http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp

⁷ Source: Reevaluation for Coalfields Expressway, Section I (Pound Bypass). December 2008. VDOT. Available at:

http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp

⁸ Source: CFX Project Timeline. Available at: http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp

meetings. WVDOT completed the Final Environmental Impact Statement in 1999, and a Record of Decision was issued by FHWA in 2000.

The Appalachian Regional Commission (ARC) will also play an important role in the development of the Coalfields Expressway. ARC is an economic development agency made up of partners from federal, state, and local governments. ARC's mission is to be a strategic partner and advocate for sustainable community and economic development in Appalachia⁹. ARC is establishing the Appalachian Development Highway System (ADHS). Corridor Q of the system, running from Shelbiana, Kentucky to Christiansburg, Virginia¹⁰ will intersect and overlap a segment of CFX near the town of Grundy in Buchanan County, Virginia.

CFX can potentially play a significant role in improving both the economy and quality of life in the Corridor. The construction of the project can inject millions of dollars into the local economy. After the road completion, CFX can significantly reduce travel time and improve efficiency for regional businesses and residents. More importantly, the Coalfields Expressway will improve safety for motorists and allow residents of the region to reach health and educational institutions in the region more easily, greatly improving their quality of life. Chmura Economics & Analytics (Chmura) was retained to provide a detailed economic impact analysis of The Coalfields Expressway on the CFX Corridor in Virginia and West Virginia.

The remainder of this report is organized as follows:

- Section 3 provides a community profile of the CFX Corridor, including population, employment, education and other social economic indicators.
- Section 4 details the location of the Coalfields Expressway, and summarizes both the traffic analysis data and access points of CFX.
- Section 5 presents a detailed analysis of the economic impact of CFX, including both the one-time construction impact and the ongoing impact due to cost savings and new service businesses.
- Section 6 estimates the fiscal benefits for state and local governments.
- Section 7 discusses other benefits of CFX, a benchmark/case study, and an assessment of risk.
- Section 8 offers a summary.

⁹ Source: <http://www.arc.gov/about/index.asp>

¹⁰ Source: http://www.arc.gov/program_areas/ADHSApprovedCorridorsandTermini.asp

3. Community Profile of the CFX Corridor

This section summarizes the community profile of the CFX Corridor, in terms of population, employment and wages, industry mix, and social indicators such as educational attainment, poverty, and disability.

3.1. Demographic Profile

3.1.1. Population and Growth Trend

Population growth is an important indicator of both an expanding economy and a vibrant community. A community having both an expanding labor force and economy attracts new residents. Further, the influx of population into an area stimulates the housing market, the retail industry, and overall consumption resulting in a larger tax base for the community.

The total population in the CFX Corridor was 206,221 based on the 2010 Census, with 81,453 in Virginia and 124,768 in West Virginia.¹¹ From 2000 through 2010, the pace of population change in the CFX Corridor severely lagged behind the state averages of both Virginia and West Virginia. The population of the Corridor declined at an annual rate of 0.5% per year, compared with 1.2% population growth in Virginia and 0.3% annual growth in West Virginia. Within the CFX Corridor, the highest growth rate was in Wise County (+0.3%), while all other counties lost residents from 2000 to 2010. Population in McDowell County, West Virginia declined by 2.1% every year during that same period. Both the remote location of and the lack of easy access to the region may have contributed to the Corridor’s relative inability to retain its residents or attract new residents.

Table 3.1: CFX Corridor Population and Growth

	Population (2000)	Population (2010)	Average Annual Growth Rate (2000-2010)
Buchanan County, Virginia	26,978	24,098	-1.12%
Dickenson County, Virginia	16,395	15,903	-0.30%
Wise County, Virginia	40,123	41,452	0.33%
McDowell County, West Virginia	27,329	22,113	-2.10%
Raleigh County, West Virginia	79,220	78,859	-0.05%
Wyoming County, West Virginia	25,708	23,796	-0.77%
CFX Corridor-Virginia	83,496	81,453	-0.25%
CFX Corridor-West Virginia	132,257	124,768	-0.58%
CFX Corridor	215,753	206,221	-0.45%
Virginia	7,078,515	8,001,024	1.23%
West Virginia	1,808,344	1,852,994	0.24%

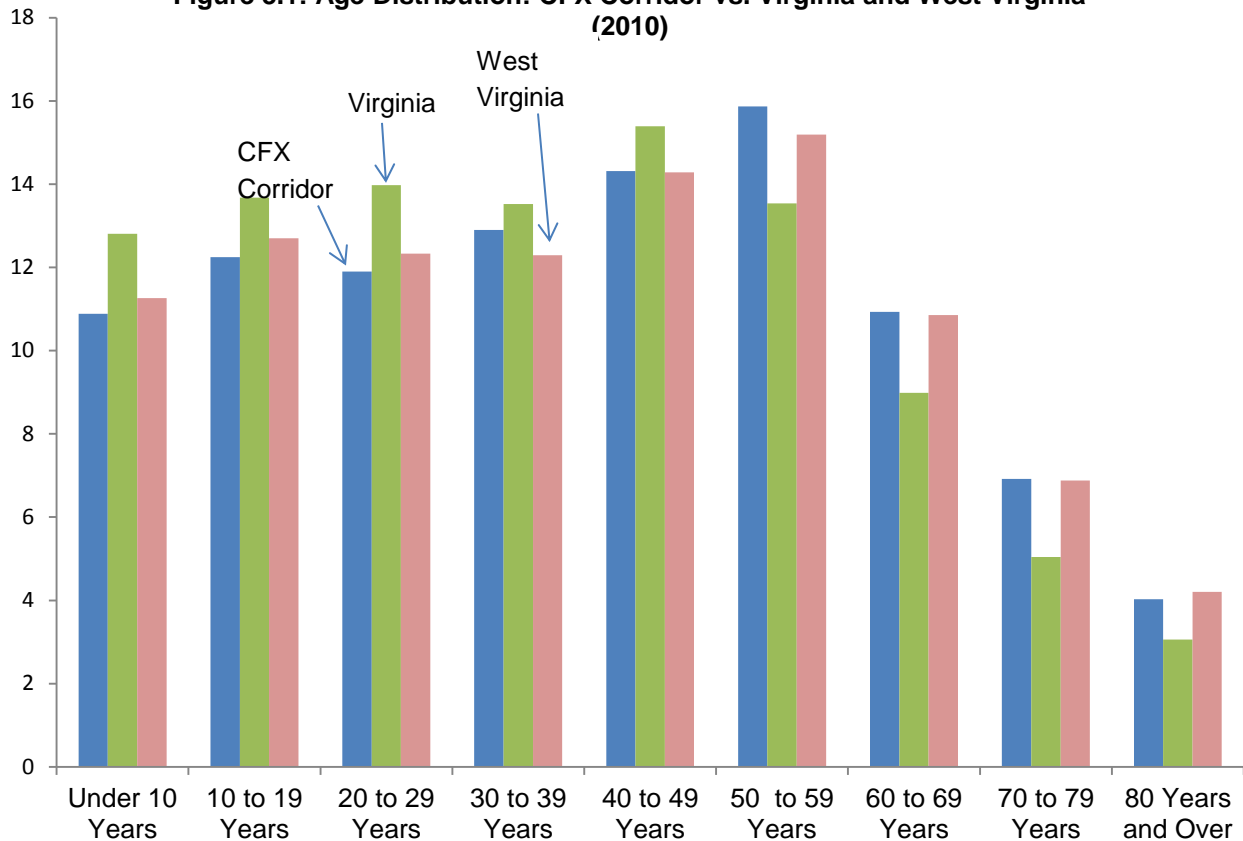
Source: U.S. Census

3.1.2. Age Distribution

Age distribution in a region can suggest patterns of growth. Age distribution is affected by birth, death, and migration rates. An aging population implies more need for healthcare and related services for the region. On the other hand, a younger population indicates that these individuals will flow into the workforce in the future. If the regional economy cannot support them, the region may risk losing the young population.

¹¹ Source: U.S. Census.

Figure 3.1: Age Distribution: CFX Corridor vs. Virginia and West Virginia (2010)

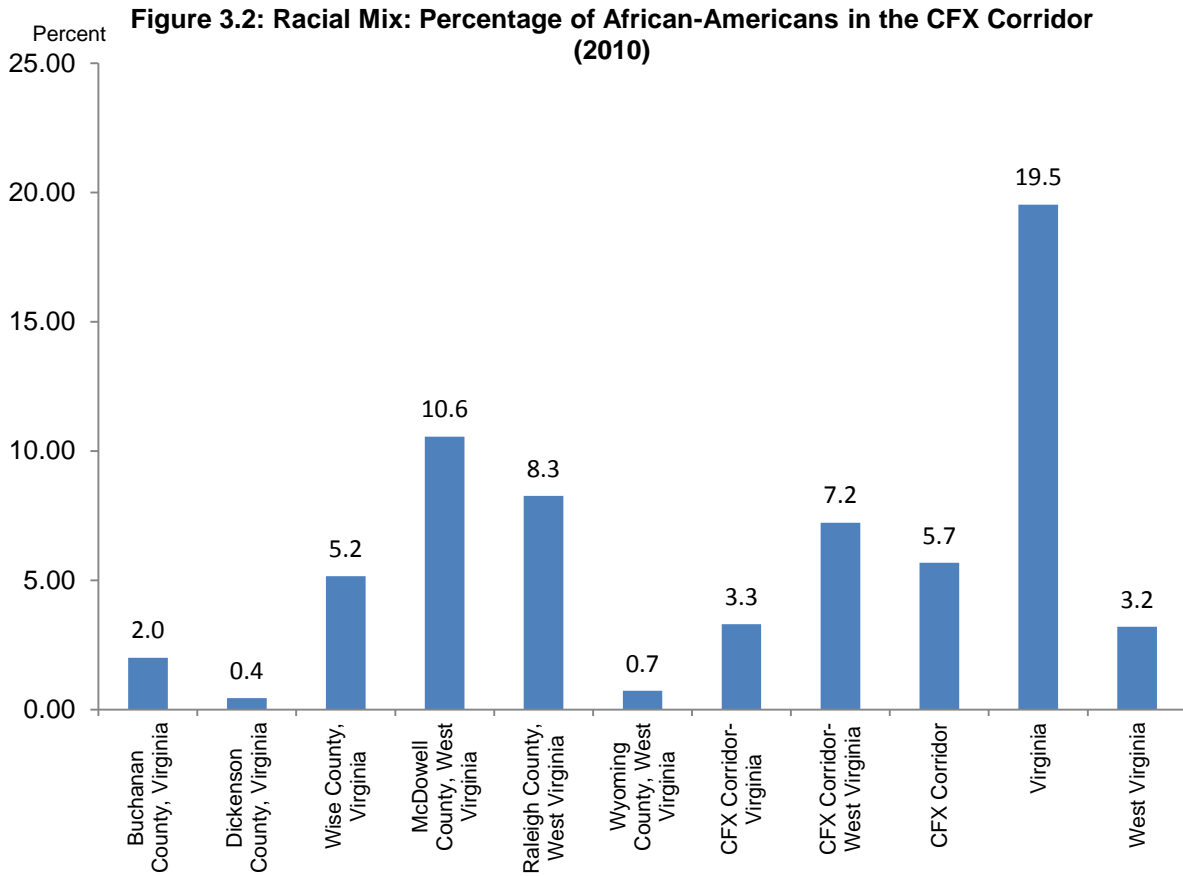


Source: U.S. Census

The age distribution of the CFX Corridor reflects an area with fewer young people and more senior residents than the state averages of Virginia and West Virginia. In 2010, 23.1% of the Corridor population was under age 20 compared to 26.5% in Virginia and 24.0% in West Virginia. Also in the same year, 21.9% of the Corridor's population was over age 60; that is similar to the state average (21.9%) in West Virginia, but higher than 17.1% in Virginia. Only 11.9% of the Corridor's population was between age 20 and 30, while 14.0% and 12.3% of Virginia and West Virginia's populations, respectively, belonged to that age group. These were young people in the phase of both going to college and entering the workforce. The low percentage of this age group indicated a lack of economic opportunities for the region, as young people had to seek employment elsewhere.

3.1.3. Race Distribution

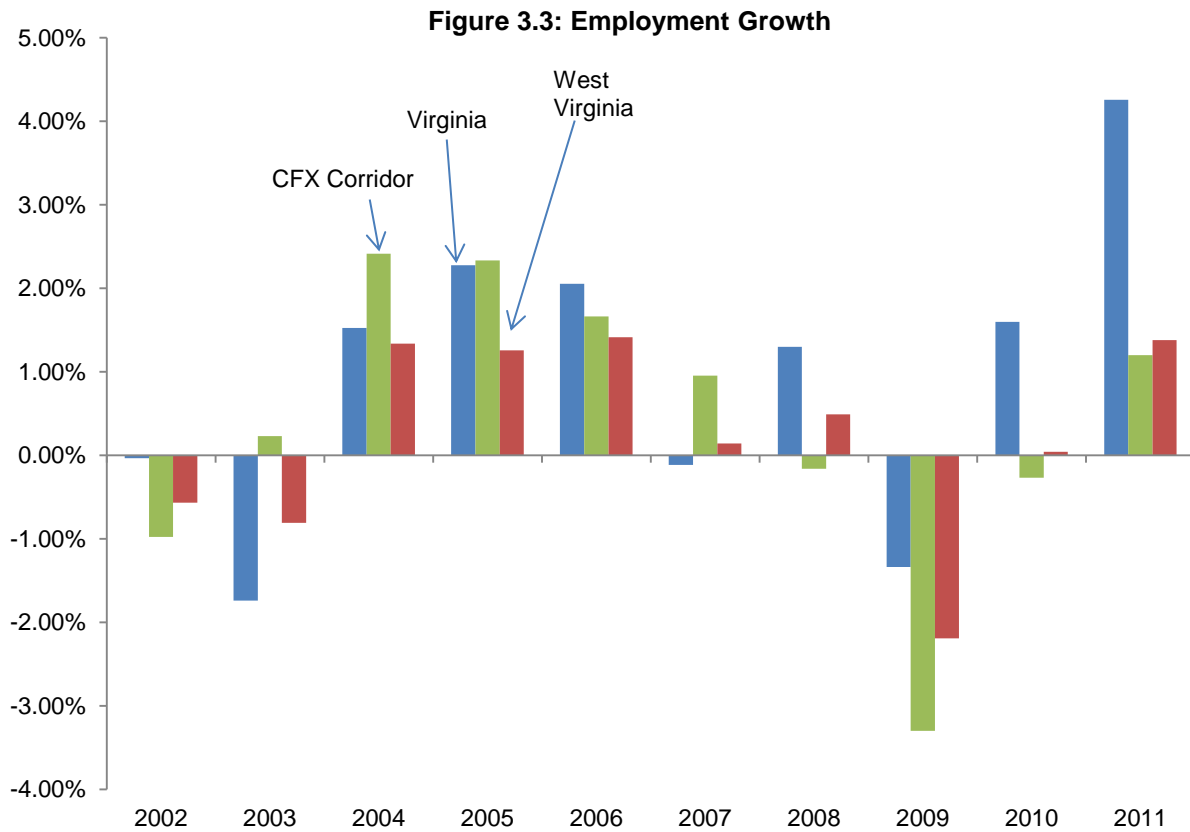
The CFX Corridor has a much higher percentage of whites when compared to minority groups, such as African-Americans, than the Virginia average. But the racial distribution of the Corridor is similar to that of West Virginia. According to data from the 2010 Census, 92.5% of the CFX Corridor population was white and 5.7% was African-American. By comparison, 69.9% of Virginia's population was white and 19.5% was African-American in 2010. In West Virginia, 94.2% of the population was white and 3.2% was African-American. The racial composition of the counties in the Corridor varies greatly by locality as shown in Figure 4.3. Dickenson County in Virginia has the lowest proportion of African-Americans at 0.4 percent in 2010, followed by Wyoming County in West Virginia with African-Americans making up 0.7 percent of its population.



3.2. Economic Profile

3.2.1. Employment and Wages

The economic base of the CFX Corridor, measured by total employment, has been growing in the past decade. Overall employment in the region increased from 58,634 in 2000 to 72,582 in 2011, expanding at an average of 2.0% per year. Meanwhile, overall employment in Virginia grew an average 0.4% percent per year and grew in West Virginia at 0.2% per year. Job growth in the Corridor outperformed both state averages. The reason is that the most recent recession (2008-09) hurt the rest of Virginia and West Virginia more severely than the CFX Corridor. Even during the recession, employment in the mining industry in the Corridor expanded. The overall employment growth for the mining industry expanded 3.3% per year from 2000 to 2011.

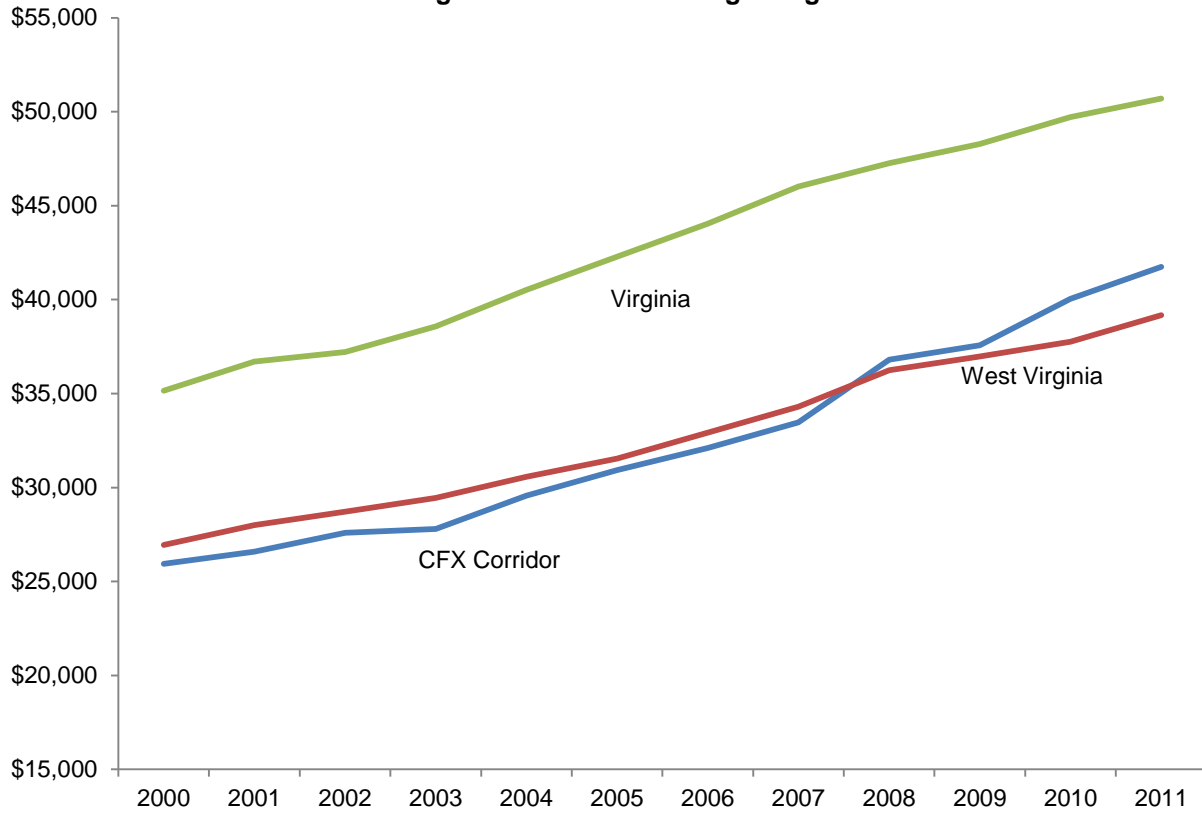


Source: Virginia Employment Commission

In 2011, the wage level of the area lagged behind the Virginia state average, but was higher than the West Virginia average (Figure 3.4). In 2011, the average wage of the CFX Corridor was \$41,740, which is 82% of the Virginia average wage of \$50,711, but higher than West Virginia’s average of \$39,167. From 2000 through 2010, the average wage of the Corridor grew at an average pace of 4.4% per year nominally—higher than the 3.7% rate for Virginia and the 3.8% rate for West Virginia. The expanding mining industry contributed to faster wage growth of the Corridor, as annual average wages in this industry advanced 5.5% per year from 2000 to 2011.



Figure 3.4: Annual Average Wages

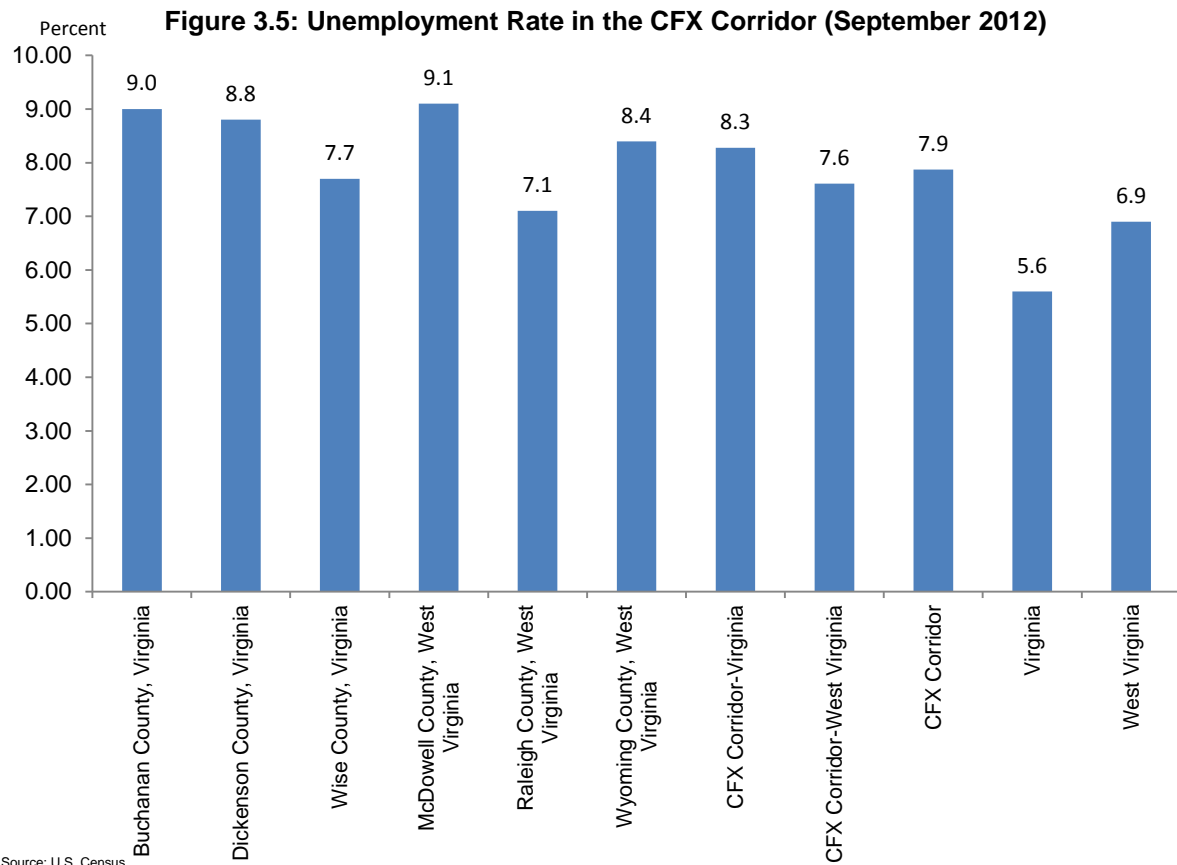


Source: Virginia Employment Commission

3.2.2. Unemployment Rate

The CFX Corridor has a higher unemployment rate than the averages of both Virginia and West Virginia. The latest data indicate that in September 2012, the unemployment rate for the region was 7.9%,¹² higher than the Virginia average of 5.6% and the West Virginia average of 6.9%. Among all localities in the Corridor, McDowell County in West Virginia had the highest unemployment rate at 9.1% in September 2012, followed by Buchanan County in Virginia at 9.0%. Raleigh County in West Virginia had the lowest unemployment rate in the Corridor at 7.1%, still higher than both Virginia and West Virginia state averages. The higher unemployment rate in the Corridor implies that creating employment opportunities for the regional workforce is of paramount importance for local governments.

¹² The state, Corridor, and county unemployment rates are not seasonally adjusted.



3.2.3. Industry Mix

Compared to the state averages of Virginia and West Virginia, Corridor employment is heavily concentrated in the mining sector (Table 3.2). Based on 2011 employment data, 15.1% of regional employment was in mining, with 0.3% and 4.7% in Virginia and West Virginia, respectively. The region has smaller percentages of employment in manufacturing and professional, scientific, and technical services than the state averages.

Since 2000, industry mix in the Corridor has changed considerably. Most significantly, the sectors of mining, healthcare, and construction have all experienced an increase in their share of total employment in the region. In 2000, 13.0% of regional employment was in mining, increasing to 15.1% in 2011. Employment shares for manufacturing, transportation, and warehousing declined from 2000 to 2011. For Virginia and West Virginia, their employment numbers experienced expansion in terms of employment share for healthcare and social assistance, and for professional, scientific and technical services, but declined in manufacturing and construction sectors.

Table 3.2: Industry Mix of the Region (2000 & 2011)

Major Industry Sector	2000			2011		
	CFX Corridor	Virginia	West Virginia	CFX Corridor	Virginia	West Virginia
Agriculture, Forestry, Fishing and Hunting	0.6%	0.4%	0.4%	0.2%	0.3%	0.2%
Mining	13.0%	0.3%	2.9%	15.1%	0.3%	4.7%
Utilities	0.7%	0.5%	1.3%	0.6%	0.5%	1.1%
Construction	5.7%	6.5%	5.6%	6.7%	5.2%	5.3%
Manufacturing	3.1%	10.7%	11.0%	2.6%	6.7%	7.0%
Wholesale Trade	3.3%	3.4%	3.5%	3.1%	3.1%	3.3%
Retail Trade	17.0%	12.1%	13.6%	12.9%	11.4%	12.4%
Transportation and Warehousing	3.9%	4.0%	3.4%	2.9%	3.4%	3.3%
Information	1.9%	3.6%	2.2%	1.1%	2.2%	1.6%
Finance and Insurance	2.4%	3.6%	3.1%	1.8%	3.5%	2.7%
Real Estate and Rental and Leasing	0.8%	1.6%	1.0%	0.6%	1.4%	1.0%
Professional, Scientific, and Technical Services	3.2%	8.5%	3.2%	3.1%	11.1%	3.7%
Management of Companies and Enterprises	0.5%	2.1%	0.4%	0.5%	2.0%	0.8%
Administrative and Support and Waste Management and Remediation Services	3.9%	6.2%	4.6%	3.9%	5.8%	4.7%
Educational Services	6.6%	8.2%	9.4%	10.1%	10.0%	9.5%
Healthcare and Social Assistance	13.8%	9.4%	15.3%	16.9%	12.2%	18.4%
Arts, Entertainment, and Recreation	1.0%	1.6%	1.2%	0.9%	1.8%	1.1%
Accommodation and Food Services	7.3%	7.4%	7.9%	7.1%	8.5%	9.4%
Other Services (except Public Administration)	3.4%	3.6%	3.2%	2.2%	3.7%	3.0%
Public Administration	8.0%	6.2%	6.6%	7.7%	6.7%	6.9%
Unclassified	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%

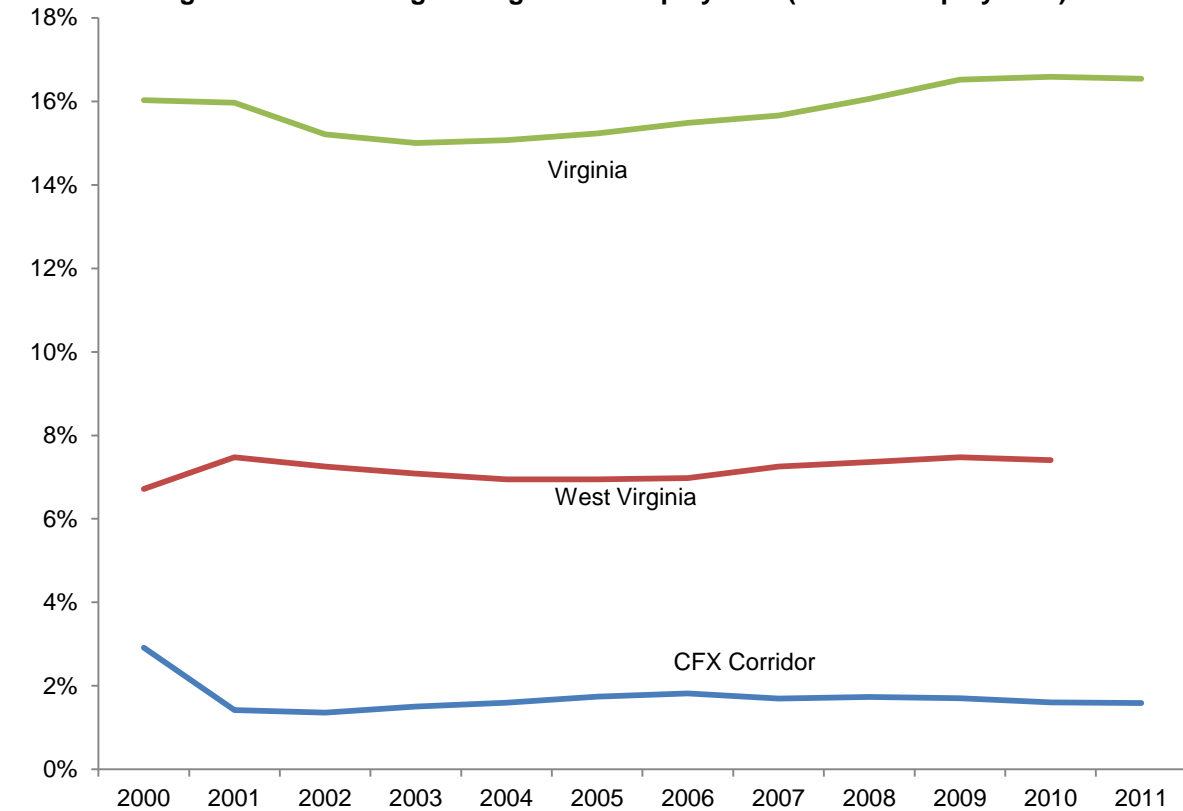
Source: JobsEQ

3.2.4. High-tech Industry

Growth of the high-tech industry in the CFX Corridor lagged behind both state averages. The region did not capitalize on the high-tech boom in the late 1990s; consequently, the percentage of high-tech employment in the CFX Corridor stayed below 2% during the past eleven years. For the same period, the percentage of high-tech employment in Virginia was around 16%, while that of West Virginia averaged over seven percent.¹³

¹³ There is no standard or widely-accepted definition of high-tech industries. The definition used here is the same one used by Chmura's *Virginia Economic Trends*. The high-tech employment for West Virginia was not available for 2011.

Figure 3.6: Percentage of High-Tech Employment (of Total Employment)



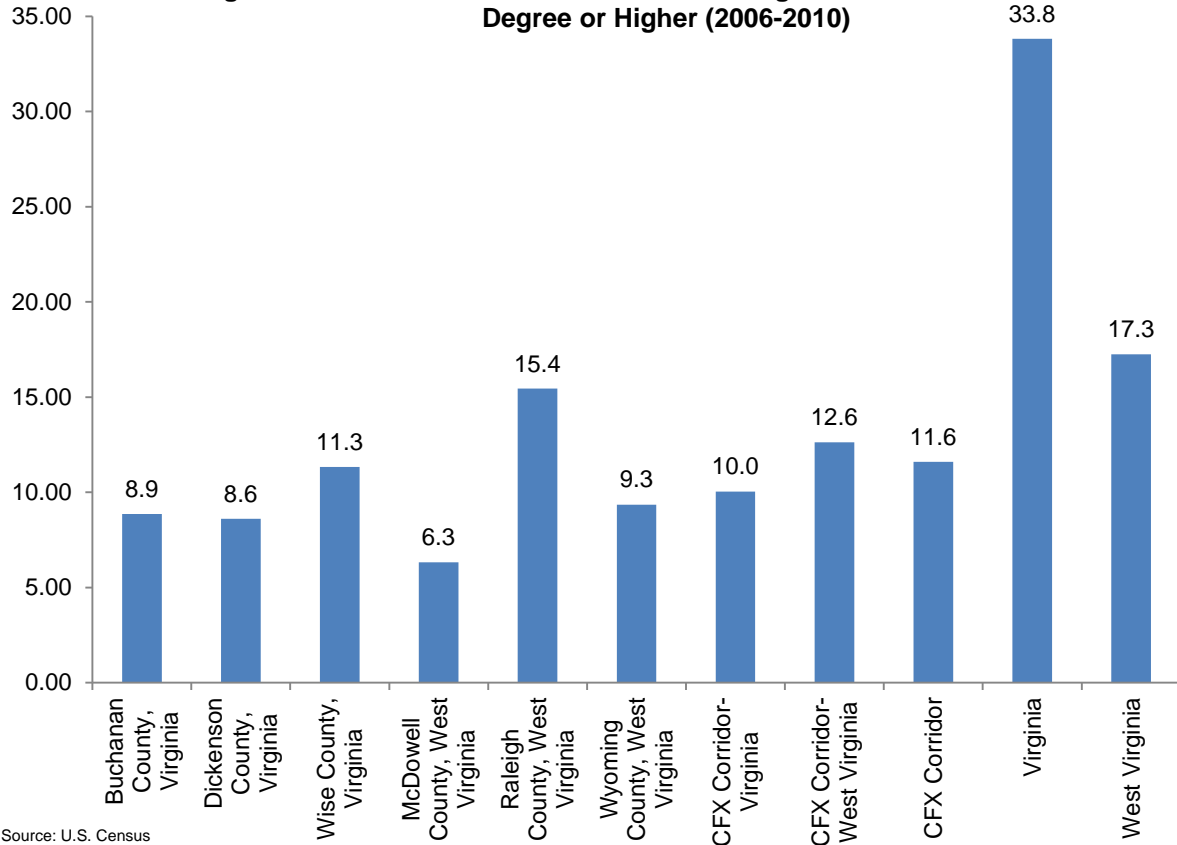
Source: Virginia Employment Commission

3.3. Social Indicators

3.3.1. Educational Attainment

Average educational attainment in the CFX Corridor is much lower than both state averages. Based on U.S. Census estimates, 11.6% of regional residents age 25 and over from 2006-2010 had a four-year degree or higher. Over the same period, 33.8% of Virginia residents and 17.3% of West Virginia residents (age 25 and older) had a four-year degree or higher. Two of the most educated counties in the CFX Corridor are Raleigh and Wise Counties, with 15.4% and 11.3%, respectively, of their residents age 25 and over having a four-year degree or higher. In McDowell County, only 6.3% of residents age 25 and over had a four-year degree or higher. The implication of the lower educational attainment for the CFX Corridor is that when the area has a need for highly-skilled occupations, it becomes more likely that a firm will recruit from outside the region.

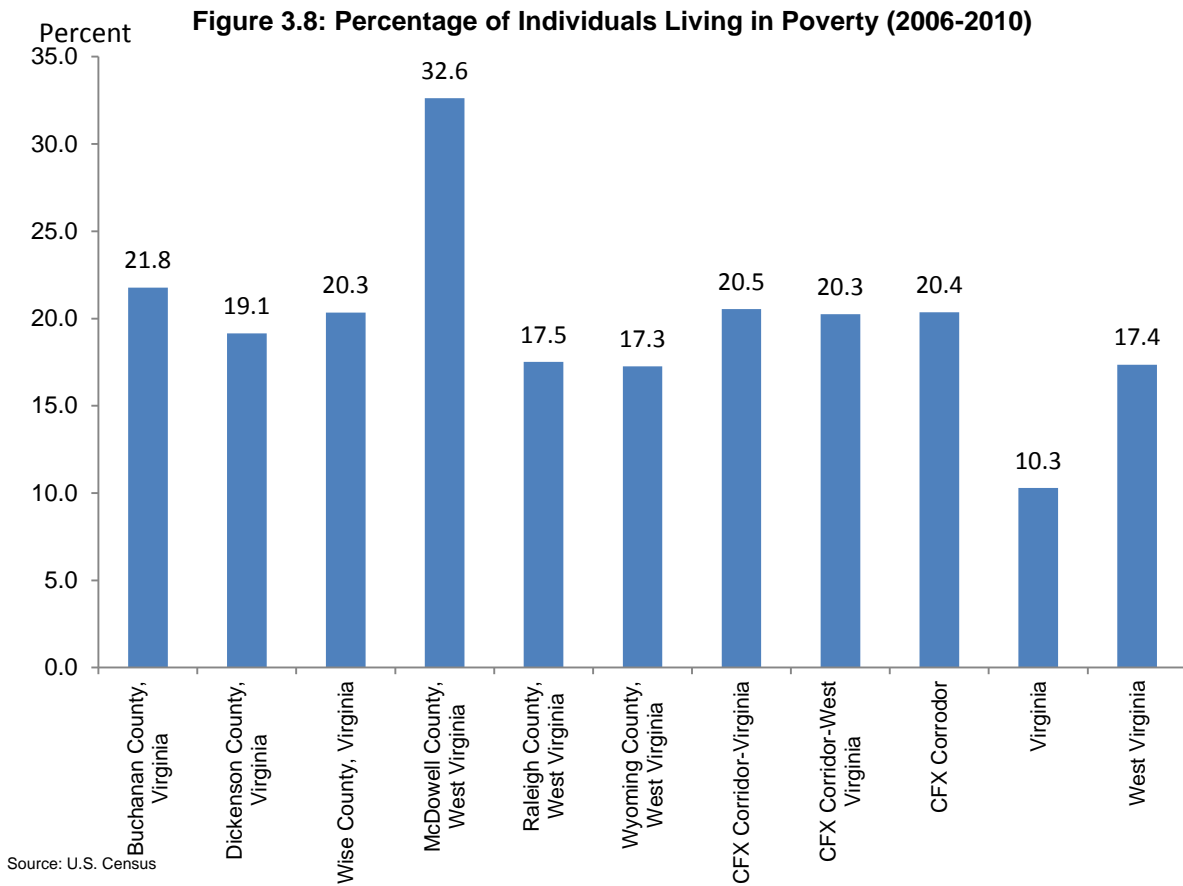
Figure 3.7 : Educational Attainment: Percentage of Adults with Bachelor's Degree or Higher (2006-2010)



Source: U.S. Census

3.3.2. Poverty

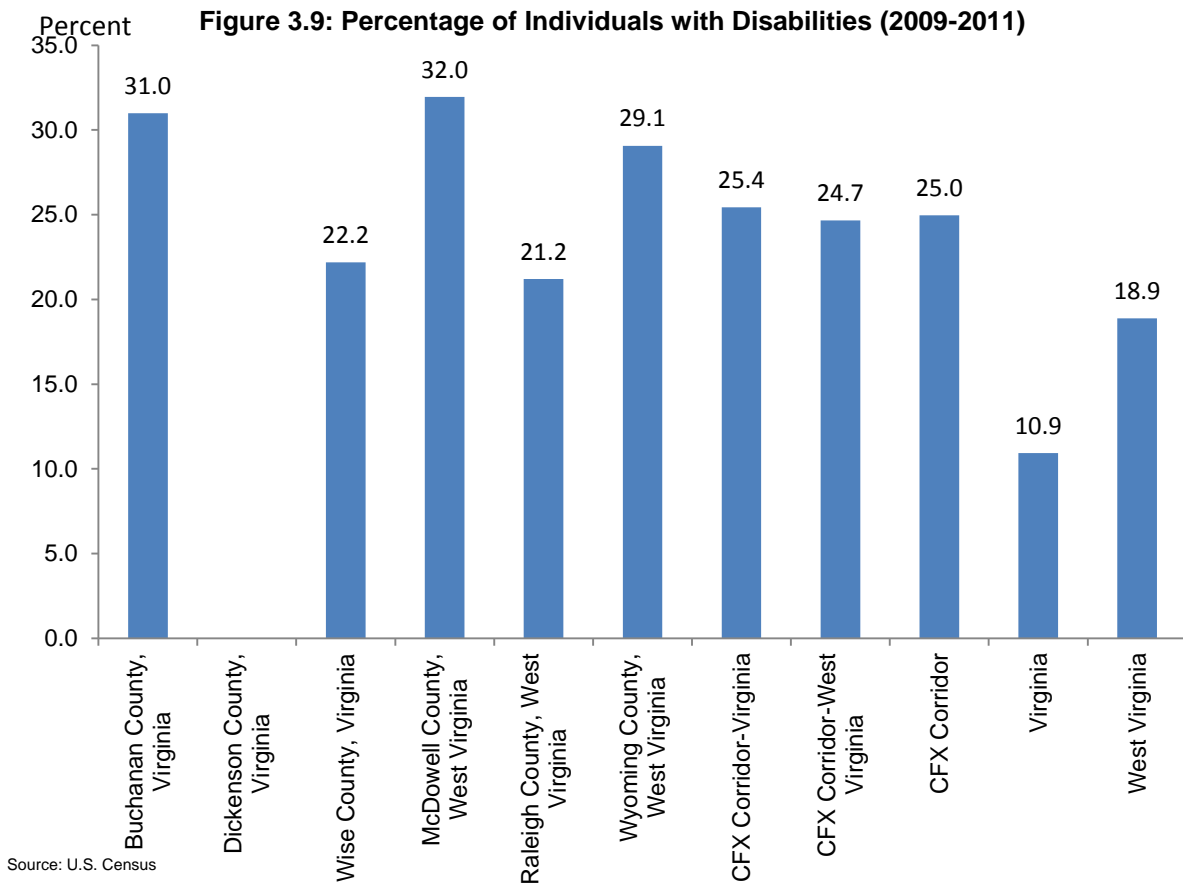
Due to the region's lower average wages and higher unemployment rate, the CFX Corridor has a higher percentage of individuals living in poverty compared to the states of Virginia and West Virginia. The Census Bureau's 2006-2010 American Community Survey estimated that 20.4% of individuals in the Corridor were in poverty compared to 10.3% in Virginia and 17.4% in West Virginia. The highest poverty rate occurred in McDowell County, with almost a third of the county's population living in poverty. The poverty rates for Buchanan and Wise Counties were over twenty percent.



3.3.3. Disability

Due to the high concentration of coal mining in the region, the CFX Corridor also has a higher percentage of individuals with disabilities. Based on the Census Bureau's 2010-2011 American Community Survey, an estimated 25.0% of individuals in the Corridor were disabled, compared to 10.9% in Virginia and 18.9% in West Virginia. The disability rates for McDowell and Buchanan Counties were over 30%, with Wyoming County not far behind.¹⁴

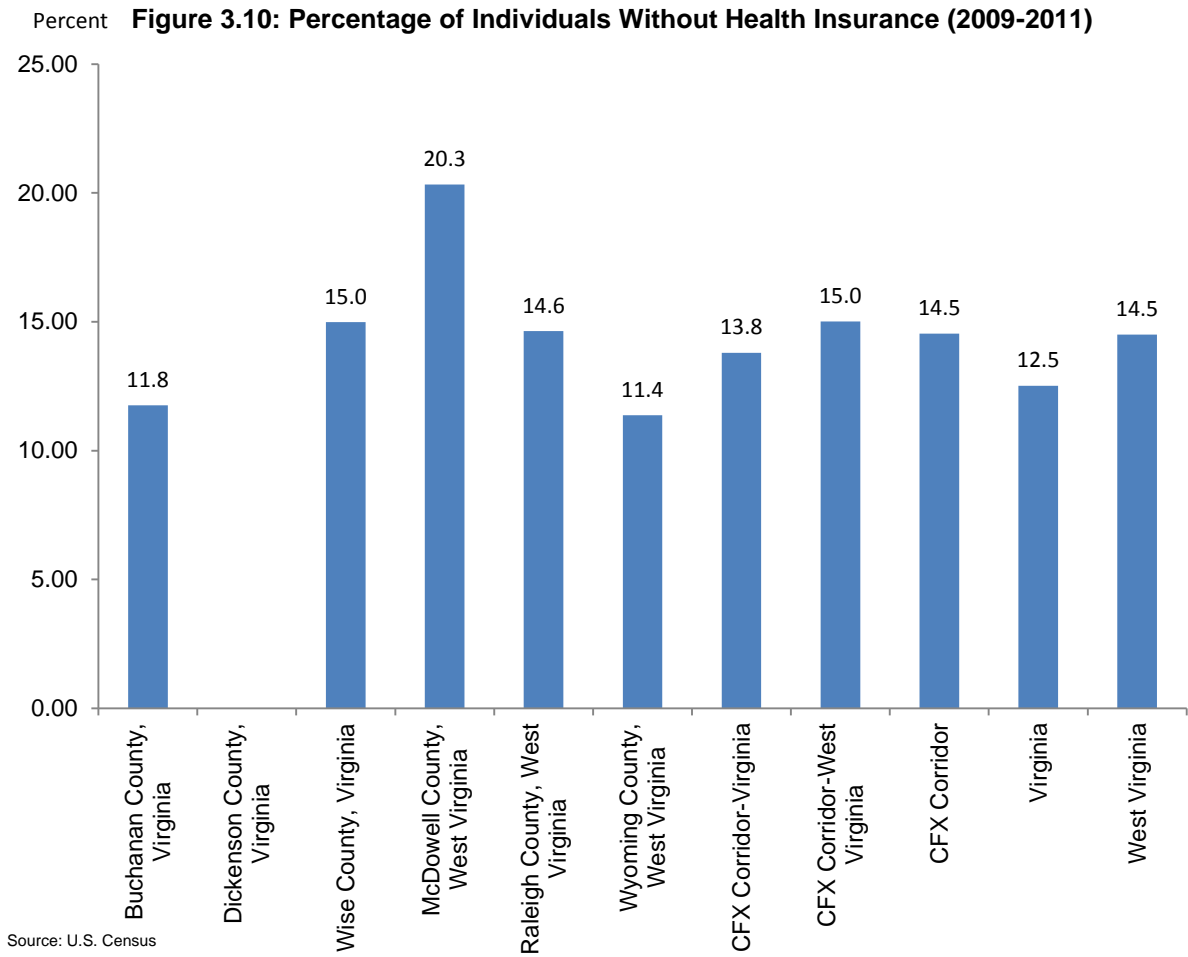
¹⁴ Disability data for Dickenson County was not provided by American Community Survey.



3.3.4. Health Indicators

The CFX Corridor has a slightly higher percentage of individuals without health insurance when compared to the Virginia average, but this percentage is similar to the West Virginia average. Based on the Census Bureau's 2010-2011 American Community Survey, an estimated 14.5% of individuals in the Corridor were without health insurance, compared to 12.5% in Virginia and 14.5% in West Virginia. The percentage of individuals without health insurance is the highest in McDowell County, at 20.3%.¹⁵ Despite higher poverty and disability rates, there is only a slightly higher percentage of uninsured individuals. For both low-income and disabled individuals, they can obtain health insurance from programs such as Medicaid if they meet certain eligibility requirements.

¹⁵ Disability data for Dickenson County was not provided by American Community Survey.



In summary, social and economic indicators in the CFX Corridor lagged behind other parts of both Virginia and West Virginia during the past decade in terms of population, employment, income, and high-tech industries. The expanding coal industry helped the Corridor through the most recent recession. But lack of diversity can pose risks for future economic development. Disparities exist among the Corridor counties. The region had lower educational attainment, higher poverty rates, and higher rates of disabled individuals.

4. Location of CFX and Traffic Projection

4.1. Location of CFX

4.1.1. CFX in Virginia

In Virginia, CFX extends from U.S. Route 23 near Pound in Wise County to the West Virginia border; there it connects with CFX in West Virginia. CFX extends approximately 52 miles through Wise, Dickenson, and Buchanan Counties.

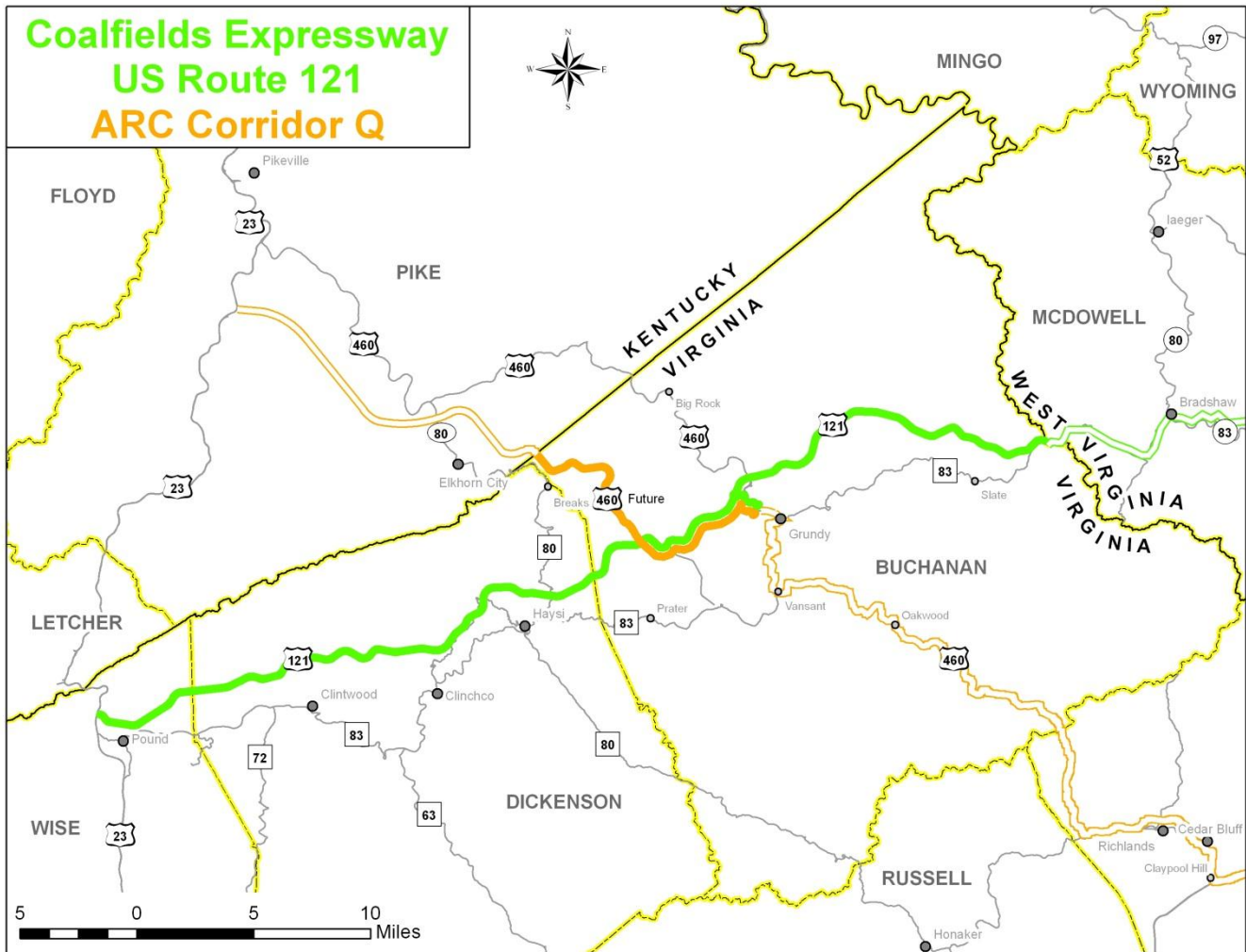
Section I of CFX (Pound Bypass) extends from U.S. Route 23 west of Pound. From there, CFX travels to the north of Pound and connects with U.S. Route 83 east of Pound.

Section II of the proposed Coalfields Expressway is approximately 26 miles long and would extend from the Pound Bypass near its connection with U.S. Route 83 in Wise County, to the Route 460 Connector in Buchanan County. From Pound, CFX would continue east generally north of and parallel to U.S. Route 83 to the town of Clintwood. The connections serving the Clintwood area are provided at U.S. Route 72 to the west, at U.S. Route 83 to the south, and at U.S. Route 672 to the east of Clintwood. From the Clintwood area, CFX passes the Cranes Nest River. It then turns in a northerly direction and has two connections with U.S. Route 63 before turning in a more easterly direction. It connects with U.S. Route 63 again before crossing the Russell Fork about one mile north of the town of Haysi, providing a direct connection to the town. The eastern terminus at Section II connects with Section IIIA at the Route 460 Connector. The Route 460 Connector is part of Corridor Q of the Appalachian Development Highway System that was created by Congress in 1965.¹⁶

The western terminus of Section IIIA (Hawks Nest) starts at the U.S. Route 460 Connector, and ends at State Route 614 in Buchanan County, located west of Grundy, Virginia. This section would overlap with Corridor Q of the Appalachian Development Highway System. For Section IIIB, CFX passes Grundy to the north, travels eastward, and ends at State Route 643. Section IIIC (Rockhouse) extends from Route 643 to Route 83 at the West Virginia state line.

¹⁶ Environmental Assessment, Coalfields Expressway Section II. FHWA and VDOT. June 2012.

Figure 4.1: Location of CFX in Virginia

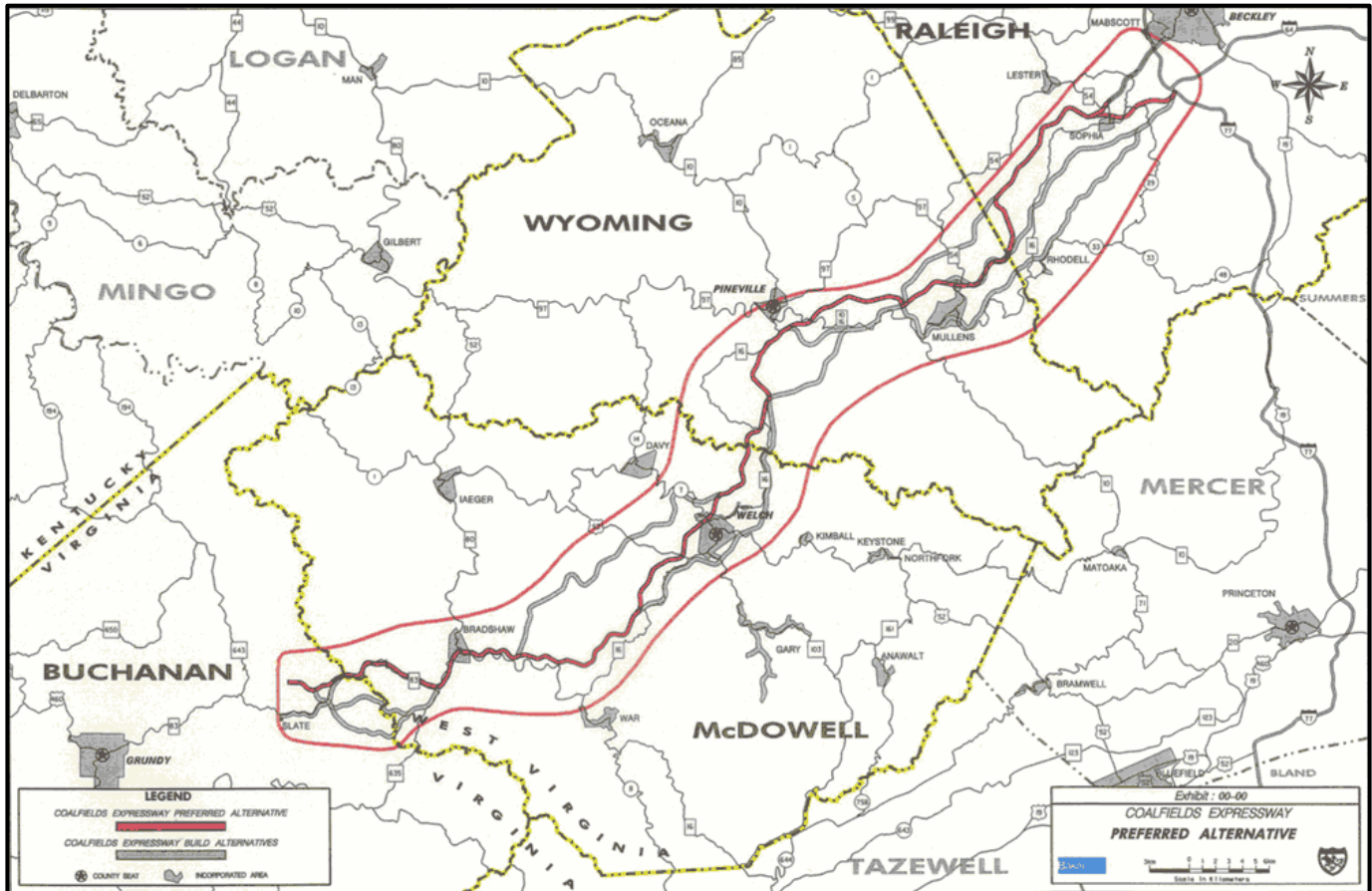


4.1.2. CFX in West Virginia

In West Virginia, the Coalfields Expressway has been designed to serve Interstates 77 and 64 near Beckley. It travels a southwest direction through West Virginia to U.S. Route 83 in Buchanan County, Virginia. CFX will generally follow West Virginia Route 16 through Raleigh and Wyoming Counties and West Virginia Route 83 in McDowell County. This four-lane highway project is approximately 65 miles long. Sections of the highway in Raleigh (Sophia area) and McDowell County in West Virginia have been constructed or are already under construction.¹⁷

¹⁷ Source: <http://www.coalfieldsexpressway.com/route/index.html>

Figure 4.2: Location of CFX in West Virginia



4.2. Access Points and Traffic Projection

Both the increased economic efficiency and business attraction will be affected by projected traffic volume on CFX and the surrounding roads. Consequently, the first step in analyzing the economic impact of CFX is to determine where the access points will be. Then the traffic pattern and volume on the new road are estimated.

There will be 24 preliminary access points along the CFX Corridor in Virginia and 16 in West Virginia (Table 4.1). In Virginia, thirteen of the access points will be located in Dickenson County, eight in Buchanan, and three in Wise. These access points along CFX will provide access to towns within the region such as Pound, Clintwood, Haysi, Grundy, and Slate. Interchanges are also planned where CFX crosses major roadways such as U.S. Route 23, U.S. Route 83, and U.S. 460. In West Virginia, the access points provide access to towns such as Bradshaw, Welch, Mullens, Sophia, and Beckley. In addition, CFX also intersects with major roads such as the proposed King Coal Highway, Interstate I-77/I-64, U.S. Route 83, and U.S. Route 16.

Table 4.1: Number of CFX Preliminary Access Points in Corridor Counties

Wise, VA	3
Dickenson, VA	13
Buchanan, VA	8
McDowell, WV	9
Wyoming, WV	4
Raleigh, WV	3
Total	40

Source: VDOT and WVDOT

Table 4.2 shows the projected average daily traffic (ADT) volumes for 2035.¹⁸ The forecasts were calculated utilizing a travel demand model by VDOT and WVDOT. In Virginia, it is projected that ADT volume will range from 4,567 in sections of Wise County to 6,705 in Buchanan County. The heaviest traffic will occur where CFX meets U.S. Route 460 near the town of Grundy in Buchanan County, and where CFX meets U.S. Route 23 near the town of Pound in Wise County. ADT volume will reach over 10,000 vehicles in 2035 near those two intersections. In West Virginia, the projected traffic volume will be higher in Wyoming and Raleigh Counties, and highest traffic volume will occur near the intersection of CFX, King Coal Highway, and I-77/I-64.¹⁹ CFX also passes through some sparsely populated areas, and ADT is projected to be less than 5,000 in many sections along the CFX Corridor.

Table 4.2: CFX Corridor Average Daily Traffic (ADT) Volumes

County	2035 Traffic Projection
Wise, VA	4,567
Dickenson, VA	7,347
Buchanan, VA	6,705
McDowell, WV	8,517
Wyoming, WV	14,517
Raleigh, WV	15,098
Average	8,561

Source: VDOT and WVDOT

Traffic in the CFX Corridor will experience moderate growth in the future. It is estimated that from 2020 to 2035, traffic is expected to grow by 0.5 percent per year.²⁰ This modest growth forecast is based on modest population and economic growth projections in the region and historic traffic trends. For example, during the six-year time frame of 2000 to 2006, traffic rates on U.S. Route 83 (which parallels the proposed CFX) were unchanged over the past few years.²¹

¹⁸ The original FEIS for Virginia CFX has traffic projection for 2020. Since then, Year 2035 was chosen by VDOT in its updated travel projection.

¹⁹ The FEIS for West Virginia CFX has only traffic projection for 2020. Chmura uses the growth rate from 2020 to 2035 for Virginia CFX to estimate the 2035 traffic for West Virginia CFX.

²⁰ Source: CFX Traffic Forecast Memo. VDOT, July 28, 2008.

²¹ Ibid.

5. Economic Impact of CFX in the Corridor

This study uses the methodology employed in several studies, such as 1998 Appalachian Development Highway System (ADHS) for the Appalachian Regional Commission.²² Since CFX has not been built, a before/after analysis is not feasible. As a result, prior studies were used to create assumptions regarding service business jobs and user benefits that may result from CFX. Generally speaking, the sources of regional economic impact attributable to a new highway can be grouped into the following three categories: (1) temporary construction impact, (2) increased economic efficiency and cost savings, and (3) economic development or business-attraction effects. Estimates from both direct construction and economic developments are input into the IMPLAN model²³ to measure the multiplier impacts of CFX on regional industries.

5.1. One-time Impact of Construction

The construction phase of CFX will create jobs in construction and related industries such as design and site development. In turn, the construction companies will boost their purchasing from regional suppliers. As a result, CFX construction will bring more sales to local suppliers, some of which will see enough sales to add employees.²⁴ In addition, area restaurants and shops will benefit as the construction workers spend their income at local establishments.²⁵ The economic impact of construction is temporary, however, lasting only during the construction phase.

The most recent estimate put total construction cost of CFX at \$2.8 billion for the Virginia section in 2013 dollars.²⁶ As Table 5.1 indicates, this figure includes costs such as pre-construction engineering work, right-of-way, mobilization, construction engineering and inspection (CEI), excavation, drainage, erosion and sediment (E&S), pavement, and construction of bridges. For CFX in West Virginia, total project costs were estimated to be \$822.2 million based on the latest 2012 estimate. Of this, \$182.9 million has been expended on the project.²⁷ Different types of spending will impact industries in the region with varying magnitudes. For example, the money spent on rights-of-way represents a transfer of property which will not generate additional economic impact on the CFX Corridor region. In estimating the economic impacts of construction, Chmura mapped spending categories in Table

²² Wilbur Smith Associates. 1998. Appalachian Development Highways Economic Impact Studies, Prepared for Appalachian Regional Commission, 1998.

²³ IMPLAN is an economic impact assessment modeling system. It allows the user to build economic models to estimate the impacts of economic changes in states, counties, or communities. It was created in the 1970s by the Forestry Service and is widely used by economists to estimate the impact of specific events on the overall economy. It is one of the two most commonly used models to estimate the economic impact of an event. The other often-used model is REMI.

²⁴ This is referred to as the indirect impact.

²⁵ This is referred to as the induced impact. The sum of the indirect and induced impact is referred to as the ripple impact.

²⁶ Source: Coalfields Expressway Decision Document. The estimate was completed in 2008, which was escalated to 2013 dollars using the VDOT escalator. This number includes the cost of connection. The decision document only provided cost breakdowns on CFX without connection (\$2.1 billion in 2008 dollars). Chmura assumes the cost breakdown for the connection is the same as for the mainline CFX. This estimate reflects the considerable cost savings resulting from coal synergy and large-scale earth-moving techniques. The construction cost for the road, based on traditional construction methods, is estimated to be \$5.1 billion in 2013 dollars

²⁷ Source: West Virginia DOT. According to the West Virginia CFX website, (<http://www.coalfieldsexpressway.com/>), the cost to construct the remaining road is estimated to be \$1.0 billion. However, the website did not indicate which year this estimate was made. Chmura chose to use the West Virginia DOT 2012 estimate in this study.

5.1 into different IMPLAN sectors and estimated their indirect and induced impacts, before aggregating them into the overall economic impacts of construction in the Corridor.

Table 5.1: Virginia CFX Construction Cost Estimate - 2013 Dollars (\$Million)

Project Costs	Estimate	Cost Distribution
Preliminary Engineering	\$180.6	6.4%
Rights-of-Way	\$82.1	2.9%
Mobilization	\$65.7	2.3%
CEI	\$234.6	8.3%
Excavation	\$1,411.1	50.1%
Drainage	\$166.3	5.9%
E&S	\$61.0	2.2%
Pavement	\$138.9	4.9%
Bridge Construction	\$254.5	9.0%
Traffic Controls	\$13.7	0.5%
Incidentals	\$58.0	2.1%
Contingencies	\$152.5	5.4%
Total	\$2,819.0	

Source: VDOT

For the project timeline, the project officially started in 2002 after FHWA issued its Record of Decision (ROD). FEIS, completed in 2001, envisioned that the construction would last for 17 years from 2003 to 2019. But the majority of the work in Virginia has not been completed. The Coalfields Expressway Decision Document, drafted in 2008, estimated a 14-year project schedule from 2008 to 2021. But this schedule has been delayed. The latest estimate shows that the near-term projects (about 20 miles of CFX) will last from 2013 to 2024.²⁸ The estimated year for the completed project will be beyond that. Without further information on the CFX completion schedule in Virginia, Chmura assumes that even if construction starts in 2013, it will take 17 years, from 2013 to 2029, to complete the project in Virginia, as estimated in the original FEIS. In West Virginia, some sections of the road have been completed, and Chmura assumes that the remaining costs will also be spent from 2013 to 2029, to be consistent with the Virginia time line.

Table 5.2 presents the estimated one-time economic impact of road construction in the CFX Corridor for the Virginia portion, West Virginia portion, and the entire Corridor. From 2013 to 2029, it is estimated that the construction activities will generate a total economic impact (including direct, indirect, and induced impacts) of \$5.3 billion, measured in current dollars, which can support 38,055 cumulative jobs in the Corridor. Of the total economic impact, \$3.7 billion is derived from direct spending during the construction phase.²⁹ This spending can directly support 24,318 cumulative jobs in the Corridor from 2013 to 2029, with the majority in construction trades. The indirect impact in the state is estimated to be \$721 million, supporting 5,894 cumulative jobs during the construction phase. This is from activities in other industries supporting construction, such as equipment rental or truck transportation. The induced impact is expected to be \$920 million, which can support 7,843 cumulative jobs during

²⁸ Source: VDOT.

²⁹ The cost estimated by VDOT is in 2011 dollars. The measured impact is smaller than the \$350.0 million total cost, because some of the spending is assumed to be paid to companies outside Virginia. Chmura uses IMPLAN Pro model to estimate the percentage of construction spending outside Virginia.

the construction phase—these jobs are expected to be concentrated in consumer service-related industries such as restaurants, hospitals, and retail stores.

Table 5.2: Economic Impact of CFX Construction in the CFX Corridor (Cumulative, 2013-2029, Current Dollars)

		Direct	Indirect	Induced	Total
Virginia	Spending (\$Million)	\$2,839	\$556	\$709	\$4,105
	Employment	18,761	4,547	6,051	29,359
West Virginia	Spending (\$Million)	\$841	\$165	\$210	\$1,216
	Employment	5,557	1,347	1,792	8,696
Total	Spending (\$Million)	\$3,680	\$721	\$920	\$5,320
	Employment	24,318	5,894	7,843	38,055

Note: Figures may not sum due to rounding
Source: IMPLAN Pro 2010

On an annual average basis, CFX construction could generate an economic impact of \$313.0 million that can support 2,239 jobs per year in the CFX Corridor from 2013 to 2029. The annual economic impact in the Virginia portion is estimated to be \$241.4 million that can support 1,727 jobs in the Corridor, while annual economic impact in the West Virginia portion is estimated to be \$71.5 million that can support 512 jobs in the Corridor. The impact of construction is primarily driven by construction cost. It is estimated that more construction money will be spent in the Virginia portion, resulting in a higher economic impact than in West Virginia.

Table 5.3: Economic Impact of CFX Construction in the CFX Corridor (Annual Average 2013-2029, Current Dollars)

		Direct	Indirect	Induced	Total
Virginia	Spending (\$Million)	\$167.0	\$32.7	\$41.7	\$241.4
	Employment	1,104	267	356	1,727
West Virginia	Spending (\$Million)	\$49.5	\$9.7	\$12.4	\$71.5
	Employment	327	79	105	512
Total	Spending (\$Million)	\$216.5	\$42.4	\$54.1	\$313.0
	Employment	1,430	347	461	2,239

Note: Figures may not sum due to rounding
Source: IMPLAN Pro 2010

5.2. Travel Efficiency, Cost Savings, and Safety Benefits

While the economic impact of construction activity only lasts during the construction phase, CFX will generate sustained benefits for the CFX Corridor communities after it is built. All existing businesses and residents located in the CFX Corridor can benefit from CFX.³⁰ There are three major categories of benefits associated with road construction. First is time savings and efficiency improvement. CFX is expected to reduce travel time in the Corridor significantly, which can in turn provide cost savings for businesses and residents. Different industries benefit to varying degrees; those requiring a significant amount of travel, such as retail, real estate, and manufacturing, could see a bigger impact in terms of productivity improvement. Other service industries, such as financial and professional services, may see limited improvement. The second benefit is vehicle maintenance cost savings for all

³⁰ Businesses outside the CFX Corridor will also benefit. Estimating those benefits is beyond the scope of this study.

motorists using CFX. Less travel time can reduce fuel usage for motorists. In addition, smoother road conditions can also reduce wear and tear on vehicles. The third category is safety benefits. CFX will be a 4-lane, partially limited-access highway that will be an improvement to 2-lane highways in the Corridor, such as U.S. Route 83—the main east-west highway in the Corridor. CFX has the potential to reduce accident rates due to enhanced safety features.³¹

Cost savings are usually estimated through a simulation model based on the amount of traffic and total time saved traveling on CFX versus the current road system. The simulation model indicates that CFX will provide significant time savings for businesses and residents in the region. In Virginia, from Pound in Wise County to the West Virginia state line, CFX can reduce travel time by 49%—from 124 minutes on the current roads (under a no-build scenario) to 63 minutes on the completed CFX.³² The improvement in travel time for the West Virginia portion of CFX can reach 50%, from 155 minutes (under a no-build scenario) to 77 minutes on the completed CFX (Table 5.4).

Table 5.4: Travel Time Savings (Minutes)

	No-Build	Proposed CFX	Time Savings
CFX Virginia	124	63	49%
CFX West Virginia	155	77	50%
Total CFX	279	140	50%

Source: VDOT and WV DOT

Chmura used secondary research to convert time savings into a dollar amount. The total value of travel efficiency, vehicle maintenance cost, and safety cost savings are estimated to be \$86.9 million in 2035 for the CFX Corridor (Table 5.5). If businesses use their cost savings to expand and hire more people, the cost savings could potentially support over 193 new jobs in the CFX Corridor in Virginia in 2035.³³

The efficiency gain refers to the benefits of the travel time savings for motorists utilizing the new CFX. For commuters, less time commuting means they can reduce work delays. For businesses, less travel time means goods and services can be delivered faster, and there will be less missed appointments, missed meetings, or other business disruptions. All those result in efficiency improvement. Efficiency improvement is estimated based on both the reduced travel time and the value of time. As Table 5.4 shows, CFX can reduce travel time for the whole length of the road by 50%, or more than two hours (140 minutes). Based on the average daily traffic in 2035, the total vehicle hours traveled can be reduced by 8.3 million hours per year for all vehicles if they travel the whole length of CFX. In addition, 61% of traffic is assumed to either originate or terminate in the Corridor.³⁴ A little over 8.0% of traffic is assumed to be trucks, while the remainder is assumed to be cars.³⁵ The value of travel time is assumed to

³¹ There will be benefits of market access, which are explained qualitatively in Section 7.

³² Source: Coalfields Expressway Final Environmental Impact Statement (FEIS). VDOT 2001. Available at: http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp

³³ In 2010, total economic output of the CFX Corridor in Virginia (based on the IMPLAN model) was \$11.5 billion. In addition, employee compensation was 36.0% of total output. So, when travel efficiency and cost savings provides a total economic impact of \$96.5 million in 2035, 38.0% of it will be employee compensation (\$96.5 million * 38.0% = \$36.7 million).

³⁴ Since both Virginia and West Virginia CFX FEIS do not have such information, Chmura uses the percentage from Economic Impact Study of Completing Appalachian Development Highway System.

³⁵ Source: CFX FEIS for Virginia and West Virginia.

be \$13 per hour for cars and \$29 per hour for trucks in 2006.³⁶ Inflating those values to 2035 dollars using the consumer price index, the completed CFX can provide an annual efficiency savings to Corridor residents and businesses in the amount of \$49.6 million per year. Among those, \$16.0 million will occur in the Virginia section and \$33.7 million will occur in the West Virginia section. The West Virginia section of CFX has higher projected traffic that can result in more time savings.

Table 5.5: Annual Travel Efficiency and Cost Savings (\$Million, 2035)

	Virginia	West Virginia	Total
Efficiency Improvement	\$16.0	\$33.7	\$49.6
Vehicle Maintenance Cost Saving	\$10.1	\$21.1	\$31.2
Safety	\$2.3	\$13.4	\$15.7
Total Benefits	\$28.3	\$68.1	\$96.5

Source: Chmura Economics & Analytics

All existing businesses and residents located in the CFX Corridor can benefit from the road as a result of reduced vehicle maintenance costs. To estimate the cost savings, Chmura first identifies assumptions of vehicle operation cost per hour and per mile from prior studies, before applying those costs to reduced time traveled. Based on the average daily traffic in 2035, total vehicle hours traveled can be reduced by 1.6 million hours per year in 2035. The vehicle maintenance cost is assumed to be \$19 per hour in 2035 dollars.³⁷ As a result, CFX can provide an estimated annual cost savings to Corridor motorists in the amount of \$31.2 million, with \$10.1 million in Virginia and \$21.1 million in West Virginia.

CFX can also improve safety. In 1997, accident rates in the Virginia section of the CFX Corridor was 1.53 per million vehicle miles travelled (VMT); this is higher than 1.35 per million VMT for the state average.³⁸ It is assumed that with 4-lanes and limited access of CFX, accident rates on the roads can be reduced to the state average of 1.35 per million VMT. This represents a reduction in the accident rate of 12%. This is consistent with prior studies that similar projects can reduce the accident rate by 10%.³⁹ The average cost per accident is assumed to be \$203,332 in 2035 dollars.⁴⁰ As a result, the completed CFX can provide annual benefits in terms of accident reduction in the amount of \$15.7 million per year in 2035.

³⁶ Source: Economic Impact Study of Completing the Appalachian Development Highway System. Prepared for Appalachian Regional Commission. Prepared by Cambridge Systematics, Inc, Economic Development Research Group, and HDR Decision Economics, June 2008.

³⁷ This is inflated based on \$10 per hour for 2010. Source: Economic Benefits of Road Improvement from I-95 Toll Revenues-Phase 2. Prepared by Chmura Economics & Analytics, August 2012.

³⁸ Source: CFX FEIS for Virginia. Accident rates for West Virginia were not available. Chmura assumes that they are higher than Virginia's CFX due to higher traffic volume. The relationship between accident and traffic volume is based on the following study: Interactions Between Accident Rate and Traffic Volume, available at:

http://www.balticroads.org/downloads/25BRC/25brc_d1_pakalnis_1.pdf

³⁹ Source: Economic Benefits of Road Improvement from I-95 Toll Revenues-Phase 2. Prepared by Chmura Economics & Analytics, August 2012.

⁴⁰ This is inflated based on 2010 accident cost. Source: Economic Benefits of Road Improvement from I-95 Toll Revenues-Phase 2. Prepared by Chmura Economics & Analytics, August 2012.

5.3. Economic Impact of Service Businesses

5.3.1. Job Creation in Service Businesses

The most direct and visible new jobs created by CFX will be in businesses along CFX serving motorists. Entrepreneurs and established corporations will build gas stations, hotels, and restaurants near access points along CFX to serve drivers who pass through, as well as locals who live nearby. To estimate potential service businesses that could be located along CFX in the Corridor, this study utilizes a “model-by-analogy” approach. Essentially, Chmura considered previous regression models built with service business data on roads in rural regions. In particular, Chmura utilized a study of businesses at rural interchanges for North Carolina because it most resembles the CFX Corridor in both economic size and structure. The following five variables have an impact on the development of service businesses at interchanges along an interstate highway:

1. Average daily traffic (ADT) on CFX
2. ADT on crossroads
3. Distance to the nearest major urban center
4. Design type (diamond or cloverleaf) of the interchange
5. Distance to the next interchange or intersecting interstate

Based on the projected traffic on CFX, roads crossing CFX, the distance to towns, and interchange design, Chmura classified the access points along CFX into the following categories: residential, light tourist service, economically competitive, economic integration, and heavy tourist.⁴¹

- Residential interchanges generally are located in a rural setting, have lower traffic volume, and are not close to a town. They normally have some development in single-family homes and nothing else. The majority of access points along CFX are classified as residential.
- Light tourist service interchanges usually have one gas station, one small motel, and support moderate traffic flow. One access point in Dickenson County near the town of Haysi, and a couple of access points in Wyoming County near the town of Mullens are classified as this type.
- Economically competitive interchanges usually have two to four gas stations, one to two fast food restaurants, and two or more hotels. They typically have high traffic flow and are within three miles of nearby towns. One access point in Wise County close to the town of Pound, one access point to the east of town of Grundy in Buchanan County, and one access point in McDowell County near the town of Welch are classified as this type.
- Economic integration interchanges are located close to a town and have a high volume of traffic. These access points have more gas stations, hotels, and restaurants because they serve motorists as well as local residents. The access point in Buchanan County crossing U.S. 460 Connectors, the access point crossing the King Coal Highway, and the access point in Raleigh County near the town of Sophia belong to this category.
- Heavy tourist intersections have the highest traffic volume and are in close proximity to another interstate. The eastern terminus of CFX in Raleigh County, where it connects with I-77 and I-64 belongs to the heavy tourist category. Each heavy tourist intersection can support more than six hotels, over six restaurants, and multiple gas stations.

⁴¹ Appendix 2 lists the criteria and business activities of each access point category.

Table 5.6 lists the projected service establishments that can be supported by CFX. In 2035, it is estimated that CFX can support 77 businesses in the Corridor, comprising 22 motels, 28 gas stations, 18 fast food restaurants, and 9 full-service restaurants.⁴²

Table 5.6: Projected Businesses Establishments in Roadside Services

	Wise	Dickenson	Buchanan	McDowell	Wyoming	Raleigh	CFX Corridor
Number of Interchanges	3	13	8	9	4	3	40
Motels	2	1	4	4	3	8	22
Gas Stations	3	1	7	7	3	7	28
Fast food Restaurants	2	0	5	5	0	6	18
Full-service Restaurants	0	0	2	2	0	5	9
Total	7	2	18	18	6	26	77

Source: Chmura Economics & Analytics

In terms of job creation, service businesses are estimated to support 880 jobs in 2035 in the Corridor, with 307 in Virginia and 573 in West Virginia (Table 5.7).⁴³ By jurisdiction, Raleigh County in West Virginia is likely to land the most of those jobs along CFX, due to the high traffic volume at the eastern terminus of the CFX. This is followed by McDowell and Buchanan Counties. To arrive at these estimates, Chmura calculated the average employment per business in the CFX Corridor in Virginia.⁴⁴ For example, an average gas station in the CFX Corridor in Virginia employs nine workers and an average motel employs 8 workers. The average number of workers is 17 for restaurants.

Table 5.7: Projected Employments in Roadside Services

	Wise	Dickenson	Buchanan	McDowell	Wyoming	Raleigh	CFX Corridor
Number of Interchanges	3	13	8	9	4	3	40
Motels	15	8	30	30	23	60	165
Gas Stations	28	9	66	66	28	66	264
Fast food Restaurants	33	0	83	83	0	100	300
Full-service Restaurants	0	0	33	33	0	83	150
Total	77	17	213	213	51	310	880

Note: Numbers may not sum due to rounding

Source: Chmura Economics & Analytics

⁴² Due to the fact that CFX closely follows several current roads in the area, the projected businesses are not entirely new. Some businesses may have existed, especially along the current Route 83 or Route 16, and they may relocate to CFX.

⁴³ It is likely that those jobs are incremental to the existing service jobs in the region to serve the increased motorists. Anecdotal examples indicate that such a project may not have a negative impact on existing businesses. For example, a recently built road/bridge bypasses the town of Clarksville on Buggs Island. While local merchants were initially concerned that businesses on the original road in downtown Clarksville would suffer, that proved to be unwarranted. Conversation with the town official showed that the merchants in town have not experienced a drop-off in activity since the new bridge was built and takes traffic away from the town's main street.

⁴⁴ Chmura has firm-level information from the Quarterly Census of Employment and Wages (or ES202) database to calculate the average business size. No firm-level data are available for West Virginia.

5.3.2. Economic Impact of Service Businesses

While spending by motorists at service businesses can bring millions of dollars into the economy, service businesses can also have ripple effects throughout the region. These ripple effects are summarized as indirect and induced. Indirect effects are generated because there are many local industries supporting restaurants, gas stations, and other visitor-service businesses. Money spent by customers in roadside restaurants and hotels also increases the sales of the suppliers for these industries. The induced effect is caused by increased income of workers employed by service businesses. These workers will in turn spend some of their income in the region, thus injecting more money into the economy.

The annual economic impact of service businesses in the CFX Corridor is estimated to be \$118.8 million, which can support 1,067 jobs in the Corridor in 2035 (Table 5.8). Of this, \$86.8 million is direct spending on food, lodging, and gas at service establishments, which can support 880 jobs in the region. Indirect impact is estimated to be \$15.6 million which can support 89 jobs in the Corridor. Induced economic impact generates \$16.3 million which can support 99 jobs in the Corridor.

Table 5.8: Annual Economic Impact of Service Businesses in CFX Corridor (2035 Onward)

		Direct	Indirect	Induced	Total
Virginia	Spending (\$Million)	\$30.3	\$5.4	\$5.7	\$41.4
	Employment	307	31	35	372
West Virginia	Spending (\$Million)	\$56.6	\$10.2	\$10.6	\$77.4
	Employment	573	58	64	695
Total	Spending (\$Million)	\$86.8	\$15.6	\$16.3	\$118.8
	Employment	880	89	99	1,067

Note: Figures may not sum due to rounding
 Source: IMPLAN Pro 2010

In 2035, about 35% of the economic impact, in terms of total spending and job creation, is expected to occur in Virginia's portion of the CFX Corridor, which is estimated to be \$41.4 million in spending that can support 372 jobs. The West Virginia portion of CFX is longer, carries more traffic, and passes through more towns and cities, resulting in larger economic impact in West Virginia. Of the total economic impact from service businesses, 65% will occur in the West Virginia section of the Corridor.

6. Fiscal Impact

In addition to creating jobs and injecting millions of dollars into the economy, CFX will produce tax revenue for the counties located in the CFX Corridor region and for Virginia and West Virginia state governments. For both states, the main tax sources are from sales tax, personal income tax, and corporate income tax. For counties along the CFX Corridor, major revenue sources for Virginia localities are sales, meal, and lodging taxes. For West Virginia localities, the main revenue sources are business and occupation (B&O) taxes, and for some counties, hotel and motel taxes.⁴⁵ To be conservative, only tax revenues from the direct impact are quantified.⁴⁶

6.1. State Fiscal Impact

6.1.1. Virginia State Fiscal Impact

During the construction phase, Virginia can collect corporate income tax from companies involved in the construction of CFX, including architecture firms and construction companies. The state also collects personal income tax from wages and salaries paid to individuals working on the project. After the construction is complete, the state will collect corporate income tax from service businesses located along CFX. Similarly, people working in these businesses will be subject to personal income tax. In addition, Virginia assesses 5% sales tax on receipts from service businesses such as gas stations, hotels, and restaurants, with 4% going to state government, and 1% going to local governments.

Chmura utilized the following methodology to estimate corporate and personal income taxes for both states. In Section 5, Chmura estimated the total output value of construction and service businesses. The IMPLAN model provides profit margins and the relative weight of wages and salaries in total output for each industry in the CFX Corridor. For example, for construction businesses in the CFX Corridor, IMPLAN shows that profits account for 6.3% of the total output while wages and salaries account for 39.4%. From this information, Chmura estimates the total profits and wages and salaries that can be attributed to CFX. The state corporate income tax rate is 6% and the average personal income tax rate is 5%.

Table 6.1 presents the tax revenues for the state of Virginia. CFX is estimated to bring the state government a total of \$62.8 million during the construction phase. The majority of state tax revenue will come from personal income tax, amounting to \$53.8 million from 2013 to 2029. Corporate income tax is estimated to total \$9.0 million during the construction phase.

Table 6.1: State Tax Estimate-Virginia (\$Million)

Construction	Corporate Income Tax	Personal Income Tax	State Sales Tax	Total
Construction (Total 2013-2029)	\$9.0	\$53.8		\$62.8
Roadside Services (Annual 2035)	\$0.3	\$0.4	\$1.2	\$1.9

Source: Chmura Economics & Analytics

⁴⁵ None of the Virginia localities charge Business, Professional, and Occupational License (BPOL) tax.

⁴⁶ This approach is recommended by Burchell and Listokin in *The Fiscal Impact Handbook*.

After construction is complete, the state of Virginia is expected to collect sales tax, corporate tax, and personal income tax from service businesses along CFX. Virginia’s sales tax is 5%, with 4% going to the state government and 1% going to local governments. In 2035, the total state tax revenue from service businesses is estimated to be \$1.9 million with sales tax accounting for more than 1.2 million. Personal and corporate income taxes are estimated to be \$0.3 and \$0.4 million per year, respectively, from 2035 onward.

6.1.2. West Virginia State Fiscal Impact

During the construction phase, the state of West Virginia can collect corporate income tax from companies involved in the construction of CFX, including architecture firms and construction companies. The state also collects personal income tax from wages and salaries paid to individuals working on the project. After the construction is complete, the state of West Virginia will collect corporate income tax from service businesses located along CFX. Similarly, people working in these businesses will be subject to personal income tax. West Virginia has a state corporate income tax rate of 8.75%, and the average personal income tax rate is 4.5%.⁴⁷ In addition, West Virginia assesses 6% sales tax on receipts from service businesses such as gas stations, hotels, and restaurants.⁴⁸

Table 6.2 presents the tax revenues for the state. The construction of CFX is estimated to bring the state government a total of \$19.9 million during the construction phase. The majority of state tax revenue will come from personal income tax, amounting to \$15.9 million. Corporate income tax is estimated to total \$4.0 million during the construction phase.

Table 6.2: State Tax Estimate-West Virginia (\$Million)

	Construction	Corporate Income Tax	Personal Income Tax	State Sales Tax	Total
Construction (Total 2013-2029)		\$4.0	\$15.9		\$19.9
Roadside Services (Annual 2035)		\$0.7	\$0.8	\$3.4	\$4.9

Source: Chmura Economics & Analytics

After construction is complete, the state is expected to collect sales tax, corporate tax, and personal income tax from service businesses in the Corridor. State sales tax for West Virginia is 6%, resulting in annual sales tax revenue of \$3.4 million. Adding corporate and personal income taxes, the total state tax revenue from service businesses is estimated to be \$4.9 million.

⁴⁷ West Virginia has a progressive state income tax system where higher income individuals pay higher percentages of their income as income tax. The rate is 4.5% for an individual earning \$25,000 to \$40,000 per year and 6.5% for an individual earning more than \$60,000 per year. Therefore, 4.5% is a reasonable and conservative average assumption for construction and service jobs created by this project.

⁴⁸ Source: West Virginia Tax Department.

6.2. Local Fiscal Impact

6.2.1. Virginia Local Governments

Chmura utilized the following methodology to estimate local tax revenue:⁴⁹ since all local taxes are based on total receipts, the direct spending impact estimated in Section 5 provides a sound basis for calculating tax revenue. In Virginia, three related local tax sources are sales, lodging, and meal taxes. Chmura calculates the regional average tax rate with the number of roadside service employment as the weight.

Since none of the localities have business, professional, and occupational licenses (BPOL), Virginia’s local governments will not receive tax revenues during construction. After the construction of CFX is complete, the service businesses in the CFX Corridor are estimated to generate \$0.3 million in sales tax for local governments. Only Dickenson County has a meal tax, while both Wise and Buchanan Counties have a lodging tax, but no meal tax. The total lodging and meal taxes are estimated to be \$0.19 million and \$0.01 million for local governments. Total annual local taxes will be \$0.5 million per year for three localities in Virginia.

Table 6.3: Local Tax Estimate-Virginia Localities (\$Million)

Construction	Sales	Meal	Lodging Tax	Total
Construction (Total 2013-2029)				\$0.00
Roadside Services (Annual 2035)	\$0.30	\$0.01	\$0.19	\$0.50

Source: Chmura Economics & Analytics

Localities in Virginia can also collect personal property taxes on the vehicles and equipment used for construction within their jurisdictions. For example, Buchanan County is expected to receive sixty thousand dollars from this tax. Wise and Dickenson Counties may also benefit.⁵⁰

6.2.2. West Virginia Local Governments

In West Virginia, two local tax sources are B&O taxes and hotel/motel taxes. Chmura calculates the regional average tax rate with roadside service employment as a weight.

During the construction phase, the West Virginia counties located in the CFX Corridor can collect B&O taxes from construction spending. It is estimated that the average B&O tax revenue will total \$11.8 million for three localities (McDowell, Raleigh, and Wyoming) in the CFX Corridor during the construction phase (Table 6.4).

After the construction of CFX is complete, local governments will collect B&O taxes and hotel/motel taxes from service businesses. In 2035, the service businesses in the West Virginia Corridor are estimated to generate \$0.9 million in revenue for local governments. McDowell County has no hotel/motel tax while both Raleigh and Wyoming

⁴⁹ Only county tax revenues are estimated in this study. In West Virginia, municipalities can also impose taxes on properties and businesses. Those are not estimated here.

⁵⁰ The exact tax amounts for those two counties depend on the construction equipment parked in those two counties at the beginning of the year. They also depend on how aggressive those counties are in pursuing such tax revenues. Chmura does not have sufficient information to quantify the tax revenues for Wise and Dickenson Counties.

Counties have a 6% hotel/motel tax.⁵¹ The total hotel and motel taxes are estimated to be \$0.6 million per year for local governments, while B&O taxes are estimated to be \$0.3 million in 2035.

Table 6.4: Local Tax Estimate-West Virginia (\$Million)

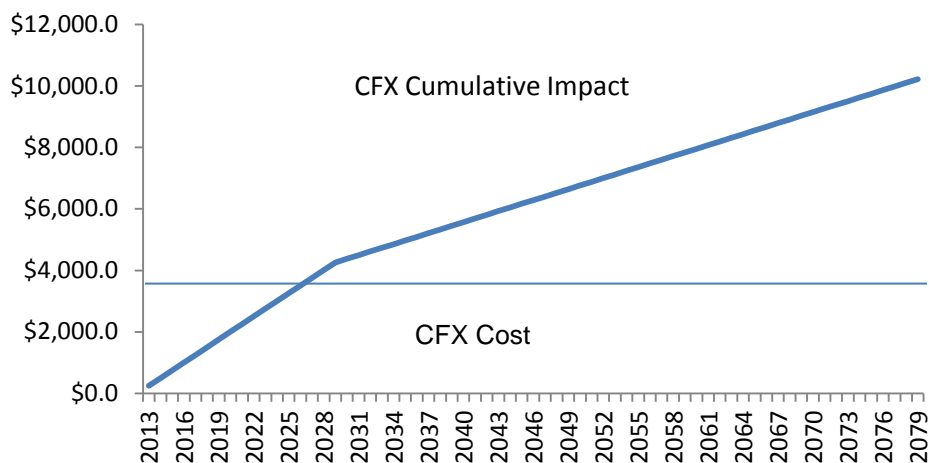
Construction	B&O Tax	Hotel/Motel Tax	Total
Construction (Total 2013-2029)	\$11.80		\$11.80
Roadside Services (Annual 2035)	\$0.30	\$0.60	\$0.90

Source: Chmura Economics & Analytics

6.3. Potential Payback Period for Investment

The cumulative economic impact generated by, as well as the cost of CFX, is presented in Figure 6.1. The benefits of CFX include travel efficiency, cost savings, and economic benefits of service businesses and potential distribution centers. The direct impacts of all three types of benefits can reach \$215.3 million in 2035. Prior to that, the estimated annual economic impact of construction will average \$313.0 million per year from 2013 to 2029. Chmura used a 2.6% discount rate to calculate the net present value of the cumulative benefits of CFX.⁵² The cumulative economic impact will exceed the cost of CFX in 2027. The cumulative impact (discounted to 2013 value) of CFX will reach \$4.5 billion in 2030, \$5.7 billion in 2040, \$6.9 billion in 2050, \$8.1 billion in 2060, and \$9.4 billion in 2070. Assuming that the life span of CFX is 50 years after its completion, from 2013 to the end of the life of the road, the cumulative economic impact is estimated to be \$10.5 billion in 2013 dollars. Each dollar of investment in CFX can result in \$2.90 dollars in economic impact in the Corridor.

Figure 6.1: Cumulative Economic Impact Over Time (\$Million, Discounted to 2013 Value)



⁵¹ Source: Raleigh, Wyoming, and McDowell County Economic Development Authority.

⁵² This is the CPI rate.

To calculate the payback period for investment, Chmura compared the cumulative impact of CFX after its completion with the cost of CFX. The benefits of CFX include travel efficiency, cost savings, and economic benefits of service businesses and potential distribution centers. The direct impacts of all three types of benefits can be \$215.3 million in 2035. The total cost of CFX was estimated at \$3.7 billion (in 2013 dollars). Discounting total economic impacts to 2013 dollars, the present value of the total economic impact will exceed the total cost in 2059, or 30 years after road completion. As a result, the potential payback period is estimated to be 30 years after road completion.⁵³

⁵³ The payback time will be longer if a higher discount rate is assumed.



7. Other Benefits of CFX

Extensive economic literature on the impact of interstate highways enables Chmura to project growth opportunities in service businesses and cost savings for current businesses. However, CFX can also bring other benefits to the region, such as expanded market access, tourism, and business attractions. Many studies that address these benefits are anecdotal in nature. As a result, while acknowledging that these benefits exist, Chmura does not attempt a formal projection of the benefits. Sections 7.1 through 7.3 will discuss these benefits, and Section 7.4 will provide a case study of other rural regions around the country that have benefited from new road construction.

7.1. CFX and Market Access

CFX will benefit mining, manufacturing, and agricultural businesses in the Corridor by providing improved access to markets. One benefit to the region is improved access to the Port of Virginia. CFX connects to U.S. 460 at Grundy, which leads to Roanoke, then to Virginia Beach, and the Port of Virginia. VDOT has started the project to construct a new section of U.S. 460 from Petersburg to Suffolk according to interstate standard. This project, coupled with CFX, will greatly reduce the travel time from the CFX Corridor to the Port of Virginia by nearly an hour.⁵⁴

Coal is the one of the top commodities exported from Virginia, in terms of commodity values.⁵⁵ The value of coal exports reached \$1.3 billion in 2011, the highest among all exported commodities (Table 7.1). In the past four years, coal exports ranked either number one or number two in terms of values among all Virginia exports. Though coal exports are shipped traditionally through rail service from Southwest Virginia to the Port of Virginia, CFX can still reduce the cost to coal industries as a large amount of coal is transported by trucks before it is loaded into rail cars.

Table 7.1: Top Ten Virginia Exports by Value (\$Million)

	2008	2009	2010	2011
Bituminous coal, not agglomerated	\$1,609	\$889	\$971	\$1,281
Memories, electronic integrated circuits	\$2,083	\$905	\$1,231	\$783
Civilian aircraft, engines, and parts	\$809	\$529	\$577	\$596
Parts & accessories of printers, copiers, and fax machines	\$243	\$266	\$404	\$477
Kraft paper	\$461	\$449	\$452	\$447
Artificial filament tow	\$312	\$353	\$328	\$372
Soybeans, whether or not broken	\$157	\$328	\$427	\$327
Road tractors for semi-trailers	\$220	\$85	\$212	\$285
Soybean oilcake & other solid residue	\$211	\$258	\$227	\$249
Parts of airplanes or helicopters	\$153	\$182	\$229	\$227

Source: U.S. Census

CFX can benefit regional agricultural and manufacturing industries reaching population centers in Virginia, West Virginia, and surrounding states, increasing their market reach. With both CFX and the Corridor Q project, travel

⁵⁴ This is the sum of 38 minutes for CFX and 15 minutes for U.S. 460. Source for U.S. 460 time savings is from: The Economic Impact of the U.S. Route 460 Corridor Improvement Project, prepared by Chmura Economics & Analytics for VDOT. November, 2011.

⁵⁵ Based on 6-Digit Harmonized System (HS) Commodities Classification. Source: <http://www.census.gov/foreign-trade/statistics/state/data/va.html>

time to the Roanoke metro area can be greatly reduced. From Roanoke, I-81 can reach population centers on the eastern seaboard such as Washington D.C. and Baltimore. The connection of CFX with I-77 and I-64 also makes it easier to reach Ohio and North Carolina. In addition, both CFX and the Corridor Q project can extend market access to the west into Kentucky. Corridor Q will join Corridor B of the Appalachian Development Highway System in Pikeville, Kentucky, which extends north to Ohio and south to North Carolina.

The projected freight movement data from the Appalachian Regional Commission can help illustrate the increased market reach after the completion of CFX. County-to-county freight movement data indicated that in 2002, six counties located in the CFX Corridor shipped 12 million tons of goods to other counties by trucks. The vast majority (99%) of goods originating from the CFX Corridor were destined for other counties within the state of Virginia and West Virginia. The District of Columbia emerged as the largest out-of-state market, especially for food and tobacco products, and wood and paper products to a lesser degree. Sizable quantities of goods were shipped by trucks to other neighboring states, including North Carolina, Ohio, and Maryland. The majority of shipments to those states were petroleum and chemical products.

In terms of commodity, 89% of total tons from truck transportation were mining products, such as coal. All mining products are transported within Virginia and West Virginia. As mentioned before, long-distance transportation of coal is typically done by rail. Coal is usually trucked to collection points in Virginia and West Virginia before being loaded to rail cars and shipped to out-of-state locations. Outside coal, the CFX Corridor also shipped 551,521 tons of other durable manufacturing goods, and 363,874 tons of food and tobacco products in 2002.

Table 7.2: Freight Movement Originating from CFX Corridor (Tons by Truck, 2002)

Commodity	Virginia	West Virginia	District of Columbia	North Carolina	Ohio	Maryland	Other States	Total
Agriculture	98,576	0	0	0	0	0	0	98,576
Food and Tobacco	295,763	18,485	49,626	0	0	0	0	363,874
Mining	8,605,943	2,023,197	0	0	0	0	0	10,629,140
Petroleum and Chemicals	65,289	34,873	0	19,588	16,021	7,214	9,249	152,234
Other Durable Mfg.	496,082	55,439	0	0	0	0	0	551,521
Wood and Paper	135,477	20,024	1,892	0	0	0	0	157,393
Electrical Equipment	3,611	0	0	0	0	0	0	3,611
Transportation Equipment	20,660	0	0	0	0	1,330	9,276	31,266
Other Nondurable Mfg	0	1,694	0	0	0	0	0	1,694
Total	9,721,401	2,153,712	51,518	19,588	16,021	8,544	18,525	11,989,309

Source: Appalachian Regional Commission

The ARC projection on freight movement data in 2035 does not take into consideration the completion of CFX, but assumes the completion of the Appalachian Development Highway System (ADHS). Since the Coalfields Expressway links the six counties in the CFX Corridor to the ADHS (via Corridor Q), it is projected that the market reach due to CFX will be even larger than those projections made by ARC, as presented in Table 7.3.

Compared with 2002 and 2035, while the truck shipments to Virginia and West Virginia changed little, the freight shipment to neighboring states increased dramatically. For example, the projected shipments to the District of Columbia increased from 51,518 tons in 2002 to 146,637 tons in 2035. Almost all of those will be food and tobacco products. Shipments to neighboring states such as North Carolina and Maryland are projected to double in 2035. While overall shipment of mining products will decline by 4%, shipments of agricultural products, food and tobacco

products, petroleum and chemical products, and other durable manufacturing products are projected to increase by more than thirty percent.

Table 7.3: Freight Movement Originating from CFX Corridor (Tons by Truck, 2035 Projection)

Commodity	Virginia	West Virginia	District of Columbia	North Carolina	Ohio	Maryland	Other States	Total
Agriculture	220,942	0	0	0	0	0	0	220,942
Food and Tobacco	279,217	54,775	142,697	0	0	0	0	476,689
Mining	7,722,871	2,136,622	0	0	0	0	0	9,859,493
Petroleum and Chemicals	109,748	31,619	0	42,223	14,977	30,189	12,888	241,644
Other Durable Mfg,	1,136,228	92,891	0	0	0	0	0	1,229,119
Wood and Paper	125,134	22,200	3,940	0	0	0	0	151,274
Electrical Equipment	813	0	0	0	0	0	0	813
Transportation Equipment	29,663	0	0	0	0	1,995	11,151	42,809
Other Nondurable Mfg,	0	1,599	0	0	0	0	0	1,599
Total	9,624,616	2,339,706	146,637	42,223	14,977	32,184	24,039	12,224,382

Source: Appalachian Regional Commission

With the development of ADHS, the market of businesses in the CFX Corridor will be expanded significantly, especially for out-of-state markets. With the completion of CFX, it is reasonable to project that freight movement from the CFX Corridor will slightly exceed those data presented in Table 7.3. Agriculture, food and tobacco manufacturing, petroleum and chemicals manufacturing, and other durable goods manufacturing will benefit the most from the improved market access to markets in the District of Columbia, North Carolina, and Maryland.

7.2. Other Economic Development Benefits

The presence of an interstate highway can increase the appeal of the region to expanding and relocating firms. Traditionally, highway connectivity is a key consideration for many firms. However, with the development of computer and communication technology as well as the declining role of manufacturing in the national economy, its importance, relative to other factors, has diminished over time. Proximity to markets, quantity and quality of the workforce, and quality of life factors are increasingly important. However, highway access is still critical for certain industries. Aside from service businesses, manufacturing plants and distribution centers also tend to locate close to major highways for transporting supplies and finished products. The CFX Corridor already has a strong mining and manufacturing base. Low wages, a low cost of living, and a renewed emphasis on clean coal technology should help CFX communities appeal to expanding mining and manufacturing firms.

Distribution centers are increasingly becoming an important business for communities along highways in this era of big-box retailers, widespread internet commerce, and just-in-time inventory systems. For example, the I-81 Corridor in western Virginia has attracted many distribution centers.⁵⁶ However, there is limitation for the CFX Corridor to attract distribution centers, as there are no major metropolitan areas within easy driving distance of the Corridor.

⁵⁶ Source: *Economic Effects of Selected Rural Interstates at the County Level*, 2005, by Jack Faucett Associates and Economic Development Research Group. This study was prepared for Federal Highway Administration, U.S. Department of Transportation.

Studies have found that distribution centers are usually located close to population centers, but also in less populated areas where land is inexpensive⁵⁷.

CFX will also have a positive effect on tourism in the region. A large part of the tourism boost is captured by service business development along CFX, but tourism attractions elsewhere in the Corridor will also benefit from CFX. The CFX Corridor provides ample attractions for recreational activities. The major attractions include the Appalachian Trail, New River Gorge, and Jefferson National Forest. CFX can improve access to those attractions and result in more visitors to the region.

Another benefit from road construction in mountainous areas is reclaimed land for development. Road construction can create land suitable for development. Many educational institutions in the CFX Corridor have benefited from land reclamation in the past. For example, the football fields and labs at the University of Virginia-Wise, and school properties in Grundy in Buchanan County were built on reclaimed land. Land reclamation can also benefit commercial and agricultural development. For example, there are shopping centers, an airport, farmland, and a winery in the region that were developed on reclaimed land. The CFX project will also create land for further development.

Population growth in the region can also be aided by CFX. Both the presence of an interstate highway and jobs associated with it have a positive effect on population growth. Jobs created by service businesses and other relocating/expanding firms can lure people to the area. In addition, the highway reduces commuting time and enhances the attractiveness of a region as a destination for residential development.

Finally, CFX can also improve the quality of life for area residents. CFX can make it more convenient for residents to reach destinations for work, education, health care, shopping, and entertainment. For example, residents can reach the Roanoke/Blacksburg area (an established healthcare and educational center) with relative ease after CFX is completed.

7.3. Assessment of Risks

The economic impact of CFX attempts to project the regional economy more than twenty years from now in terms of output and employment growth. These projections are based on a set of assumptions. As a result, the projections are subject to forecasting risks as actual events may vary from the assumptions. Unpredictable events create the potential for either larger (upside) or smaller (downside) effects than indicated here. Some of these factors are discussed below.

7.3.1. Downside Risks

For the service businesses and associated employment to materialize, certain conditions need to be met. Since one major requirement is the availability of water and sewer services to the site, development may require additional investments by the counties along the CFX Corridor to bring these services to rural interchanges. If water and sewer systems are not in place, it will deter the development of service businesses such as hotels, restaurants, and gas stations.

⁵⁷ Source: *Retail Distribution Centers: How New Business Processes Impact Minority Labor Markets*.
<http://www.eeoc.gov/stats/reports/retaildistribution/index.html>

Continued rises in oil prices could reduce the traffic projection and thus the economic impact. Oil prices have been volatile over the past few years, but the long-term supply and demand trend indicates that it will increase in the long run. Without the discovery of new oil reserves and with the demand for oil being forecast to increase, the long-term trend is likely that the price of oil will continue to rise. Higher oil prices could have a negative effect on the projected economic impact as high oil prices can reduce automobile travel.

The impact analysis is based on the assumption that no recession will occur in the study period, and business output and employment can continue to grow. The downside risk is that if there is a recession, the projected service businesses and overall cost savings would be less than estimated in this study. In addition, a recession would also slow the pace of business expansion and relocation.

The traffic projection cited in this report is based on the assumption that CFX in Virginia and West Virginia is not a toll road. Should a toll be imposed on the road, Chmura expects the traffic volume on CFX would be smaller, as would the resulting economic impact of travel efficiency and service businesses. Some other public-private projects in Virginia (such as U.S. 460 in southeast Virginia) are designed to be toll roads.

7.3.2. Upside Risks

This report does not incorporate several projects that are already in process, or are in the planning stage, that could increase the traffic projection on the road. Buchanan County is developing a project at Poplar Gap right off CFX. This project covers over 4,500 acres of land, and will host residential, retail, entertainment, and convention venues, as well as business and government offices.⁵⁸ The economic impacts of those projects are not estimated here. Similarly, any other retail or manufacturing projects in the Corridor have a potential to increase the traffic projection significantly.

It is possible that traffic projections on CFX might be low. The traffic projection made by VDOT and WVDOT focused only on CFX in the Corridor. It does not consider the boost in traffic from the network effect. CFX will connect to the interstate network near Beckley in West Virginia, and it will also connect to the Appalachian Development Highway System through Corridor Q. The network effect from these connections can boost the traffic on CFX. For this reason, the traffic volume could be higher than currently projected when all road projects in the region are completed. As a result, the economic impact will be higher than what is projected in this report.

7.4. Benchmark Analysis of Rural Highways

New and expanded highways have significant impacts in rural areas, both in terms of economic development and quality of life. To quote the U.S. Transportation Secretary Ray LaHood, “We know that affordable transportation choices in our rural communities give residents better access to jobs and health care, and provide an incentive for much-needed economic development.”⁵⁹ This section contains a review of literature regarding these impacts with specific regional examples where available.

A study by Chandra and Thompson examined historical data on interstate highway construction and economic activity in the United States from 1969 to 1993.⁶⁰ Based upon this set of data, new interstate highways raised

⁵⁸ Source: Buchanan County Poplar Gap Phase II Project, Buchanan County Industrial Development Authority.

⁵⁹ “Rural Connections: Challenges and Opportunities in America’s Heartland,” September 2011, TRIP (tripnet.org).

⁶⁰ “Does public infrastructure affect economic activity? Evidence from the rural interstate highway system,” Amitabh Chandra and Eric Thompson, *Regional Science and Urban Economics*, 30 (2000).

earnings in counties that directly benefitted from the new construction compared to counties without new construction. The cumulative earnings growth premium ranged from 6-8% 24 years after the initial highway opening. However, these data also showed a decrease in wages, especially in retail, in counties adjacent to the new highway counties, resulting in no net regional growth. For highway counties, the benefit of the new highway varied according to sector, with services and retail fairing particularly well.

Another case study examined ten rural counties in Georgia that benefitted from the Governor's Road Improvement Program (GRIP) which converted existing primary routes and truck connection routes into multi-lane highways.⁶² The report listed three general ways that transportation infrastructure improvements benefit regional economies: (1) by expanding markets and providing for increased specialization of labor, (2) by helping businesses decrease shipping costs and expand their access to markets, and (3) by providing adequate infrastructure essential to numerous sectors, including manufacturing, agriculture, tourism, and services. In the ten-county rural study region benefiting from the GRIP investments in Georgia, specific economic improvements were gained, including: (1) an increase in total retail sales greater than the state, metropolitan, or nonmetropolitan counties' averages, (2) an increase in per capita income at a rate above average for the state, metropolitan, and nonmetropolitan counties, and (3) a decrease in total unemployment rate greater than that for the state, metropolitan, and nonmetropolitan counties. In general, it was found that the "ten nonmetropolitan counties in the study group experienced pronounced economic improvements in comparison to their nonmetropolitan counterparts."⁶³

From an economic development perspective, a strong highway system is a crucial piece of infrastructure for regions looking to attract prospects. One example is Chico, California, a city with population of 107,000 and 20 miles from Interstate 5. The mayor of Chico, Ann Schwab, sees this as a serious disadvantage for her city: "Even though Chico is ideally located in the middle of the West Coast market, these 20 miles of separation from the Interstate can make it challenging for Chico to retain and attract businesses that have a significant distribution component."⁶⁴ Closer to home, Danville, Virginia would also reap benefits from improved access. Laurie Moran, president of the Danville Pittsylvania County Chamber of Commerce explains, "The lack of an Interstate Highway System definitely impairs the Danville region's ability to be competitive in the attraction and recruitment of new businesses. While we have a good primary highway system serving our region, we know that we often are eliminated from consideration by businesses that require Interstate access."⁶⁵

One of the benefits of an improved rural highway system can be categorized as both an economic advantage as well as a boost to the quality of life of residents, namely, connecting citizens to a wider array of employers. The average (mean) travel time to work in the United States is 25.5 minutes, and is slightly higher in Virginia (27.7 minutes).⁶⁶ Improvements in the highway system that substantially cut down travel time will also reduce commuting time and therefore open up a broader array of potential employers to workers. The benefits here are to both workers and employers: workers can achieve higher wages as they have more job opportunities, and employers have access to a wider pool of workers, which can lead to an increase in productivity.

⁶² "An Analysis of the Governor's Road Improvement Road Program (GRIP) for the Georgia Department of Transportation," Douglas C. Bachtel et al, 2007.

⁶³ Ibid.

⁶⁴ "Connecting Rural and Urban America," American Association of State Highway and Transportation Officials (AASHTO), 2010.

⁶⁵ Ibid.

⁶⁶ Mean travel time data are per the 2011 American Community Survey, based on workers 16 years and over who do not work at home.

Similar to improved access to jobs, an expanded rural highway system that reduces travel time also boosts quality of life by providing access to other services. One of the most important improvements is better access for residents to critical services such as education and healthcare. Improved access to tourism and recreation spots is a benefit to both residents and out-of-region visitors looking for access to those amenities. The improved transportation system also gives residents easier access to other services and businesses such as retail and food services.

Another important quality of life benefit of improved rural highways is safety. According to the Federal Highway Administration, rural roads account for 40% of all vehicle traffic in the national road network, and more than 57% of traffic fatalities nationwide occur on rural roads.⁶⁷ Moreover, some contend that narrow, two-lane, rural roads (many built in the 1960s and 1970s) cannot safely carry the kinds of trucks and commercial vehicles now using the American roadways.⁶⁸

In summary, as stated by the Rural Policy Research Institute (RUPRI): “transportation is an essential component of rural economic development and quality of life considerations.”⁶⁹ RUPRI also makes the important point that economic development and quality of life both feedback and support growth in each other. For example, as noted earlier, improved economic development translates into better job opportunities and higher wages, which in turn supports a higher quality of life for residents from better jobs and higher wages. In addition, however, quality of life improvements such as increased access to services boosts economic development since regions with a higher quality of life will be more attractive to business investment and skilled workers. Thus, economic development, quality of life, and transportation are all closely linked and support growth and improvements in each other.⁷⁰

⁶⁷ “Rural Highways Underfunded, Pose Safety Risks, MU Experts Say,” News Bureau, University of Missouri, October 11, 2011.

⁶⁸ “Connecting Rural and Urban America,” American Association of State Highway and Transportation Officials (AASHTO), 2010.

⁶⁹ “Rethinking Federal Investments in Rural Transportation: Rural Considerations Regarding Reauthorization of the Surface Transportation Act,” Brian Dabson et al, April 2011.

⁷⁰ Ibid.



8. Summary

The construction and ongoing operations of CFX will inject hundreds of millions of dollars into the CFX Corridor and provide jobs for workers in construction, retail, service, and warehouse industries. This study estimates that the construction of CFX will inject an annual average of \$313.0 million in total economic impact (direct plus ripple impacts) into the local economy from 2013 through 2029. The construction will also generate 2,239 jobs each year during this period (Table 8.1).

Table 8.1: CFX Economic Impact Summary

	Total Economic Impact (\$MM)	Total Job Creation	State Tax Revenues (\$MM)	Local Tax Revenues (\$MM)
Average Annual One-time Construction Impact (2013-2029)				
CFX Virginia	\$241.4	1,727	\$3.7	\$0.0
CFX West Virginia	\$71.5	512	\$1.2	\$0.7
CFX Corridor	\$313.0	2,239	\$4.9	\$0.7
Ongoing Impact (2035)-CFX Virginia				
Total User Benefits	\$28.3			
Roadside Services	\$41.4	372	\$1.9	\$0.5
Total CFX Virginia Corridor (2035)	\$69.8	372	\$1.9	\$0.5
Ongoing Impact (2035)-CFX West Virginia				
Cost Savings (Productivity)	\$68.1			
Roadside Services	\$77.4	695	\$4.9	\$0.9
Total CFX West Virginia Corridor (2035)	\$145.5	695	\$4.9	\$0.9
Ongoing Impact (2035)-CFX Corridor				
Total User Benefits	\$96.5			
Roadside Services	\$118.8	1,067	\$6.8	\$1.4
Total CFX Corridor (2035)	\$215.3	1,067	\$6.8	\$1.4

Source: Chmura Economics & Analytics

After the completion of CFX, both existing businesses and residents can benefit from the highway. CFX can help improve travel efficiency and provide cost savings. The total user benefits are estimated to reach \$96.5 million in 2035.

The most immediate new businesses as a result of CFX are the service businesses clustering around access points along CFX. These service businesses will serve both motorists on CFX and local residents. Chmura estimates that a total of 77 service businesses can be supported by CFX in 2035. These service businesses can generate an economic impact of \$118.8 million and create 1,067 jobs in the CFX Corridor.

State and local governments of the region are expected to reap considerable fiscal benefits from this project. When the project is complete, it is estimated that two state governments will receive \$6.8 million in 2035 in sales tax and corporate and individual income tax on an annual basis. The local governments in the CFX Corridor will receive annual tax benefits totaling \$1.4 million in 2035 in the form of local taxes.

CFX will benefit mining, manufacturing, and agricultural businesses in the CFX Corridor by providing easier access to markets. The presence of an interstate highway can increase the appeal of the region to expanding and relocating firms. CFX will also have a positive effect on population and tourism growth, as well as improving quality of life in the region.

Appendix 1: Impact Study Glossary

IMPLAN Professional—an economic impact assessment modeling system. It allows the user to build economic models to estimate the impacts of economic changes in states, counties, or communities. It was created in the 1970s by the Forestry Service and is widely used by economists to estimate the impact of specific events on the overall economy.

Input-Output Analysis—an examination of business-business and business-consumer economic relationships capturing all monetary transactions in a given period, allowing one to calculate the effects of a change in an economic activity on the entire economy (impact analysis).

Direct Impact—economic activity generated by a project or operation. For construction, this represents activity of the contractor; for operations, this represents activity by tenants of the property.

Overhead—construction inputs not provided by the contractor.

Indirect Impact—secondary economic activity that is generated by a project or operation. An example might be a new office building generating demand for parking garages.

Induced (Household) Impact—economic activity generated by household income resulting from direct and indirect impacts.

Ripple Effect—the sum of induced and indirect impacts. In some projects, it is more appropriate to report ripple effects than indirect and induced impacts separately.

Multiplier—the cumulative impacts of a unit change in economic activity on the entire economy.

Appendix 2: Interchange Development Categories

Table A1: Interstate Interchange Classifications

Category	Development	Requirements for Classifications
0	Minimum Forest Agriculture Agriculture-residential	no requirements
1	Residential Single-family homes Medium-sized lots	< 2,000 average daily traffic (ADT) not close to town rural setting
2A	Light Tourist Service 1+ gas station 1 small motel	> 4,000 ADT water service availability moderate visibility within 10 miles of town
2B	Economically Competitive 2-4 gas stations 1-2 fast food restaurants 2+ hotels	> 8,000 ADT water & sewer availability town within 3 miles > 5 miles from next exit
2C	Economic Integration 4+ gas stations 3+ fast food restaurants 2+ full-service restaurants other business/malls	> 12,000 ADT water and sewer availability town within 2 miles
3A	Heavy Tourist 6+ hotels 3+ full-service restaurants 3+ fast food restaurants 3+ gas stations	water and sewer availability 2-3 miles from interchange

Source: Hartgen, et al. "Growth at Rural Interchanges: What, Where, Why. Transportation Research and Record, 1359

