



PREPARED FOR  
**Virginia Coalfields Expressway Authority**



12/7/2021

# Economic Impact

**Coalfields Expressway in  
its Corridor in Virginia and  
West Virginia**



## Contents

1. EXECUTIVE SUMMARY .....	1
2. BACKGROUND.....	4
3. LOCATION OF CFX AND TRAFFIC PROJECTION .....	5
3.1. CFX LOCATION .....	5
3.2. ACCESS POINTS AND TRAFFIC PROJECTION ..	7
4. ECONOMIC IMPACT OF CFX IN THE CORRIDOR.....	8
4.1. ONE-TIME IMPACT OF CONSTRUCTION .....	8
4.2. TRAVEL EFFICIENCY, COST SAVINGS, AND SAFETY BENEFITS.....	9
4.3. ECONOMIC IMPACT OF SERVICE BUSINESSES .....	10
5. FISCAL IMPACT OF CFX .....	13
5.1. STATE FISCAL IMPACT .....	13
5.2. LOCAL FISCAL IMPACT .....	14
5.3. POTENTIAL PAYBACK PERIOD FOR INVESTMENT.....	15
6. OTHER BENEFITS OF CFX.....	16
6.1. CFX AND MARKET ACCESS.....	16
6.2. OTHER ECONOMIC DEVELOPMENT BENEFITS .....	17
6.3. ASSESSMENT OF RISKS .....	18
7. SUMMARY .....	20
APPENDIX 1: IMPACT ANALYSIS GLOSSARY	21
APPENDIX 2: BENCHMARK ANALYSIS OF RURAL HIGHWAYS.....	22

## 1. Executive Summary

The Coalfields Expressway (CFX) is a highway project located in the states of Virginia and West Virginia.<sup>1</sup> CFX aims to provide improved highway access for regional businesses and residents in 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.<sup>2</sup>

In 2013, Chmura Economics & Analytics (Chmura)<sup>3</sup> completed an economic impact analysis of CFX in its corridor.<sup>4</sup> This 2021 study provides an updated analysis based on the latest data available, and extended timeline of the CFX project. This update utilizes a similar methodology and approach. 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 & other user benefits.** The construction of a highway can reduce travel time for area businesses and residents alike. Trade, manufacturing, and construction sectors will benefit greatly from a new highway in the Coalfields region. Healthcare and education sectors will also benefit.
- **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 one-time economic impact of construction of the Coalfields Expressway is expected to reach \$5.9 billion in the Corridor from 2013 to 2038.**

- The updated estimated cost of CFX in Virginia is \$3.1 billion in 2021 dollars, including the segment overlapping with U.S. Route 460. The 2013 cost estimate for the West Virginia portion of CFX was \$846 million.<sup>5</sup>
- From 2013 to 2038, the construction of CFX is projected to generate \$5.9 billion in cumulative economic impact in the Corridor. Of this total, \$4.1 billion will be direct

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

<sup>2</sup> These six counties are referred to as the CFX Corridor region in this report.

<sup>3</sup> Chmura provides economic software, consulting, and data to our clients that help them make informed decisions to benefit their communities. Chmura's PhD economists, data scientists, and strategic planners guide clients through their local labor market. Over the past 22 years, Chmura has served hundreds of clients nationwide with thoroughness, accuracy, and objectivity.

<sup>4</sup> Source: Economic Impact of the Coalfields Expressway in the CFX Corridor in Virginia and West Virginia. Prepared for the Virginia Department of Transportation, by Chmura Economics & Analytics, January 2013.

<sup>5</sup> Since a large part of the West Virginia portion of CFX has been constructed, Chmura did not find a new cost estimate. Data is utilized from the previous study.

construction spending while \$1.8 billion will be the ripple economic impact of construction.<sup>6</sup> Construction can support 40,105 cumulative jobs (both direct and ripple) in the Corridor from 2013 to 2038.

- On an annual average basis, CFX construction can generate an economic impact of \$225.4 million that can support 1,543 jobs per year in the CFX Corridor from 2013 to 2038.
- The Virginia portion of the CFX Corridor is expected to receive over 75% of the construction impact due to larger construction spending projections for Virginia.

**After its completion in 2039, CFX can provide \$89.2 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 significant time savings for businesses and residents traveling the entire length of the road. Time savings can reach 49% in Virginia and 50% in West Virginia.
- The total user benefits for the region are estimated to reach \$89.2 million per year in 2039. Of this amount, \$45.0 million is the estimated value of time saved by motorists. The estimated savings in vehicle operation costs is \$39.0 million, while \$5.2 million is the estimated cost savings from accident reduction.
- Over 65% 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 2039, CFX can support 79 service businesses and 981 jobs in the Corridor. The total annual economic impact (including direct and ripple effects) is \$151.9 million that can support 1,236 jobs.**

- Based on traffic projections and patterns, it is estimated that CFX can support approximately 23 motels/hotels, 29 gas stations, and 27 restaurants in the Corridor.
- The direct output of these businesses is estimated to be \$114.4 million in 2039, with ripple effects of \$37.5 million. In terms of job creation, these service businesses will directly employ 981 workers with a ripple effect of 254 additional jobs per year in 2039.
- In 2039, about 36% of the economic impact from service businesses is expected to occur in Virginia's section of the CFX Corridor, and 64% of the economic impact will occur in West Virginia.

**The cumulative economic impact of CFX, during its 50-year life span, is estimated to be \$12.8 billion in 2021 dollars.**

- Each dollar of investment in CFX can result in \$3.10 in economic impact in the Corridor during its life span.
- The potential payback period for CFX is estimated to be 28 years after completion.

**After CFX is completed, it is estimated that Virginia will receive \$2.5 million in annual tax revenue while the fiscal benefit for West Virginia's state government will be \$5.3 million per year.**

- After construction is complete, both state governments are expected to collect corporate and personal income taxes from service businesses along CFX, in the amount of \$2.5 million per year for Virginia, and \$5.3 million per year for West Virginia.

<sup>6</sup> 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 firms or their suppliers spend their income in the region. The ripple effect is the sum of induced and indirect impacts.

- Local governments in Virginia can collect an estimated \$0.7 million in annual tax revenue, from sales, meals, and lodging taxes. West Virginia's local governments can collect an estimated \$1.1 million in annual tax revenue from lodging tax and business and occupation (B&O) tax.
- During the construction phase, Virginia's state government can receive \$70.6 million in cumulative tax revenue, while West Virginia's government can receive \$12.9 million in cumulative tax revenue from 2013 to 2038.

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 (Million)	Total Employment	State Tax Revenue (Million)	Local Tax Revenue (Million)
<b>One-time Construction Impact (2013-2038)</b>				
Annual Average				
<b>CFX Virginia</b>	\$177.7	1,147	\$2.7	\$0.0
<b>CFX West Virginia</b>	\$47.6	396	\$0.5	\$0.5
<b>CFX Corridor</b>	<b>\$225.4</b>	<b>1,543</b>	<b>\$3.2</b>	<b>\$0.5</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX Virginia</b>				
<b>Total User Benefits</b>	\$28.3			
<b>Service Businesses</b>	\$55.3	441	\$2.5	\$0.7
<b>Total CFX Virginia Corridor 2039</b>	<b>\$83.5</b>	<b>441</b>	<b>\$2.5</b>	<b>\$0.7</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX West Virginia</b>				
<b>Total User Benefits</b>	\$61.0			
<b>Service Businesses</b>	\$96.6	795	\$5.3	\$1.1
<b>Total CFX West Virginia Corridor 2039</b>	<b>\$157.6</b>	<b>795</b>	<b>\$5.3</b>	<b>\$1.1</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX Corridor</b>				
<b>Total User Benefits</b>	\$89.2			
<b>Service Businesses</b>	\$151.9	1,236	\$7.8	\$1.8
<b>Total CFX Corridor 2039</b>	<b>\$241.1</b>	<b>1,236</b>	<b>\$7.8</b>	<b>\$1.8</b>

Source: Chmura Economics & Analytics

**Other benefits of CFX are better market access, increased appeal for business expansion and relocation, 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 jobs, 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.

## 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.<sup>7</sup>

The Coalfields Expressway has been 30 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.<sup>8</sup> 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 CFX. In November 2001, the Federal Highway Administration (FHWA) issued its Record of Decision, selecting the preferred route for the expressway.

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

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 healthcare and educational institutions in the region more easily, improving their quality of life.

In 2013, Chmura Economics & Analytics (Chmura) completed an economic impact analysis of CFX in its corridor. Since then, the Virginia portion of CFX has progressed slowly, while West Virginia has completed a large portion of the road. The Virginia Coalfields Expressway Authority needs an updated economic impact study to accelerate CFX development in Virginia. Chmura was again retained to provide an updated analysis of the Coalfields Expressway in the CFX Corridor in Virginia and West Virginia.

The remainder of this report is organized as follows:

- Section 3 details the location of the Coalfields Expressway and summarizes both the traffic analysis data and access points of CFX.
- Section 4 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 5 estimates the fiscal benefits for state and local governments.
- Section 6 discusses other benefits of CFX, and an assessment of risk.
- Section 7 offers a summary.

<sup>7</sup> Source: Coalfields Expressway Final Environmental Impact Statement (FEIS). VDOT 2001. Available at: [http://www.virginiadot.org/projects/bristol/coalfields\\_expressway.asp](http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp).

<sup>8</sup> Source: Record of Decision, Coalfields Expressway Location Study, Federal Highway Administration, 2001. Available at: [http://www.virginiadot.org/projects/bristol/coalfields\\_expressway.asp](http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp).

### 3. Location of CFX and Traffic Projection

#### 3.1. CFX Location

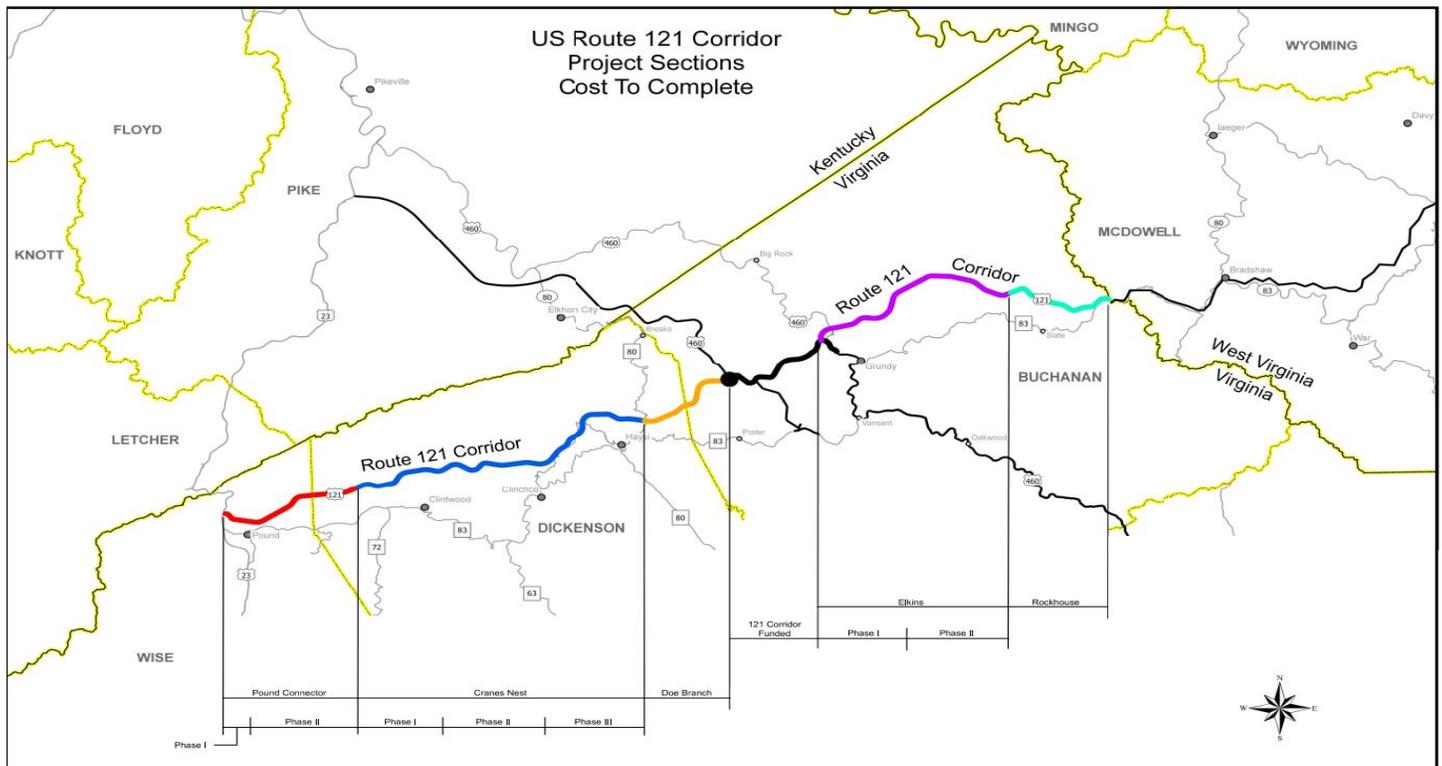
In Virginia, CFX extends from U.S. Route 23 near Pound in Wise County to the West Virginia border in Buchanan; there it connects with CFX in West Virginia. CFX extends approximately 52 miles through the Virginia counties of Wise, Dickenson, and Buchanan.

In Wise County, CFX (Pound Bypass) extends from U.S. Route 23 west of Pound. From there, CFX travels north of Pound and connects with U.S. Route 83 east of Pound.

The next section of CFX 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. More specifically, from Pound, CFX would continue east generally north of and parallel to U.S. Route 83 to the town 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. Afterwards, it connects with US Route 460 at the Route 460 Connector. The Route 460 Connector is part of Corridor Q of the Appalachian Development Highway System (ADHS) that was created by Congress in 1965.<sup>9</sup>

The next segment of CFX 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. CFX passes Grundy to the north, travels eastward, and ends at State Route 643. From there, CFX extends from Route 643 to Route 83 at the West Virginia state line.

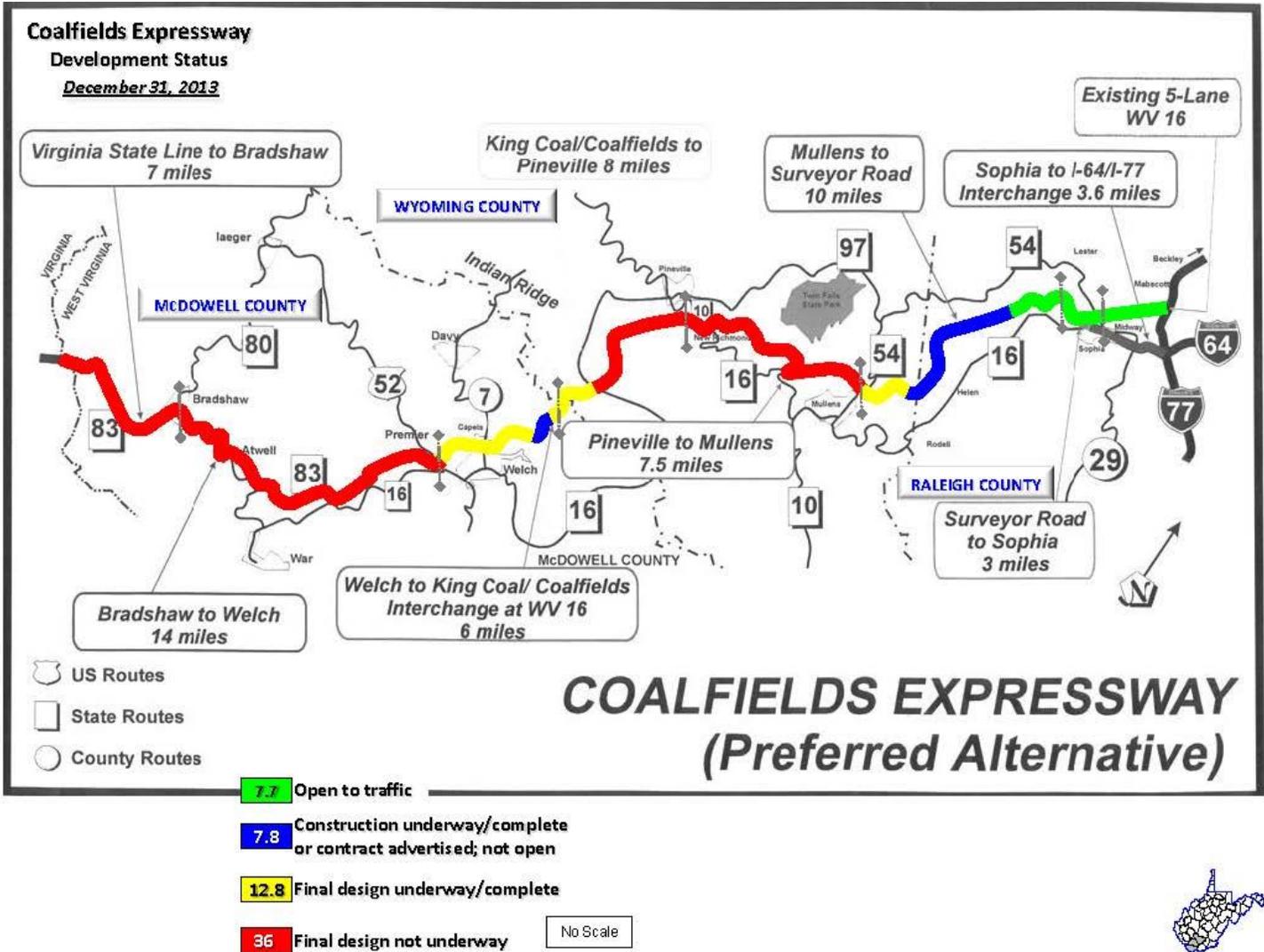
Figure 3.1: Location of CFX in Virginia



<sup>9</sup> Environmental Assessment, Coalfields Expressway Section II. FHWA and VDOT. June 2012.

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.<sup>10</sup>

Figure 3.2: Location of CFX in West Virginia



<sup>10</sup> Source: <http://www.coalfieldsexpressway.com/route/index.html>.

### 3.2. 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.

Chmura did not find updated engineering studies on both segments of CFX. As a result, Chmura based its analysis on the 2013 study. It is assumed that there will be 24 preliminary access points along the CFX Corridor in Virginia and 16 in West Virginia (Table 3.1). In Virginia, 13 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 intersections 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 3.2 shows the projected average daily traffic (ADT) volumes for 2039, when the construction of CFX in both states is complete.<sup>11</sup> The forecasts were calculated utilizing a travel demand model by VDOT and WVDOT. In Virginia, it is projected that ADT volume will range from 4,753 in sections of Wise County to 7,646 in Dickenson 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 2039 near those two intersections. In West Virginia, the projected traffic volume will be higher in Wyoming and Raleigh counties, and the highest traffic volume will occur near the intersection of CFX, King Coal Highway, and I-77/I-64. 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.

Traffic in the CFX Corridor will experience moderate growth in the future. Compared with the 2013 Chmura study, traffic is expected to grow by 1.0% per year. This growth forecast is based on modest population and economic growth projections in the region and historical traffic trends. The latest data from VDOT show that traffic volume was down in 2020, due to the COVID-19 pandemic.

**Table 3.1: Total CFX Preliminary Access Points**

Corridor County	Number
Wise, VA	3
Dickenson, VA	13
Buchanan, VA	8
McDowell, WV	9
Wyoming, WV	4
Raleigh, WV	3
<b>Total</b>	<b>40</b>

Source: VDOT and WVDOT

**Table 3.2: CFX Corridor Average Daily Traffic (ADT) Volumes**

Location	2039 Traffic Projection
Wise, VA	4,753
Dickenson, VA	7,646
Buchanan, VA	6,978
McDowell, WV	8,863
Wyoming, WV	15,108
Raleigh, WV	15,713
<b>Average</b>	<b>8,910</b>

Source: VDOT, WVDOT, and Chmura

<sup>11</sup> The original FEIS for Virginia's section of CFX has traffic projection for 2020. VDOT also provided a 2035 projection for Chmura's 2013 study. Traffic data for West Virginia are only available for 2020. Chmura uses the growth rate of traffic in the region to estimate the traffic for 2039.

## 4. Economic Impact of CFX in the Corridor

This report uses the methodology employed in several studies, such as 1998 Appalachian Development Highway System (ADHS) for the Appalachian Regional Commission.<sup>12</sup> 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 impact and economic development are input into the JobsEQ<sup>®</sup> economic impact model to measure the multiplier impacts of CFX on regional industries.

### 4.1. 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 generate more sales for local suppliers; the impact on some local businesses will allow them to hire additional employees.<sup>13</sup> Area restaurants and shops will also benefit as construction workers spend their income at local establishments.<sup>14</sup> This initial economic impact is temporary, however, lasting only during the construction phase.

The most recent estimate put total construction cost of CFX at \$3.1 billion for the Virginia section (in 2021 dollars), including \$416 million for the segment overlapping with U.S. Route 460.<sup>15</sup> For CFX in West Virginia, the total project cost was estimated to be \$822 million based on the 2012 estimate, or \$1.1 billion in 2021 dollars.<sup>16</sup>

The last study utilized a 17-year time frame from 2013 to 2029, assuming Virginia’s construction would start in 2013. Since Virginia’s segment of CFX has not yet been funded as of 2021, Chmura uses a new start date of 2022 with completion in 2038. However, for the West Virginia portion, there have been no such delays, so Chmura uses the same timeline as the 2013 study. As a result, the construction schedule for the entire highway will last 26 years, from 2013 to 2038.

Table 4.2 presents the estimated one-time economic impact of road construction in the Virginia portion, West Virginia portion, and the entire CFX Corridor. From 2013 to 2038, it is estimated that construction activities will generate a total economic impact (including direct, indirect, and induced impacts) of \$5.9 billion, measured in current dollars, which can support 40,105 cumulative jobs in the Corridor. Of the total economic impact, \$4.1 billion is derived from direct spending during the construction phase. This spending can directly support 26,246 cumulative jobs in the Corridor from 2013 to 2038, with the majority in construction trades. The indirect impact in the state is estimated to be \$865.0 million, supporting 6,565 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 \$889 million, which can support 7,294 cumulative jobs during the construction phase—these jobs are expected to be concentrated in consumer service-related industries such as restaurants, hospitals, and retail stores.

**Table 4.2: Economic Impact of CFX Construction in the CFX Corridor (Cumulative, 2013-2038, Current Dollars)**

		Direct	Indirect	Induced	Total
Virginia	Spending (Million)	\$3,238.4	\$682.2	\$700.7	\$4,621.2
	Employment	19,511	4,880	5,423	29,813
West Virginia	Spending (Million)	\$867.7	\$182.8	\$187.8	\$1,238.3
	Employment	6,735	1,685	1,872	10,292
<b>Total</b>	<b>Spending (Million)</b>	<b>\$4,106.1</b>	<b>\$865.0</b>	<b>\$888.5</b>	<b>\$5,859.5</b>
	<b>Employment</b>	<b>26,246</b>	<b>6,565</b>	<b>7,294</b>	<b>40,105</b>

*Note: Numbers may not sum due to rounding.*

*Source: JobsEQ by Chmura*

<sup>12</sup> Wilbur Smith Associates. Appalachian Development Highways Economic Impact Studies, Prepared for Appalachian Regional Commission, 1998.

<sup>13</sup> This is referred to as the indirect impact.

<sup>14</sup> This is referred to as the induced impact. The sum of the indirect and induced impact is referred to as the ripple impact.

<sup>15</sup> Source: Virginia Coalfields Expressway Authority, US Route 121 Corridor Project Sections, Cost to Complete, March 2021. This report documents a \$2.6 billion cost for CFX without the Route 460 overlap. Cost for the overlapped section is directly from VDOT.

<sup>16</sup> Chmura did not find an updated cost estimate for West Virginia and thus utilized the cost estimate from the 2013 study.

On an annual average basis, CFX construction could generate an economic impact of \$225.4 million that can support 1,543 jobs per year in the CFX Corridor from 2013 to 2038. The annual economic impact in the Virginia portion is estimated to be \$177.7 million that can support 1,147 jobs in the Corridor, while annual economic impact in the West Virginia portion is estimated to be \$47.6 million that can support 396 jobs in the Corridor. The impact of construction is primarily driven by construction cost. It is estimated that more construction money will be spent to build the Virginia portion of CFX, resulting in a higher economic impact than in West Virginia.

**Table 4.3: Economic Impact of CFX Construction in the CFX Corridor (Annual Average 2013-2038, Current Dollars)**

		Direct	Indirect	Induced	Total
Virginia	Spending (Million)	\$124.6	\$26.2	\$26.9	\$177.7
	Employment	750	188	209	1,147
West Virginia	Spending (Million)	\$33.4	\$7.0	\$7.2	\$47.6
	Employment	259	65	72	396
<b>Total</b>	<b>Spending (Million)</b>	<b>\$157.9</b>	<b>\$33.3</b>	<b>\$34.2</b>	<b>\$225.4</b>
	<b>Employment</b>	<b>1,009</b>	<b>252</b>	<b>281</b>	<b>1,543</b>

*Note: Numbers may not sum due to rounding.*

*Source: JobsEQ by Chmura*

## 4.2. Travel Efficiency, Cost Savings, and Safety Benefits

While the economic impact of construction activities 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 Corridor can benefit from CFX.<sup>17</sup> There are three major categories of benefits associated with road construction, the first being 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 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 four-lane, partially limited-access highway. It will be an improvement to the many two-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.<sup>18</sup>

**Table 4.4: Travel Time in the CFX Corridor (Minutes)**

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

*Source: VDOT and WVDOT*

A simulation model is utilized to estimate cost-saving benefits of the highway. The model is based on the amount of traffic and total time required to travel CFX in comparison to 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 highway.<sup>19</sup> 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 highway (Table 4.4).

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 is estimated to be \$89.2 million in 2039 for the CFX Corridor (Table 4.5).

<sup>17</sup> Businesses outside the CFX Corridor will also benefit. Estimating those benefits is beyond the scope of this study.

<sup>18</sup> There will be benefits of market access, which are explained qualitatively in Section 7.

<sup>19</sup> Source: Coalfields Expressway Final Environmental Impact Statement (FEIS). VDOT 2001. Available at: [http://www.virginiadot.org/projects/bristol/coalfields\\_expressway.asp](http://www.virginiadot.org/projects/bristol/coalfields_expressway.asp).

**Table 4.5: Annual Travel Efficiency and Cost Savings in 2039 (Million)**

	Virginia	West Virginia	Total
Efficiency Improvement	\$14.5	\$30.5	\$45.0
Vehicle Maintenance Cost Savings	\$12.6	\$26.4	\$39.0
Safety	\$1.2	\$4.0	\$5.2
<b>Total Benefits</b>	<b>\$28.3</b>	<b>\$61.0</b>	<b>\$89.2</b>

Source: Chmura Economics & Analytics

Of the \$89.2 million, the first component is the efficiency gain, referring to the benefits of travel time savings for motorists utilizing CFX. For commuters, less time commuting means reduced work delays. For businesses, less travel time means faster delivery of goods and services. Missed appointments, missed meetings, or other business disruptions will also decrease. These can all result in efficiency improvement, which is estimated based on both the reduced travel time and the value of time. As Table 4.4 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 2039, the total vehicle hours traveled can be reduced by 8.7 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.<sup>20</sup> A little over 8.0% of traffic is assumed to be trucks, while the remainder is assumed to be cars.<sup>21</sup> The value of travel time is assumed to be \$24 per hour for cars and \$54 per hour for trucks in 2039 dollars.<sup>22</sup> As a result, CFX can provide an annual efficiency savings to Corridor residents and businesses in the amount of \$45.0 million per year. Of this amount, \$14.5 million will occur in the Virginia section and \$30.5 million will occur in the West Virginia section. The West Virginia section of CFX has a higher traffic projection that can result in more time savings.

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 identified assumptions of vehicle operation cost per hour and per mile from prior studies, before applying those costs to the reduction in travel time. Based on the average daily traffic in 2039, total vehicle hours traveled can be reduced by 8.7 million hours per year in 2039. The vehicle maintenance cost is assumed to be \$23 per hour in 2039 dollars.<sup>23</sup> As a result, CFX can provide an estimated annual cost savings to Corridor motorists in the amount of \$39.0 million, with \$12.6 million in Virginia and \$26.4 million in West Virginia.

CFX can also improve safety. Using the same assumption as the 2013 study, CFX can reduce accidents by 12%. The average cost per accident is assumed to be \$159,303 in 2039 dollars.<sup>24</sup> As a result, the completed highway can provide an accident reduction benefit in the amount of \$5.2 million per year in 2039.

### 4.3. Economic Impact of Service Businesses

#### 4.3.1. 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 studies on service businesses near roads in rural regions. In particular, Chmura utilized a study of businesses at rural interchanges in North Carolina because it most resembles the CFX Corridor in both economic size and structure.<sup>25</sup>

Based on traffic projections, roads crossing the highway, 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.

<sup>20</sup> Since neither Virginia nor West Virginia CFX FEIS includes this information, Chmura uses the percentage retrieved from the *Economic Impact Study of Completing the Appalachian Development Highway System*.

<sup>21</sup> Source: CFX FEIS for Virginia and West Virginia.

<sup>22</sup> 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.

<sup>23</sup> Source: AAA, 2021-YDC-Fact-Sheet-FINAL-8-9-21.pdf (aaa.com). Chmura inflated the amount to 2039 values.

<sup>24</sup> This is inflated from 2010 accident cost estimates. Source: Economic Benefits of Road Improvement from I-95 Toll Revenues-Phase 2. Prepared by Chmura Economics & Analytics, August 2012.

<sup>25</sup> Please see Chmura’s 2013 study for more details of this approach.

- Residential interchanges generally are located in a rural setting, have lower traffic volume, and are not close to a town. There is some development, but mostly in single-family homes. The majority of access points along CFX are classified as residential.
- Light tourist service interchanges usually have a limited number of service businesses—usually one gas station and one small motel. These interchanges can support a moderate volume of 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 east of the 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 the U.S. 460 Connector, 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 connecting to 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.

Table 4.6 lists the projected service establishments that can be supported by CFX. In 2039, it is estimated that CFX can support 79 businesses in the Corridor, comprising 23 motels, 29 gas stations, 18 fast-food restaurants, and nine full-service restaurants.<sup>26</sup>

In 2039, service businesses are estimated to support 981 jobs in the Corridor, with 350 in Virginia and 632 in West Virginia (Table 4.7). By jurisdiction, Raleigh County in West Virginia is likely to land most of those jobs along CFX, due to the high traffic volume at the eastern terminus that links CFX to I-64 and I-77. 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 and West Virginia.<sup>27</sup> For example, an average gas station in the CFX Corridor in Virginia employs eight workers and an average motel employs 10 workers. The average number of workers is 19 for restaurants and 8 for gas stations.

**Table 4.6: Projected Number of Roadside Service Business Establishments**

	Wise	Dickenson	Buchanan	McDowell	Wyoming	Raleigh	CFX Corridor
Interchanges	3	13	8	9	4	3	40
Motels	3	1	4	4	3	8	23
Gas Stations	4	1	7	7	3	7	29
Fast-food Restaurants	2	0	5	5	0	6	18
Full-service Restaurants	0	0	2	2	0	5	9
<b>Total</b>	<b>9</b>	<b>2</b>	<b>18</b>	<b>18</b>	<b>6</b>	<b>26</b>	<b>79</b>

Source: JobsEQ by Chmura

**Table 4.7: Projected Employments in Roadside Service Businesses**

	Wise	Dickenson	Buchanan	McDowell	Wyoming	Raleigh	CFX Corridor
Interchanges	3	13	8	9	4	3	40
Motels	31	10	42	42	31	83	239
Gas Stations	32	8	56	56	24	56	233
Fast-food Restaurants	38	0	95	95	0	114	342
Full-service Restaurants	0	0	37	37	0	93	167
<b>Total</b>	<b>101</b>	<b>18</b>	<b>230</b>	<b>230</b>	<b>55</b>	<b>346</b>	<b>981</b>

Source: JobsEQ by Chmura

<sup>26</sup> Since CFX is near several current roads in the area, the number of projected businesses may not all be entirely new establishments. Some businesses along the current Route 83 or Route 16 may relocate to CFX.

<sup>27</sup> Source: JobsEQ.

4.3.2. Economic Impact of Service Businesses

While spending by motorists at roadside service businesses can bring millions of dollars into the economy, these businesses can also contribute ripple effects throughout the region. In 2039, when construction of CFX is completed, the annual economic impact of service businesses in the CFX Corridor is estimated to be \$151.9 million, which can support 1,236 jobs in the Corridor (Table 4.8). Of this, \$114.4 million is direct spending on food, lodging, and gas at service establishments, which can support 981 jobs in the region. Indirect impact is estimated to be \$17.2 million which can support 100 jobs in the Corridor. Induced economic impact generates \$20.3 million which can support 154 jobs in the Corridor.

In 2039, about 36% of the economic impact, in terms of total spending and job creation, is expected to occur in Virginia’s portion of the CFX Corridor. This is estimated to be \$55.3 million in spending that can support 441 jobs. The West Virginia portion of CFX carries more traffic, passes through more towns and cities, and connects with major interstate highways, resulting in larger economic impact in West Virginia. Of the total economic impact from service businesses, 64% will occur in the West Virginia section of the Corridor.

**Table 4.8: Economic Impact of Service Businesses in the CFX Corridor (Annual 2039 Onward)**

		Direct	Indirect	Induced	Direct
Virginia	Spending (Million)	\$41.8	\$6.2	\$7.3	\$55.3
	Employment	350	36	56	441
West Virginia	Spending (Million)	\$72.6	\$11.0	\$13.0	\$96.6
	Employment	632	65	99	795
<b>Total</b>	<b>Spending (Million)</b>	<b>\$114.4</b>	<b>\$17.2</b>	<b>\$20.3</b>	<b>\$151.9</b>
	<b>Employment</b>	<b>981</b>	<b>100</b>	<b>154</b>	<b>1,236</b>

*Note: Numbers may not sum due to rounding.*

*Source: JobsEQ by Chmura*

## 5. Fiscal Impact of CFX

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 and for the Virginia and West Virginia state governments. For both states, the main revenue 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, meals, and lodging taxes. For West Virginia localities, the main revenue sources are business and occupation (B&O) taxes; some counties will collect lodging taxes.<sup>28</sup> To be conservative, only tax revenue from the direct impact is quantified.<sup>29</sup>

### 5.1. State Fiscal Impact

#### 5.1.1. Virginia State Fiscal Impact

During the construction phase, Virginia can collect corporate income tax from companies such as architecture firms and construction companies. The state also collects personal income tax from wages and salaries paid to individuals working on the project. After construction is complete, the state will collect corporate income tax from service businesses located along CFX. Similarly, individuals employed by these businesses will be subject to personal income tax. In addition, Virginia assesses 5.3% sales tax on receipts from service businesses such as gas stations, hotels, and restaurants.

Chmura utilized the following methodology to estimate corporate and personal income taxes for both states. In Section 4, Chmura estimated the total revenue of construction and service businesses. The JobsEQ impact model provides profit margins and the relative weight of wages and salaries in total revenue (sales) for each industry in the CFX Corridor. From this information, Chmura estimates the total profits and income that can be attributed to CFX. The state corporate income tax rate is 6% and the average personal income tax rate is 5.1%.

**Table 5.1: Virginia State Tax Estimate (Million)**

	Corporate Income Tax	Personal Income Tax	State Sales Tax	Total
<b>Construction (Total 2013-2038)</b>	\$3.1	\$67.5		\$70.6
<b>Service Businesses (Annual 2039)</b>	\$0.1	\$0.6	\$1.8	\$2.5

Source: Chmura Economics & Analytics

Table 5.1 presents the tax revenue for the state of Virginia. CFX is estimated to contribute \$70.6 million to the state government during the construction phase from 2013 to 2038. The majority of state tax revenue will come from personal income tax, amounting to \$67.5 million from 2017 to 2038. Corporate income tax is estimated to total \$3.1 million during the construction phase.

After construction is complete, the state of Virginia is expected to collect sales tax, corporate income tax, and personal income tax from service businesses along CFX. Virginia's sales tax is 5.3%, with 4% going to the state government and 1% going to local governments. In 2039, the total state tax revenue from service businesses is estimated to be \$2.5 million with sales tax accounting for \$1.8 million. Corporate and personal income taxes are estimated to be \$0.1 million and \$0.6 million per year, respectively, from 2039 onward.

#### 5.1.2. West Virginia State Fiscal Impact

During the construction phase, the state of West Virginia can collect corporate income tax from companies such as architecture firms and construction companies. The state also collects personal income tax from wages and salaries paid to individuals working on the project. After construction is complete, the state of West Virginia will collect corporate income tax from service businesses located along CFX. Similarly, these employees will be subject to personal income tax. West Virginia has a state corporate income tax rate of 6.5%,

<sup>28</sup> None of the Virginia localities charge Business, Professional, and Occupational License (BPOL) tax.

<sup>29</sup> This approach is recommended by Burchell and Listokin in *The Fiscal Impact Handbook*.

and the average personal income tax rate is 4.1%.<sup>30</sup> In addition, West Virginia assesses 6% sales tax on receipts from service businesses such as gas stations, hotels, and restaurants.<sup>31</sup>

Table 5.2 presents tax revenue for the state. CFX is estimated to contribute \$12.9 million to the state government during the construction phase. The majority of state tax revenue will come from personal income tax, amounting to \$12.0 million. Corporate income tax is estimated to total \$0.9 million during the construction phase.

After construction is complete, the state is expected to collect sales tax, corporate income 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 \$4.4 million. Adding corporate and personal income taxes, the total state tax revenue from service businesses is estimated to be \$5.3 million per year in 2039.

**Table 5.2: West Virginia State Tax Estimate (Million)**

	Corporate Income Tax	Personal Income Tax	State Sales Tax	Total
<b>Construction (Total 2013-2038)</b>	\$0.9	\$12.0		\$12.9
<b>Service Businesses (Annual 2039)</b>	\$0.1	\$0.9	\$4.4	\$5.3

Source: Chmura Economics & Analytics

## 5.2. Local Fiscal Impact

### 5.2.1. Virginia Local Governments

Chmura utilized the following methodology<sup>32</sup> to estimate local tax revenue: since all local taxes are based on total receipts, the direct spending impact estimated in Section 4 provides a basis for calculating tax revenue. In Virginia, three related local tax sources are sales, lodging, and meals taxes. Chmura calculates the regional average tax rate with the number of roadside service business employment as the weight.

Since none of the localities impose business, professional, and occupational license (BPOL) tax, Virginia’s local governments will not receive tax revenue during construction. After the construction of CFX is complete, the service businesses in the CFX Corridor are estimated to generate \$0.4 million in sales tax for local governments. Only Dickenson County has a meals tax, while both Wise and Buchanan counties have a lodging tax, but no meals tax. The total lodging and meals taxes are estimated to be \$0.3 million and \$0.02 million, respectively, for local governments. Total annual local taxes will be \$0.7 million per year for three localities in Virginia.

**Table 5.3: Local Tax Estimate for Virginia Localities (Million)**

	Sales Tax	Meals Tax	Lodging Tax	Total
<b>Construction (Total 2013-2038)</b>				\$0.0
<b>Service Businesses (Annual 2039)</b>	\$0.4	\$0.02	\$0.3	\$0.7

Source: Chmura Economics & Analytics

### 5.2.2. West Virginia Local Governments

In West Virginia, two local tax sources are business and occupation (B&O) taxes and hotel/motel (lodging) taxes. Chmura calculates the regional average tax rate with roadside service business employment as a weight. During the construction phase, 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 \$11.9 million for three localities (McDowell, Raleigh, and Wyoming) in the CFX Corridor during the construction phase from 2013 to 2038 (Table 5.4).

<sup>30</sup> West Virginia has a progressive state income tax system where individuals in higher income brackets pay more 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, 4.1% is a reasonable and conservative average assumption for construction and service jobs created by this project.

<sup>31</sup> Source: West Virginia Tax Department.

<sup>32</sup> Only county tax revenue is estimated in this study. In West Virginia, municipalities can impose taxes on properties and businesses, but those are not estimated here.

After the construction of CFX is complete, local governments will collect B&O and lodging taxes from service businesses. In 2039, the service businesses in the West Virginia Corridor are estimated to generate \$1.1 million in revenue for local governments. McDowell County has no lodging tax while both Raleigh and Wyoming counties collect a 6% lodging tax.<sup>33</sup> The total lodging taxes are estimated to be \$0.7 million per year for local governments, while B&O taxes are estimated to be \$0.4 million in 2039.

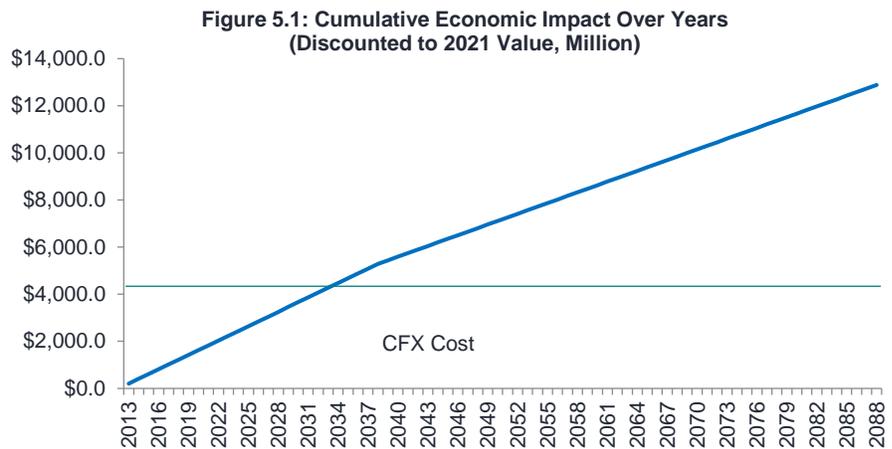
Table 5.4: Local Tax Estimate for West Virginia Localities (Million)

	B&O Tax	Lodging Tax	Total
<b>Construction (Total 2013-2038)</b>	\$11.9		\$11.9
<b>Service Businesses (Annual 2039)</b>	\$0.4	\$0.7	\$1.1

Source: Chmura Economics & Analytics

### 5.3. Potential Payback Period for Investment

The cumulative economic impact generated by CFX (as well as the cost) is presented in Figure 5.1. The benefits of CFX include travel efficiency, cost savings, and economic benefits of service businesses. The direct impacts of all three types of benefits can reach \$241.1 million in 2039. Prior to that, the estimated annual economic impact of construction will average \$225.3 million per year from 2013 to 2038. Like the 2013 study, Chmura used a 3% discount rate to calculate the net present value of the cumulative benefits of CFX. The cumulative economic impact (discounted to the 2021 value) will exceed the cost of CFX in 2033. 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 \$12.8 billion in 2021 dollars. Each dollar of investment in CFX can result in \$3.10 in economic impact in the Corridor.



Source: Chmura

To calculate the payback period for investment, Chmura compared the cumulative impact of CFX with the cost of building the road. The benefits of CFX include travel efficiency, cost savings, and economic benefits of service businesses. The direct impacts of all three types of benefits can be \$241.1 million in 2039. The total cost of CFX was estimated at \$4.1 billion (in 2021 dollars). Discounting total economic impacts to 2021 dollars, the present value of the total economic impact will exceed the total cost in 2066. This is 28 years after road completion, which will be the potential payback period.

<sup>33</sup> Source: West Virginia Department of Taxation. Found at <https://tax.wv.gov/Business/HotelOccupancyTax/Pages/HotelOccupancyTax.aspx>.

## 6. 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 6.1 through 6.3 will qualitatively discuss these benefits, and Appendix 2 will provide a case study of other rural regions around the country that have benefited from new road construction.

### 6.1. 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.

Coal is one of the top commodities exported from Virginia, in terms of commodity values.<sup>34</sup> The value of coal exports reached \$1.5 billion in 2020, the highest among all exported commodities (Table 6.1). In the past four years, coal exports ranked number one 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.

Coal is also one of the top commodities exported from West Virginia, in terms of commodity values.<sup>35</sup> The value of coal exports reached \$1.4 billion in 2020, the highest among all exported commodities (Table 6.2). In the past four years, coal exports ranked number one in terms of values among all West Virginia exports. CFX can reduce the cost to coal industries as a large amount of coal is transported by trucks before it is loaded into rail cars.

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 Corridor Q of the ADHS project (discussed in Section 3), travel 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 streamlines travel to both 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

**Table 6.1: Top Ten Virginia Exports by Value (Million)**

	2017	2018	2019	2020
Bituminous coal, whether or not pulverized, but no	\$896	\$1,109	\$1,999	\$1,518
Memories, electronic integrated circuits	\$635	\$736	\$694	\$827
Soybeans, other than seed	\$596	\$699	\$489	\$751
Civilian Aircrafts, Engines, and Parts	\$424	\$482	\$573	\$438
Parts and accessories of printers, copying machine	\$316	\$375	\$367	\$371
Meat of Swine, Nesoi, Frozen	\$36	\$92	\$92	\$257
Kraft paper and paperboard (not for writing, etc.)	\$415	\$274	\$272	\$232
Soybean oilcake & other solid residues resulting	\$181	\$277	\$210	\$210
Artificial filament tow of cellulose acetate	\$163	\$182	\$215	\$206
Road tractors for semi-trailers	\$310	\$536	\$503	\$205

Source: U.S. Census

**Table 6.2: Top Ten West Virginia Exports by Value (Million)**

	2017	2018	2019	2020
Bituminous coal, whether or not pulverized, but no	\$3,240	\$4,438	\$2,260	\$1,445
Spark-ignition reciprocating piston engines for pr	\$520	\$409	\$644	\$650
Polyamide-6,-11,-12,-6,6,-6,9,-6,10 or -6,12	\$171	\$207	\$198	\$157
Polyethers nesoi, in primary forms	\$119	\$140	\$125	\$128
Civilian aircraft, engines, and parts	\$195	\$231	\$158	\$119
Propylene copolymers, in primary forms	\$106	\$133	\$127	\$111
Aluminum alloy rectangular (including square) plat	\$145	\$143	\$168	\$103
Polyesters nesoi, saturated, in primary forms	\$86	\$107	\$88	\$75
Polyacetals, in primary forms	\$98	\$111	\$65	\$67
Supported catalysts with precious metal	\$81	\$28	\$58	\$63

Source: U.S. Census

<sup>34</sup> Based on 6-Digit Harmonized System (HS) Commodities Classification. Source: <http://www.census.gov/foreign-trade/statistics/state/data/va.html>.

<sup>35</sup> Ibid.

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 (Table 6.3). The freight movement data indicates that in 2035, 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 was destined for other counties in 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 will be 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.

**Table 6.3: Freight Movement Originating from the CFX Corridor (Tons by Truck, 2035 Projections)**

	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
<b>Total</b>	<b>9,624,616</b>	<b>2,339,706</b>	<b>146,637</b>	<b>42,223</b>	<b>14,977</b>	<b>32,184</b>	<b>24,039</b>	<b>12,224,382</b>

Source: Appalachian Regional Commission

The Appalachian Regional Commission (ARC) projection on freight movement data in 2035 did not take into consideration the completion of CFX but assumed 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. With the completion of CFX, it is reasonable to project that freight movement from the CFX Corridor will exceed the data presented in Table 6.3. 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.

## 6.2. 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 e-commerce, and just-in-time inventory systems. The COVID-19 pandemic accelerated this trend. For example, the I-81

Corridor in western Virginia has attracted many distribution centers.<sup>36</sup> 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. Studies have found that distribution centers are usually located close to population centers, but also in less populated areas where land is inexpensive.<sup>37</sup>

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 the highway. The CFX Corridor provides ample attractions for recreational activities. 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 athletic 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 throughout the region that were developed on reclaimed land. The CFX project will also create an opportunity for further land development.

Population growth in the region can also be aided by CFX. Both the presence of an interstate highway and associated jobs 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, healthcare, 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.

### 6.3. Assessment of Risks

The economic impact of CFX attempts to project the condition of the regional economy more than 20 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.

#### 6.3.1. Downside Risks

For the service businesses and associated employment to materialize, certain conditions must be met. Since one major requirement is the availability of water and sewer services to any new business site, development may require additional investment 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.

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 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 it 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 to be smaller, as would the resulting economic impact of travel

<sup>36</sup> *Economic Effects of Selected Rural Interstates at the County Level*, by Jack Faucett Associates and Economic Development Research Group. Prepared for the Federal Highway Administration, U.S. Department of Transportation, 2005.

<sup>37</sup> *Retail Distribution Centers: How New Business Processes Impact Minority Labor Markets*. Found at: <https://www.eeoc.gov/special-report/retail-distribution-centers-how-new-business-processes-impact-minority-labor-markets>

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.

Finally, the recent COVID-19 pandemic will present a significant downside risk for the road construction and related business development. COVID-19 has affected tourism and travel businesses around the country. Individuals remain cautious regarding travel while infection risk is high, and CFX and associated businesses will be affected as long as the pandemic continues.

### 6.3.2. Upside Risks

This report does not incorporate several projects that are already in process, or are in the planning stage, which could increase the traffic projection on the road. Any retail or manufacturing projects in the Corridor have a potential to increase the traffic projection significantly.

It is possible that CFX traffic projection might be low. The projection made by VDOT and WVDOT focuses 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 projected traffic volume could be higher when all road projects in the region are complete. As a result, the economic impact will be higher than what is expected in this report.

## 7. 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 \$225.4 million in total economic impact (direct plus ripple impacts) into the local economy from 2013 through 2038. Construction will also generate 1,543 jobs each year during this period (Table 7.1).

**Table 7.1: CFX Economic Impact Summary**

	Total Economic Impact (Million)	Total Employment	State Tax Revenue (Million)	Local Tax Revenue (Million)
<b>One-time Construction Impact (2013-2038)</b>				
<b>Annual Average</b>				
<b>CFX Virginia</b>	\$177.7	1,147	\$2.7	\$0.0
<b>CFX West Virginia</b>	\$47.6	396	\$0.5	\$0.5
<b>CFX Corridor</b>	<b>\$225.4</b>	<b>1,543</b>	<b>\$3.2</b>	<b>\$0.5</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX Virginia</b>				
<b>Total User Benefits</b>	\$28.3			
<b>Service Businesses</b>	\$55.3	441	\$2.5	\$0.7
<b>Total CFX Virginia Corridor 2039</b>	<b>\$83.5</b>	<b>441</b>	<b>\$2.5</b>	<b>\$0.7</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX West Virginia</b>				
<b>Total User Benefits</b>	\$61.0			
<b>Service Businesses</b>	\$96.6	795	\$5.3	\$1.1
<b>Total CFX West Virginia Corridor 2039</b>	<b>\$157.6</b>	<b>795</b>	<b>\$5.3</b>	<b>\$1.1</b>
<b>Ongoing Impact (2039)</b>				
<b>CFX Corridor</b>				
<b>Total User Benefits</b>	\$89.2			
<b>Service Businesses</b>	\$151.9	1,236	\$7.8	\$1.8
<b>Total CFX Corridor 2039</b>	<b>\$241.1</b>	<b>1,236</b>	<b>\$7.8</b>	<b>\$1.8</b>

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 \$89.2 million in 2039.

The most immediate new service businesses will be clustered around access points along CFX. These businesses will serve both motorists and local residents. Chmura estimates that a total of 79 service businesses can be supported by CFX in 2035. These service businesses can generate an economic impact of \$151.9 million and create 1,236 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 both state governments will receive \$7.8 million in 2039 in sales tax, corporate income tax, and individual income tax on an annual basis. The local governments in the CFX Corridor will receive annual tax benefits totaling \$1.8 million in 2039 in the form of local taxes.

CFX will benefit mining, manufacturing, and agricultural businesses in the 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 Analysis Glossary

*JobsEQ Economic Impact*—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.

*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: 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 Pete Buttigieg, “We know that a lot of the bridges that need work are in rural areas, and we know what happens to a community if the bridge is out or the road infrastructure is inadequate”.<sup>38</sup> 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.<sup>39</sup> Based upon this set of data, new interstate highways raised 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.<sup>40</sup> 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.”<sup>41</sup>

A study by Nadiri and Mamuneas examined the contributions that highway capital has on industry and national productivity growth.<sup>42</sup> They found that interstate highway investments lowered production costs and distribution costs in most industry sectors. The study showed that on average U.S industries saved an average of 24 cents per dollar invested in non-local road systems. The contribution of the highway network to productivity has been on decline since the 1950s. During the 1950s, highway network investments contributed 31% of U.S. productivity growth, dropping to 25% in the 1960s and 7% in the 1980s. This indicated a diminishing marginal product of highway investment.

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.”<sup>43</sup> 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

<sup>38</sup> Source: <https://ocj.com/2021/04/rural-infrastructure-needs-highlighted/>.

<sup>39</sup> “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).

<sup>40</sup> “An Analysis of the Governor’s Road Improvement Road Program (GRIP) for the Georgia Department of Transportation,” Douglas C. Bachtel et al, 2007.

<sup>41</sup> Ibid.

<sup>42</sup> Nadiri, M.I. and Mamuneas, T.P. *Contribution of Highway Capital to Industry and National Productivity Growth*. NYU and NBER, September 1996. Source: <https://corpora.tika.apache.org/base/docs/govdocs1/106/106202.pdf>.

<sup>43</sup> “Connecting Rural and Urban America,” American Association of State Highway and Transportation Officials (AASHTO), 2010.

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."<sup>44</sup>

The National Bureau of Economic Research (NBER) provided new estimates of the benefits of U.S Highway Construction.<sup>45</sup> It concluded that "Even for highways in rural mountainous areas, the estimated economic benefits from adding an additional lane-mile exceed the annual construction and maintenance costs."

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 27.6 minutes and is slightly higher in Virginia (28.4 minutes).<sup>46</sup> 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.

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.<sup>47</sup> 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.<sup>48</sup>

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."<sup>49</sup> RUPRI also makes the important point that economic development and quality of life both influence 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.<sup>50</sup>

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<sup>44</sup> Ibid.

<sup>45</sup> Source: <https://www.nber.org/digest/apr19/new-estimates-benefits-us-highway-construction>.

<sup>46</sup> Mean travel time data are per the 2019 American Community Survey, based on workers 16 years and over who do not work at home.

<sup>47</sup> "Rural Highways Underfunded, Pose Safety Risks, MU Experts Say," News Bureau, University of Missouri, October 11, 2011.

<sup>48</sup> "Connecting Rural and Urban America," American Association of State Highway and Transportation Officials (AASHTO), 2010.

<sup>49</sup> "Rethinking Federal Investments in Rural Transportation: Rural Considerations Regarding Reauthorization of the Surface Transportation Act," Brian Dabson et al, April 2011.

<sup>50</sup> Ibid.