



## **Ross County Solar**

### **Exhibit K**

### **Socioeconomic Report**

**Case No. 20-1380-EL-BGN**

# Socioeconomic Report

## REDACTED

### Ross County Solar Project

Buckskin and Paint Townships,  
Ross County, Ohio

Prepared for:



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## EXECUTIVE SUMMARY

On behalf of Ross County Solar, LLC (Applicant), Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) has prepared this socioeconomic report for the proposed Ross County Solar Project, an up to 156 megawatt of direct current (MW<sub>DC</sub>) solar power generating facility (Facility) located in Paint and Buckskin townships in Ross County, Ohio. The materials contained herein are developed in support of the Applicant's submittal (Application) for a Certificate of Environmental Compatibility and Public Need (Certificate).

The Facility is located approximately 0.5 mile southeast of the Village of Greenfield, 2.5 miles west of the Village of South Salem, and 7 miles northwest of the Village of Bainbridge. The closest metropolitan area is Columbus, Ohio, located approximately 48 miles north of the Facility (see Figure 2: Regional Facility Location). The proposed Facility will include a solar field of photovoltaic (PV) modules and associated support facilities, consisting of fence line, belowground or hybrid electrical collection lines, inverters, access roads, a substation, an operations and maintenance (O&M) building, weather stations, and laydown yards. The Facility is scheduled to begin construction as early as the fourth quarter of 2021.

The focus of this report is to assess the potential socioeconomic impacts of the proposed Facility on the two local municipalities, seven townships, and two counties that are within a 5-mile radius from the Facility (Study Area) (see Figure 1). It reviews relevant conditions throughout the area and interprets trends and patterns of change as represented by several demographic and economic indicators. Potential impacts, including those to employment, earnings, and overall economic output resulting from the Facility, are then assessed considering the current socioeconomic conditions within the Study Area.<sup>1</sup>

The construction and operation of the Facility will have positive impacts throughout the local and statewide economy. Businesses involved in on-site Facility construction and operations, as well as those associated throughout the industrial supply chain, are expected to see a measurable increase in the demand for their services. In addition, the earnings by workers during construction and operation of the Facility are expected to generate additional spending, creating a "ripple effect" throughout the economy. The employment and economic impacts of the Facility were assessed using the Jobs and Economic Development Impact (JEDI) photovoltaics model (version PV12.23.16), a model established by the National Renewable Energy Laboratory (NREL), with results shown in Table ES-1. The JEDI model results show that Facility construction could increase on-site and off-site employment by an estimated 288 workers statewide, with total earnings of approximately \$18.5 million. The operation and maintenance of the installed Facility is estimated to increase on-site and off-site employment demand by an additional 20 workers statewide annually, with total annual earnings of approximately \$1.2 million. The total value of on-site and off-site industrial production and

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<sup>1</sup> Economic data used within this report reflect pre-COVID-19 conditions and therefore may not represent current economic conditions.

induced benefits in the statewide economy associated with Facility construction is estimated at \$28.0 million and at \$3.0 million annually during operation.

**Table ES-1. Summary of Estimated Results of Statewide Jobs and Economic Impact Analysis**

	<b>Jobs (FTE)</b>	<b>Earnings (Millions)</b>	<b>Output (Millions)</b>
<b>Construction</b>			
Project Development and On-site Labor Total	199	\$13.9	\$14.1
Construction & Installation Labor	194	\$13.5	-
Construction and Installation Related Services	5	\$0.4	-
Module & Supply Chain Impacts	48	\$2.5	\$7.4
Induced Impacts	42	\$2.2	\$6.5
<b>Total Impacts</b>	<b>288</b>	<b>\$18.5</b>	<b>\$28.0</b>
<b>Annual Operation</b>			
On-site Labor Impacts	5	\$0.4	\$0.4
Local Revenue & Supply Chain Impacts	4	\$0.2	\$0.7
Induced Impacts	11	\$0.7	\$2.0
<b>Total Impacts</b>	<b>20</b>	<b>\$1.2</b>	<b>\$3.0</b>

Source: NREL JEDI Model (version PV12.23.16) (USDOE NREL, 2016). Cost values verified by the Applicant in June 2020.

Notes: Earnings and Output values are millions of dollars in 2020 dollars. Construction and operating period jobs are full-time equivalent for one year (1 FTE = 2,080 hours). Impact totals and subtotals are independently rounded, and therefore may not add up directly to the integers shown in this table.

Furthermore, the Facility is anticipated to have a positive impact on local taxing jurisdictions, likely through a payment-in-lieu of tax agreement (PILOT) and other payments. Taxing jurisdictions located within the Study Area that receive various forms of payments include Greenfield Exempted Village School District, and Paint and Buckskin townships in Ross County. Assuming that a PILOT payment is implemented, it will be a positive revenue stream to municipalities and other local taxing jurisdictions. The PILOT amount is anticipated to total \$1,092,000 in the first year and continue annually for the lifespan of the Facility. The Facility will not impose significant additional burdens on municipal and school district services and thus will not increase the costs to the communities in the region.

This assessment shows that the construction and operation of the Facility will have positive economic impact on the communities within the Study Area. Through lease payments to private landowners, short- and long-term job creation, and payments to the taxing jurisdictions, the Facility will supply a revenue stream to these jurisdictions without requiring significant services or expenditures on their behalf.

## INTRODUCTION

This report reviews relevant socioeconomic conditions in the Study Area and interprets trends and patterns of change as represented by several demographic and economic indicators. Potential impacts to employment, earnings, and overall economic output from the Facility are then assessed considering the current socioeconomic conditions within the Study Area. When such comparison is informative, state and federal demographic and economic data also are included. Unless noted otherwise, the Study Area for this report includes the following communities, all of which are found wholly or partially within the Study Area: Madison, Paint, and Fairfield townships, and the Village of Greenfield, in Highland County; Perry and Wayne townships in Fayette County; and Paint, Paxton, and Buckskin townships, and the Village of South Salem, in Ross County.

Part I of this report presents a socioeconomic profile of the Study Area and the State of Ohio, including a demographic profile with specific data on population trends, projected population growth, and civilian labor force data. Part II reviews the types of potential impacts that could be experienced throughout the region, including those regarding housing demand, commercial and industrial employment, and transportation networks. Part III describes the methods of analysis of potential economic benefits provided within this report, including an overview of the JEDI Model. The results of the JEDI Model are presented in Part IV, which describes the jobs created by the construction and operation of the Facility, as well as a summary of payments to landowners as a result of land leases. Part V reviews the potential impacts of the Facility from the perspective of local taxing jurisdictions.

## PART I: SOCIOECONOMIC PROFILE

### 1. Population trends

As shown in Figure 1, the 5-Mile Study Area is almost equally divided between Ross and Highland counties, with a small portion in Fayette County. The Facility is located approximately 50 miles south of the Columbus metropolitan area. As indicated in Table 1, the counties within the region have grown slightly in recent years. At a local level, however, five of the nine jurisdictions within the 5-mile Study Area have decreased in population in the past 18 years, although Buckskin and Perry townships have experienced significant population increases.

**Table 1: Population**

Jurisdiction within a 5-Mile Radius of Facility	2000 Population	2018 Population	Annual Growth Rate (2000-2018)	Projected 2030 Population	Projected Total Growth (2018-2030)	2018 Population Density (people per square mile)
Fayette County	28,433	28,625	0.0%	28,754	0.5%	70
Highland County	40,875	43,007	0.3%	44,527	3.5%	77
Ross County	73,345	77,051	0.3%	79,687	3.4%	111
Buckskin Township	1,040	2,444	7.5%	5,821	138.2%	49
Madison Township	6,922	6,630	-0.2%	6,446	-2.8%	191
Paint Township (Highland County)	4,112	4,532	0.6%	4,850	7.0%	78
Paint Township (Ross County)	1,169	1,012	-0.7%	925	-8.6%	28
Paxton Township	2,165	2,078	-0.2%	2,023	-2.6%	66
Perry Township	945	1,758	4.8%	3,078	75.1%	61
Village of Greenfield	4,906	4,597	-0.3%	4,408	-4.1%	2,394
Village of South Salem	213	278	1.7%	340	22.4%	1,463
Wayne Township	1,367	908	-1.9%	724	-20.2%	20

Source: U.S. Census Bureau Decennial Census (2000), ACS 5-Year Estimates (2014-2018), population projections based on respective 2000-2018 growth rates.

County populations are expected to continue the overall trend of population increase over the next decade, ranging from 0.5% and 3.5% (see Table 1).

Although employment related to the construction of the Facility will be substantial, this employment is relatively short-term and is not expected to result in the permanent relocation of construction workers to the area; therefore, the Facility is not anticipated to generate significant population growth within the Study Area. The number of potential short- and long-term employment opportunities associated with the construction and operation of the Facility is discussed in further detail Part IV.

## 2. Employment statistics

Table 2 illustrates the size of the local labor force in counties within 5 miles of the proposed Facility, as well as the broader State of Ohio. Annual average unemployment rates have decreased both state-wide and county-wide from 2016 to 2018. The total annual unemployment rate for Fayette County and the State of Ohio has been relatively lower than that of Ross County and Highland County over these three years. Tables 3a, 3b, 3c, and 3d illustrate employment in Ohio and all counties within the 5-mile study area, broken down by sector for 2018 (most current data available).



**Table 2: Local Labor Force and Unemployment**

County	Labor Force	Employed	Un-employed	2016 Annual Unemployment Rate	2017 Annual Unemployment Rate	2018 Annual Unemployment Rate
Fayette County	13,374	12,543	797	6.9%	6.3%	6.0%
Highland County	18,896	17,659	1,237	9.6%	7.3%	6.5%
Ross County	31,357	30,398	2,490	9.9%	7.6%	7.6%
State of Ohio	5,901,307	5,549,577	343,232	7.2%	6.5%	5.8%

Note: Not Seasonally Adjusted, Source: U.S. Census Bureau, American Community Survey 5-Year Estimates 2016, 2017, and 2018.

**Table 3a: Employment and Payroll by NAICS Sector in Ohio**

NAICS code description	Number of full and part-time employees	First-quarter payroll (\$1,000)	Annual payroll (\$1,000)	Total establishments
Total for all sectors	4,878,062	59,680,589	236,239,178	251,937
Agriculture, forestry, fishing and hunting	1,237	9,423	44,310	298
Mining, quarrying, oil and gas extraction	11,103	193,697	821,035	692
Utilities	24,823	919,104	2,632,581	713
Construction	200,028	2,740,200	12,766,242	20,011
Manufacturing	683,660	10,036,853	39,419,978	13,888
Wholesale trade	233,741	3,847,963	15,097,713	13,483
Retail trade	557,095	3,688,063	15,001,013	34,906
Transportation and warehousing	191,804	2,395,700	9,816,586	7,835
Information	100,197	1,732,038	6,699,447	4,298
Finance and insurance	262,686	6,557,901	21,204,571	17,147
Real estate and rental and leasing	62,899	774,891	3,089,671	10,751
Professional, scientific, technical	257,936	4,551,316	18,599,123	23,777
Management of companies and enterprises	152,558	4,424,007	15,507,405	2,211
Administrative and support and waste management and remediation services	407,148	3,398,773	14,509,576	13,460
Educational services	114,420	873,457	3,487,279	3,093
Health care and social assistance	857,995	9,737,383	41,060,503	29,748
Arts, entertainment, and recreation	78,735	597,544	2,963,293	3,910
Accommodation and food services	478,811	1,782,025	7,661,289	24,324
Other services (except public admin.)	200,881	1,419,092	5,851,182	27,179
Industries not classified	305	1,159	6,381	213

Note: The Annual Economic Census data shown in this table is based on a sampling frame of selected establishments obtained from the U.S. Census Bureau's Business Register. Meanwhile the American Community Survey data shown in Table 2 is based on a sampling frame of housing unit addresses and resident group quarters facilities. (x)=data unavailable. Source: U.S. Census Bureau, Annual Economic Surveys 2018.

**Table 3b: Employment and Payroll by NAICS Sector in Fayette County**

<b>NAICS code description</b>	<b>Number of full and part-time employees</b>	<b>First-quarter payroll (\$1,000)</b>	<b>Annual payroll (\$1,000)</b>	<b>Total establishments</b>
Total for all sectors	10,136	84,207	336,450	589
Agriculture, forestry, fishing and hunting	(x)	(x)	(x)	(x)
Mining, quarrying, oil and gas extraction	(x)	(x)	(x)	(x)
Utilities	11	268	890	3
Construction	252	3,440	17,740	44
Manufacturing	1,827	21,795	85,506	28
Wholesale trade	581	9,903	31,952	32
Retail trade	2,635	12,840	52,625	170
Transportation and warehousing	316	3,015	12,472	22
Information	45	568	2,235	11
Finance and insurance	144	1,997	7,646	35
Real estate and rental and leasing	51	357	1,535	14
Professional, scientific, technical	71	487	2,143	18
Management of companies and enterprises	919	11,556	45,103	7
Administrative and support and waste management and remediation services	496	2,156	9,916	26
Educational services	(x)	(x)	(x)	(x)
Health care and social assistance	1,132	9,946	41,032	47
Arts, entertainment, and recreation	132	396	1,695	8
Accommodation and food services	1,215	3,886	17,481	64
Other services (except public admin.)	295	1,434	5,790	57
Industries not classified	(x)	(x)	(x)	(x)

Note: The Annual Economic Census data shown in this table is based on a sampling frame of selected establishments obtained from the U.S. Census Bureau's Business Register. Meanwhile the American Community Survey data shown in Table 2 is based on a sampling frame of housing unit addresses and resident group quarters facilities. (x)=data unavailable. Source: U.S. Census Bureau, Annual Economic Surveys 2018.

**Table 3c: Employment and Payroll by NAICS Sector in Highland County**

NAICS code description	Number of full and part-time employees	First-quarter payroll (\$1,000)	Annual payroll (\$1,000)	Total establishments
Total for all sectors	9,360	82,552	330,743	661
Agriculture, forestry, fishing and hunting	(x)	(x)	(x)	(x)
Mining, quarrying, oil and gas extraction	25	270	1,559	3
Utilities	72	1,193	4,810	5
Construction	249	2,080	10,884	65
Manufacturing	1,998	22,900	98,828	28
Wholesale trade	167	1,512	5,264	17
Retail trade	1,624	9,863	39,261	130
Transportation and warehousing	170	1,670	7,528	23
Information	59	597	2,151	8
Finance and insurance	607	17,075	53,514	45
Real estate and rental and leasing	67	492	1,968	23
Professional, scientific, technical	113	801	3,162	31
Management of companies and enterprises	(x)	(x)	(x)	(x)
Administrative and support and waste management and remediation services	928	3,976	19,286	27
Educational services	53	166	680	4
Health care and social assistance	1,738	14,516	57,441	98
Arts, entertainment, and recreation	158	537	2,449	14
Accommodation and food services	931	2,631	11,808	55
Other services (except public admin.)	380	1,705	7,468	82
Industries not classified	(x)	(x)	(x)	(x)

Note: The Annual Economic Census data shown in this table is based on a sampling frame of selected establishments obtained from the U.S. Census Bureau's Business Register. Meanwhile the American Community Survey data shown in Table 2 is based on a sampling frame of housing unit addresses and resident group quarters facilities. (x)=data unavailable. Source: U.S. Census Bureau, Annual Economic Surveys 2018.

**Table 3d: Employment and Payroll by NAICS Sector in Ross County**

NAICS code description	Number of full and part-time employees	First-quarter payroll (\$1,000)	Annual payroll (\$1,000)	Total establishments
Total for all sectors	23,528	274,377	1,127,157	1,218
Agriculture, forestry, fishing and hunting	45	211	892	10
Mining, quarrying, and oil and gas extraction	10	172	975	4
Utilities	128	2,815	9,691	9
Construction	678	6,531	33,835	100
Manufacturing	4,070	73,215	288,902	32
Wholesale trade	555	7,302	30,171	50
Retail trade	3,977	24,442	98,000	246
Transportation and warehousing	1,009	10,482	44,137	51
Information	322	4,209	17,874	16
Finance and insurance	478	5,965	22,963	73
Real estate and rental and leasing	196	1,181	5,220	45
Professional, scientific, and technical services	421	3,690	15,166	60
Management of companies and enterprises	155	2,406	9,213	11
Administrative and support and waste management and remediation services	1,080	9,577	40,260	55
Educational services	171	1,571	6,769	7
Health care and social assistance	6,529	104,390	432,292	166
Arts, entertainment, and recreation	183	567	3,194	19
Accommodation and food services	2,601	9,486	40,966	121
Other services (except public administration)	920	6,165	26,637	143
Industries not classified	(x)	(x)	(x)	(x)

Note: The Annual Economic Census data shown in this table is based on a sampling frame of selected establishments obtained from the U.S. Census Bureau's Business Register. Meanwhile the American Community Survey data shown in Table 2 is based on a sampling frame of housing unit addresses and resident group quarters facilities. (x)=data unavailable. Source: U.S. Census Bureau, Annual Economic Surveys 2018.

Anticipated employment impacts of the Facility are outlined in Table ES-1. Employment related to the construction of the Facility will be relatively short-term and is not expected to result in permanent impacts to statewide or regional industrial sectors. Permanent jobs related to operations and maintenance of the Facility include on-site labor and indirect jobs created through local revenue, supply chains, and induced impacts. While these permanent positions will have positive impacts throughout the regional economy, the level of job creation is not anticipated to be significant when compared with current regional employment and payroll by industry sector (e.g., administrative services or

accommodation/food services). Therefore, the Facility is not anticipated to have a significant impact on statewide or regional industrial sectors. The short- and long-term employment opportunities associated with the construction and operation of the Facility are discussed in further detail Part IV.

Although not represented by the 2018 U.S. Census data in Table 3, the agricultural sector plays a substantial role in both the state and regional economy. 2017 data from the USDA National Agricultural Statistics Service indicates that there were 128,686 agricultural producers and 77,805 agricultural operations in the State of Ohio. At a regional level, USDA NASS shows 780 agricultural producers and 491 total agricultural operations in Fayette County, 2,183 agricultural producers and 1,254 total agricultural operations in Highland County, and 1,827 agricultural producers and 1,121 total agricultural operations in Ross County. Long-term land lease payments from the Project will provide added income for host landowners, enabling them to potentially supplement existing agricultural operations.

## **PART II: REGIONAL DEVELOPMENT IMPACTS**

The regional economy surrounding the Study Area is shaped in large part by both the rural economy of Fayette, Highland, and Ross counties and the manufacturing economy of the greater Columbus metropolitan region. As a primarily agricultural economy in proximity to one of the strongest manufacturing hubs in the U.S., this area has made substantial progress toward stabilization and growth as it continued to emerge from the recession in the 2010s.<sup>2</sup> The regional context for the development of this Facility is discussed in further detail below in terms of three primary components: housing, commercial and industrial development, and transportation. In addition, the compatibility of the proposed Facility with regional developmental goals and plans is reviewed.

### **1. Housing**

Table 4 below summarizes housing characteristics in the State of Ohio and the communities within the Study Area.

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<sup>2</sup> It is noted, however, that economic data used within this report reflect pre-COVID-19 conditions and therefore may not represent current economic conditions.

**Table 4: Study Area Housing Characteristics**

Jurisdiction	Total housing units	Occupied units	Vacant units	Vacancy rate (%)		Median value (owner-occupied)	Median gross rent	Households with gross rent > 35% of household income
				Home-owner	Rental			
State of Ohio	5,188,270	4,653,075	534,195	1.6	5.6	\$140,000	\$788	37.3%
Fayette County	12,760	11,736	1,024	0.9	0.9	\$112,700	\$715	32.1%
Highland County	19,326	16,646	2,680	1.7	2.1	\$111,700	\$680	37.6%
Ross County	32,073	28,747	3,326	1.4	3.6	\$120,900	\$727	40.0%
Buckskin Township	876	829	47	0.5	0.0	\$136,600	\$573	48.8%
Madison Township	3,134	2,776	358	2.3	0.0	\$94,300	\$608	38.1%
Paint Township (Highland)	2,190	1,602	588	3.3	0.0	\$78,100	\$763	40.2%
Paint Township (Ross)	608	441	167	0.0	0.0	\$124,800	\$647	0.0%
Paxton Township	888	794	94	1.0	0.0	\$95,800	\$577	46.8%
Perry Township	612	586	26	0.0	0.0	\$157,700	\$707	69.4%
Village of Greenfield	2,275	1,989	286	0.9	0.0	\$83,100	\$611	39.2%
Village of South Salem	110	106	4	5.3	0.0	\$69,000	\$704	44.0%
Wayne Township	486	404	82	0.0	0.0	\$145,000	\$702	13.3%

Source: U.S. Census Bureau, American Community Survey 5-Year Estimates 2014-2018.

The Study Area features a diverse array of housing options. Within the Study Area, all three counties have relatively similar median housing values as well as median gross rent values, which are notably lower than the State of Ohio. At a local scale, Buckskin Township, Perry Township, and Wayne Township have the highest median housing values, higher than that of the State of Ohio. Notably, while having a high owner-occupied median home value, Buckskin Township also has the lowest median gross rent and the highest percentage of households paying greater than 35% of household income on rent compared to all the other jurisdictions in the Study Area. More than 7,030 housing units within the counties are reported to be currently vacant, 1,652 of which occur within the Study Area communities. Given these figures, it is not expected that the development of the Facility will have a significant impact on the regional housing market. While the Facility development may not represent a widespread boom for rental property owners, it is worth noting that the availability of vacant rental housing throughout the Study Area indicates that the Facility should not have a destabilizing effect on current renters.

## 2. Commercial and Industrial Development

The diversification of Ohio's energy generation portfolio will have significant and positive economic impacts. At both regional and national levels, the State is noted to have a relatively high capacity for both distributed and utility-scale

solar photovoltaic systems. In a recent report, the Environmental Law & Policy Center (ELPC) found that Ohio had the second-highest solar capacity in the Midwest region, at 119 MW at the time of the report (ELPC, 2016). At a national level, The Solar Foundation ranked Ohio 30th in the U.S. for installed solar capacity (The Solar Foundation, 2019). Furthermore, there is tremendous capacity for growth due to an established manufacturing base and trained workforce, central location and reliable transportation infrastructure, and a diverse array of research centers and technical advisory services (ELPC, 2016).

The Environmental Law & Policy Center estimated that the State of Ohio is currently home to 207 solar power supply chain businesses, including many component and equipment manufacturers (ELPC, 2016). Many of the state's plastic and glass manufacturers have taken advantage of the growing demand for solar by becoming suppliers for these components and equipment. The 2019 Solar Jobs Census reports that Ohio ranks in the top seven states for solar jobs, with 7,282 workers in the solar industry (a 1.7% increase over 2018). Most of these jobs (57%) were for installation, while the remainder were for manufacturing (28%), wholesale trade distribution (10%), operations and maintenance (3%), and other fields (3%). Since 2018, jobs in the field of installation and operations have increased, while jobs in the manufacturing and distribution fields have decreased slightly (The Solar Foundation, 2019). Although the rate of job growth in Ohio's solar industry is beginning to plateau (solar jobs increased by 21.2% in 2016, 11.8% in 2017, 10.5% in 2018, and 1.7% in 2019), the steady and continued solar industry growth reflects the industry's stable foothold in the state. Given the pandemic-led economic disruption underway at the time of submission of this Application, additional employment in the solar industry sector may be especially welcome.

The state's current energy generation portfolio aims for an 8.5% overall renewable energy component by 2026. With the recent increases in its PV capacity, Ohio is on a path to achieving this target. Specific short- and long-term economic impacts of this Facility on commercial and industrial development throughout the region are described in further detail in Part V of this report.

### **3. Transportation**

The region surrounding the Facility features U.S. and Ohio highways, county and local roadway networks, rail lines, and small airports. These facilities are described in more detail below.

The primary transportation routes near the Facility are State Route (SR) 41, which runs north-south along the east border of the Facility, and a series of county and local roads that intersect the Facility. Delivery routes have not been finalized, but it is likely that the delivery of Facility components to the Project Area will be from the north by way of U.S. Route (US) 35 to SR 75 then SR 41. An alternate route from the south could also be utilized by way of US 50 to SR 41. Once at the Project Area, county and township roads will be utilized. The proposed Facility is not expected to cause any substantial disruption to major transportation corridors serving the Study Area, as most solar photovoltaic

components and equipment are relatively small and require only relatively low impact means of transport. For more information about roads, see the Route Evaluation Study, included with the Application.

One freight rail line operated by Indiana & Ohio Central Railroad runs through the Study Area. The rail line runs east-west and bisects the eastern part of the Study Area, through the Village of Greenfield. There is also a second freight rail line operated by CSX Transportation, which has significant operations across North America. This rail line runs north-south along the east edge of the Village of Greenfield within the Study Area. No municipalities in the Study Area appear to be connected to the CSX Transportation line and the rail system is not anticipated be used for the transportation of any Facility components.

#### **4. Local and Regional Plans**

The proposed site for the Facility is in Buckskin and Paint townships, Ross County, Ohio. The surrounding 5-mile Study Area is comprised of land of three counties (Ross, Highland, and Fayette), eight townships (Buckskin, Paint, Madison, Fairfield, Paint, Wayne, Paxton, and Perry), and two villages (South Salem and Greenfield). The only available planning document adopted by the Ross County Planning Commission is the Ross County/City of Chillicothe Thoroughfare Plan Update (most recently amended in 2012). This plan's goals and recommendations apply to the City of Chillicothe and its surrounding area, well outside of the Study Area for this Facility. No other planning document was found for Ross County or its jurisdictions, which includes Paxton, Paint, and Buckskin townships and the Village of South Salem. Highland County does not have formal planning documents available; however, the Highland County Community Action Organization, Inc (HCCAO) issued a Needs Assessment for this county, which includes Paint, Fairfield, and Madison townships, as well as the Village of Greenfield. Fayette County currently holds the 2016 enVISION Fayette County Plan as the main planning document. No plans were found for Perry and Wayne townships, located within Fayette County. Descriptions of existing plans from jurisdictions within the 5-Mile Study Area and their compatibility with the Facility are described as follows.

- 2016 enVISION Fayette County Plan: The 2016 enVISION Fayette County Plan serves as a revised and updated document of the 2006 Fayette County Comprehensive Land Use Strategy Plan. The five major themes discussed in this plan are People, Place, Prosperity, Partnerships, and Implementation. The prosperity vision promotes economic development activities and supports renewable energy projects in the area. As stated in the Plan, the "vision for Fayette County is to become a sustainable rural community by embracing practices that balance the importance of the natural environment with the need for growth and economic development" (p. 80). The Facility is compatible with this vision through its opportunity for economic development and sustainable practices like renewable energy production near the county.
- 2019 Highland County Community Needs Assessment: This document was prepared by the Highland County Community Action Organization, Inc (HCCAO), a private, non-profit corporation established in 1965 (HCCAO, n.d.). This needs assessment mostly focuses on the county's population needs and recognizes the necessity



of economic development in the area. Even though Highland County's land is mostly dedicated to farming, and holds valuable natural amenities, one of the top needs listed in the document includes economic development and increased access to jobs. The Facility is compatible with the recommendations of this needs assessment, as it is expected to benefit the local economy and provide job opportunities for surrounding communities, while providing agricultural viability and natural resource protection.

## **5. Concurrent or Secondary Uses**

The Applicant has no plans for concurrent or secondary use of the Facility, other than potentially entering into a grazing agreement if a willing landowner is found. Grazing primarily would be used as a vegetation management technique. See the Vegetation Management Plan submitted with the Application for more detail.

# **PART III: MEASURING ECONOMIC IMPACTS**

## **1. Calculating Economic Benefits**

Quantifying the economic impacts of the proposed Ross County Solar Project is essential to understanding the potential benefits that the Facility could have on the statewide (i.e., local) economy. Solar power development, like other commercial development projects, can expand the local economy through both direct and indirect means. Income generated from direct employment during the construction and operation of the Facility will subsequently be used to purchase local goods and services, creating a ripple effect throughout the local economy. This report analyzes three levels of impact that the proposed Facility may have on the statewide economy:

- **On-site labor impacts:** These are the direct impacts experienced by the companies/individuals residing in Ohio engaged in the construction and operation of the Facility. This value estimates the dollars spent on labor and professional services by project developers, consultants, and construction contractors, as well as on operation and maintenance (O&M) personnel. On-site labor impacts do not reflect material expenditures.
- **Module and supply chain impacts:** These impacts measure the estimated increase in demand for goods and services in industry sectors that supply or otherwise support the companies engaged in construction and operation (also known as "backward-linked" industries). These measures account for the demand for goods and services such as project components, project analysis, legal services, financing, and insurance.
- **Induced impacts:** Induced impacts measure the estimated effect of increased household income resulting from the Facility. Induced impacts reflect the reinvestment of earned wages, as measured throughout the first two levels of economic impact. This reinvestment can occur throughout the economy in a variety of sectors, such as on household goods, entertainment, food, clothing, and transportation.

Each of these three categories can be measured in terms of three indicators: jobs (as expressed through the increase in employment demand), the amount of money earned through those jobs, and the overall economic output associated with each level of economic impact. These indicators are described in further detail below:

- **Jobs:** Jobs refer to the increase in employment demand as a result of the development of the Facility. These positions are measured across each level of impact, such that they capture the estimated number of jobs on site, in supporting industries, and in the businesses that benefit from household spending. For the purposes of this analysis, this term refers to the total number of year-long full-time equivalent (FTE) positions created by the Facility. Persons employed for less than full time or less than a full year are included in this total, each representing a fraction of an FTE position (e.g., a half-time, year-round position is 0.5 FTE).
- **Earnings:** This measures the wages and salary compensation paid to the employees described above.
- **Output:** Output refers to the value of industry production in the state or local economy, across all appropriate sectors, associated with each level of impact. For the manufacturing sector, output is calculated by total sales plus or minus changes in inventory. For the retail sector, output is equal to gross profit margin. For the service sector, it is equal to sales volume. For example, output would include the profits incurred by those businesses that sell electrical transmission cable or motor vehicle fuel for use in the Facility.

## 2. Methodology

The employment and economic impacts of the Facility were assessed using the Jobs and Economic Development Impact (JEDI) photovoltaics model (version PV12.23.16). The JEDI model was created by the National Renewable Energy Laboratory (NREL)—a government-owned, contractor-operated laboratory funded by the U.S. Department of Energy (USDOE)—to assess the economic impacts of proposed solar energy generating facilities during both the construction and operation phases (USDOE NREL, 2020). This model allows users to estimate jobs, earnings, and economic output by impact level (described below) using facility-specific data provided by the Applicant (such as year of construction, size of project, module type, and location) and geographically defined multipliers. These multipliers are produced by IMPLAN Group, LLC using a software/database system called IMPLAN (Impact analysis for PLANning), a widely-used and widely-accepted general input-output modeling software and data system that tracks each unique industry group in every level of the regional data (IMPLAN Group, 2019). The most currently available IMPLAN multipliers (2018) for the State of Ohio were used during the time of analysis (September 2020).

Using the JEDI model to calculate the number of jobs and economic output from a proposed facility is a two-step process. The first step requires facility-specific data inputs. For purposes of the JEDI model, the Applicant has assumed the following facility-specific inputs:

- Project Location: State of Ohio
- Year of Construction: 2022

- System Application: Utility-Scale
- Capacity: 156 MW<sub>DC</sub>, 120 MW<sub>AC</sub>
- Module Material: Crystalline Silicon
- System Tracking: Single Axis
- Base Installed System Cost: \$1,000/kW<sub>DC</sub>
- Annual direct Operations and Maintenance Cost: \$4.00/kW
- Money Value (Dollar Year): 2020

Using this Facility-specific data, the JEDI model then creates a list of default values, which include project cost values, default tax values, default lease payment values, and default local share of spending values. These default values are derived from 10 years of research by NREL, and stem from various sources, including interviews and surveys of leading project owners, developers, engineering and design firms, and construction firms active in the solar energy sector.

The second step of the JEDI model methodology requires the review, and if warranted, the customization of default project cost values to more reasonable estimates. The Applicant reviewed the default project cost values and statewide shares subtotaled by each of the following categories in the JEDI model: Materials and Equipment during Installation (i.e., Construction), Labor during Installation (i.e., Construction), Other Costs during Installation (e.g., permitting and overhead during Construction), Labor during Operation & Maintenance (O&M), Materials and Services during Operation & Maintenance, Debt Financing, Tax Parameters, Payroll Parameters. The Applicant's team then made specific adjustments to improve accuracy (see Table 5).

<BEGIN CONFIDENTIAL INFORMATION>

Table 5: Adjustments Made to JEDI Model Cost Inputs

Facility Expenditure Categories			
Construction Materials & Equipment Costs			
Construction Labor Total Costs			
Construction - Other Costs			
Construction Materials and Equipment Sales Tax			
Operating/Maintenance Labor Costs			
Operating/Maintenance Materials and Services			
Operating/Maintenance Materials/Equip. Sales Tax			
Local Property Tax Payments			
Payroll Parameters Construction Worker Hourly Wage			
Payroll Parameters O&M Technician Hourly Wage			
Payroll Parameters Construction Worker Employer Overhead			
Payroll Parameters O&M Technician Employer Overhead			

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2017); Cost values verified by the Applicant in June 2020.

<END CONFIDENTIAL INFORMATION>

a. Capital and Intangible Costs

In addition to the aforementioned construction costs specified as inputs for the JEDI analysis, the Applicant is presenting additional capital and intangible cost details for the purposes of responding to the Application requirements.

i. Estimated Capital and Intangible Costs by Alternative

The total estimated capital and intangible costs of the Facility are <BEGIN CONFIDENTIAL INFORMATION> <END CONFIDENTIAL INFORMATION>. As described in Section 4906-4-04 of the Application, the Applicant has not proposed alternative project areas. Therefore, no cost comparison between alternatives is available.

ii. Cost Comparison with Similar Facilities

Installed project costs compiled by the U.S. Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Laboratory) in December 2019 indicate that the capital costs of the Facility are in line with recent industry trends. The Berkeley Laboratory compilation shows that capacity-weighted average installed costs in 2018 averaged roughly \$1,640/kW<sub>AC</sub> (Bolinger, Seel, & Robson, 2019).

These costs are slightly higher than the cost estimated for the Facility, which could be attributed to locational and system size differences. The estimated cost of the Facility is not anticipated to substantially differ from other Facilities completed by the Applicant.

iii. Present Worth and Annualized Capital Costs

Capital costs will include development costs, construction design and planning, equipment costs, and construction costs. The costs will be incurred within a year or two of start of construction. Therefore, a present worth analysis is essentially the same as the costs presented above **<BEGIN CONFIDENTIAL INFORMATION>[REDACTED]<END CONFIDENTIAL INFORMATION>**. As alternative project areas and facilities were not considered in this Application, the capital cost information in this section is limited to the proposed Facility.

b. Operation and Maintenance Expenses

In addition to the aforementioned operation and maintenance costs specified as inputs for the JEDI analysis, the Applicant is presenting additional O&M cost details for the purposes of responding to the Application requirements.

i. Estimated Annual Operation and Maintenance Expenses

For the first two years of commercial operation, staffing is estimated to be **<BEGIN CONFIDENTIAL INFORMATION>[REDACTED]<END CONFIDENTIAL INFORMATION>**. O&M costs are estimated at **<BEGIN CONFIDENTIAL INFORMATION>[REDACTED]<END CONFIDENTIAL INFORMATION>**, including staffing costs.

ii. Operation and Maintenance Cost Comparisons

O&M costs are a significant component of the overall cost of solar projects but can vary widely between facilities. The Berkeley Laboratory has compiled O&M cost data for 48 installed utility-scale solar power projects in the United States, totaling 900 MW<sub>AC</sub> of capacity, with commercial operation dates of 2011 through 2018. In general, facilities installed more recently have incurred lower O&M costs than those installed in 2011. Specifically, capacity-weighted average O&M costs for projects constructed in 2011 equal \$32/kW<sub>AC</sub>-year. The O&M costs dropped to around \$16/kW<sub>AC</sub>-year for projects installed in 2015, and to \$19/kW<sub>AC</sub>-year for projects installed in the 2018 (Bolinger, Seel, & Robson, 2019).

The O&M costs for the Facility are estimated to be approximately **<BEGIN CONFIDENTIAL INFORMATION>[REDACTED]<END CONFIDENTIAL INFORMATION>**, depending on the maturity of the project each year of its life cycle. These estimated O&M costs exclude all other ongoing expenses related to environmental monitoring, property taxes, land royalties, reverse power, and insurance. These costs will be

consistent with the average costs compiled by the Berkeley Laboratory, as described above. The O&M costs for the Facility are not anticipated to be significantly different from other facilities the Applicant operates.

iii. Present Worth and Annualized Operation and Maintenance

The annual O&M costs will be subject to inflationary increases. These costs are expected to increase with inflation after the first two years. The net present value of the O&M costs per kW, assuming a 30-year Facility life, and inflation rate of 2% and a 6% discount rate, is approximately **<BEGIN CONFIDENTIAL INFORMATION>[REDACTED]<END CONFIDENTIAL INFORMATION>**. As alternative project areas and facilities were not considered in this Application, the O&M cost information in this section is limited to the Facility.

## PART IV: ECONOMIC IMPACT ON THE LOCAL ECONOMY

The results of the socioeconomic analysis are illustrated in Table 6 below and summarized in the narrative that follows. The results shown in Table 6 describe the potential impact of the Facility on industries throughout the state, including the direct labor impacts that occur specifically within the local economy.

**Table 6: Local Economic Impacts**

	<b>Jobs (FTE)</b>	<b>Earnings (Millions)</b>	<b>Output (Millions)</b>
<b>Construction</b>			
Project Development and On-site Labor Total	199	\$13.9	\$14.1
Construction & Installation Labor	194	\$13.5	-
Construction and Installation Related Services	5	\$0.4	-
Module & Supply Chain Impacts	48	\$2.5	\$7.4
Induced Impacts	42	\$2.2	\$6.5
<b>Total Impacts</b>	<b>288</b>	<b>\$18.5</b>	<b>\$28.0</b>
<b>Annual Operation</b>			
On-site Labor Impacts	5	\$0.4	\$0.4
Local Revenue & Supply Chain Impacts	4	\$0.2	\$0.7
Induced Impacts	11	\$0.7	\$2.0
<b>Total Impacts</b>	<b>20</b>	<b>\$1.2</b>	<b>\$3.0</b>

Source: NREL JEDI Model (version PV12.23.16) (USDOE NREL, 2016). Cost values verified by the Applicant in June 2020

Notes: Earnings and Output values are millions of dollars in 2020 dollars. Construction and operating period jobs are full-time equivalent for one year (1 FTE = 2,080 hours). Impact totals and subtotals are independently rounded, and therefore may not add up directly to the integers shown in this table.

### **1. New Jobs in the Local Economy**

Demand for new jobs associated with the Ross County Solar Project will be created during both construction and operation. The money injected into the statewide economy through the creation of these jobs will have long-term, positive impacts on individuals and businesses in Ohio as it ripples through the economy.

### **2. Local Economic Impact: Construction Phase**

Based upon JEDI model computations, it is anticipated that construction of the proposed Facility could directly generate employment of an estimated 199 on-site construction and project development personnel FTE positions with an average wage rate of \$23 per hour and 45.6% employer payroll overhead. Module and supply chain industries could in turn generate an additional 48 jobs over the course of Facility construction. In addition, Facility construction could induce demand for 42 jobs through the spending of additional household income. The total impact of 288 new jobs could result in up to approximately \$18.5 million in earnings, assuming a 2022 construction start and wage rates consistent with statewide and nationwide averages. Nationally, the estimated national wage rate for solar photovoltaic installers is \$22.12 per hour (U.S. Bureau of Labor Statistics, 2018) and statewide, labor wages range from approximately \$22 per hour for all installation, maintenance and repair operations to approximately \$50 per hour for construction management occupations (Ohio Bureau of Labor Statistics, 2018). Local employment could primarily benefit those in the construction trades, including laborers and electricians. Facility construction will also require workers with specialized skills, such as panel assemblers, specialized excavators, and high voltage electrical workers. It is anticipated that many of the highly specialized workers will come from outside the immediate area and will remain only for the duration of construction.

In addition to jobs and earnings, the construction of the Facility is expected to have a positive impact on economic output, a measurement of the value of goods and services produced and sold by backward-linked industries. As described in the definition above, output provides a general measurement of the amount of profit earned by manufacturers, retailers, and service providers connected to a given project. The value of economic output associated with construction of the Facility is estimated to be \$28.0 million. Between workers' additional household income and industries' increased production, the impacts associated with the Facility are likely to be experienced throughout many different sectors of the statewide economy.

### **3. Local Economic Impact: Operations and Management Phase**

Based upon JEDI model computations, the O&M of the proposed Facility is estimated to generate five direct FTE jobs with estimated annual earnings of approximately \$0.4 million. Wage rates for the direct operational employees are projected to be \$24.00 per hour with 45.6% employer payroll overhead, consistent with Ohio state averages estimated to be approximately \$22 per hour for installation, maintenance, and repair occupations (Ohio Bureau of Labor Statistics, 2018).

Operations and maintenance of the Facility also should generate new jobs in other sectors of the economy through supply chain impacts and the expenditure of new and/or increased household earnings. Increased employment demand throughout the supply chain is estimated to result in approximately four jobs with annual earnings of approximately \$0.2 million. In addition, it is estimated that 11 jobs with associated annual earnings of \$0.7 million will be induced through the increased household spending associated with earnings related to Facility operations. These impacts may include restaurant, hospitality, and other tourism-derived local spending from employees and visitors to the Facility. In total, while in operation, the Facility is estimated to generate demand for 20 FTE jobs with annual earnings of approximately \$1.2 million. Total annual economic output is estimated to increase by \$3.0 million as a result of Facility operations and maintenance.

#### **4. Land Lease Payments**

Operation of the Facility will result in payment to local landowners in association with the lease agreements executed to host Facility components. These annual lease and easement payments will offer direct benefits to participating landowners, which will be in addition to any income generated from the surrounding land use (e.g., agricultural production). The Applicant estimates that these payments will total approximately \$20.4 million over 25 years. These lease payments will have a positive impact on the region, to the extent that landowners will spend their revenue locally.

## **PART V: LOCAL TAX REVENUES**

### **1. Legislative Context**

Solar energy projects in the State of Ohio can be exempted from tangible personal property and real property tax payments if they meet certain conditions. These conditions are enumerated in Section 5727.75 of the Ohio Revised Code (ORC). Operators of these exempted projects, known as qualified energy projects (QEP), are instead required to make annual payments in lieu of taxes (PILOT). To be certified as a QEP by the State, a project must meet all of the following criteria:

- an application for certification of the energy project as a QEP that complies with the requirements under Section 5727.75 of the ORC and Chapter 122:23-1 of the Ohio Administrative Code (OAC) must be submitted to the director of the Ohio Development Services Agency (ODSA) on or before December 31, 2022;
- an application under Section 4906.20 of the ORC must be submitted to the Ohio Power Siting Board (OPSB) on or before December 31, 2022;
- the county commissioners of the county in which property of the project is located must have adopted a resolution approving the application submitted to ODSA or the county commissioners must pass a resolution declaring the county an alternative energy zone (AEZ);
- construction (defined as either the date the application for a certificate is filed with OPSB or the date the contract for construction or installation is entered, whichever is earlier) must begin by December 31, 2022.



If an applicant is granted exemption from taxation for any of the tax years 2011 through 2023, the QEP will be exempt from taxation for tax year 2024 and all ensuing years, as long as the property is placed into service before January 1, 2024. The amount of PILOT to be paid annually to the county treasurer is assessed per megawatt (MW) of nameplate capacity, with the rate of \$7,000/MW. County commissioners may require an additional service payment, if the total of the additional payment and the PILOT do not exceed \$9,000 per MW.

## **2. Estimated Payments In Lieu Of Taxes**

The model assumed that the applicant would execute a payment-in-lieu of tax agreement (PILOT), which would require annual PILOT payments to Ross County. These funds would then be apportioned to the Greenfield Exempted Village School District, and Paint and Buckskin townships in Ross County. The maximum payment of \$9,000 per MW was assumed. Based on the maximum Facility capacity of 120 MW<sub>AC</sub>, the PILOT amount will total approximately \$1,080,000 annually for the lifespan of the Facility. The Facility is expected to achieve commercial operations as early as 2022 and have a lifespan of approximately 30 years.

## **CONCLUSION**

The socioeconomic effects of the Facility, when assessed considering state economic trends, will have a positive impact on the communities within the Study Area. Lease payments, short- and long-term job creation, and PILOT revenues will benefit private landowners, businesses, and taxing jurisdictions. The Facility is not expected to generate significant expenditures on behalf of these beneficiaries; therefore, it will have a positive impact on the social and economic conditions of these communities, as summarized below.

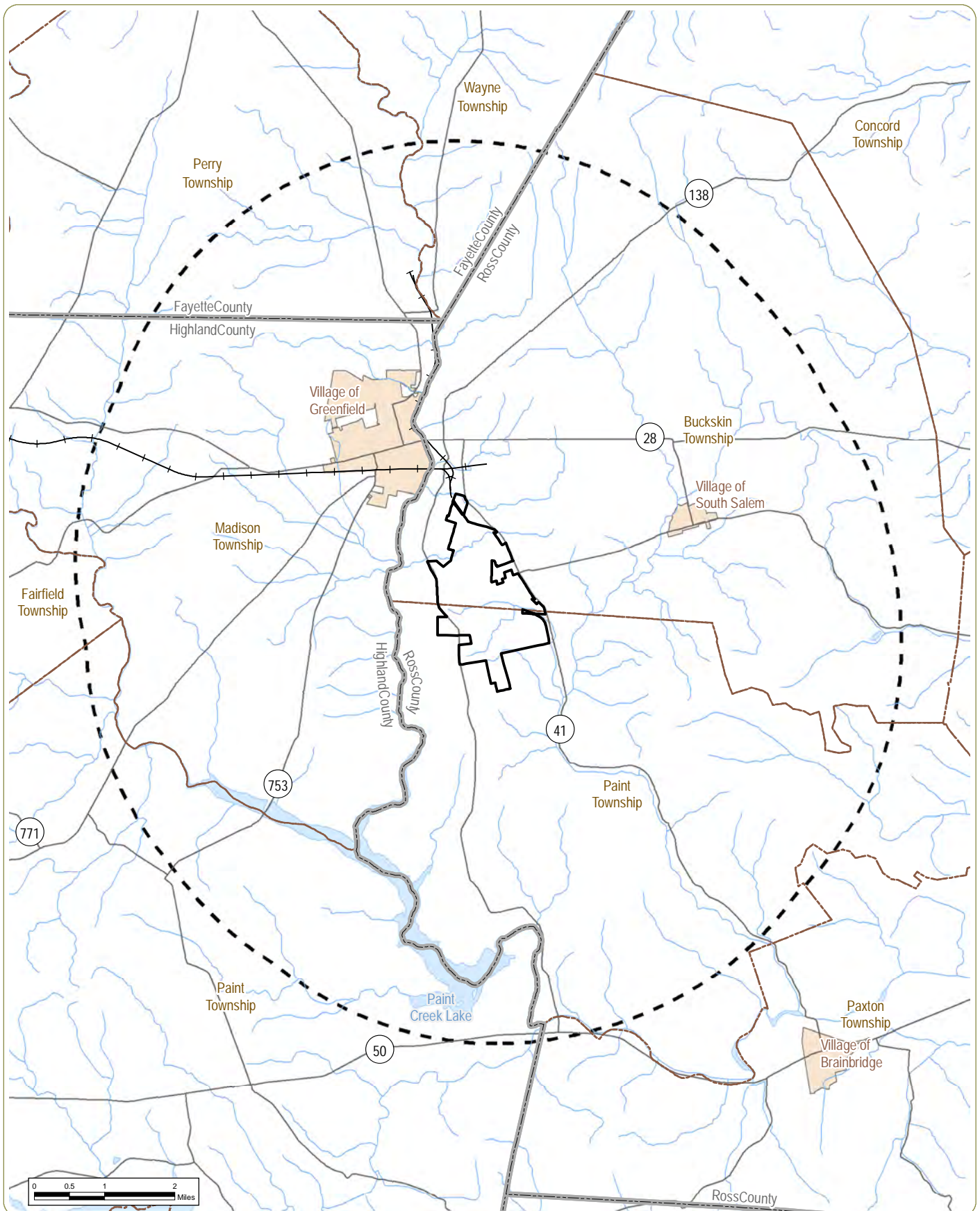
1. **Total Local Economic Benefit:** The construction of the Facility is expected to produce an estimated \$18.5 million in employment earnings and \$28.0 million in total economic output. Subsequently, each year the Facility is operational it is expected to generate approximately \$1.2 million in earnings and \$3.0 million in total economic output.
2. **Local Employment Benefits:** During the construction period, the Facility is expected to support demand for a total estimate of 288 on-site, supply chain, and induced employment positions. It is expected to support an estimated total of 20 positions during each year of its operation.
3. **Land Lease Revenues:** The development of the Facility will result in approximately \$20.4 million in total lease payments made to participating landowners over 25 years.
4. **Property Tax Revenues:** Construction of the proposed Facility will increase local government revenues. PILOT revenues could amount to approximately \$1,080,000 per year to be distributed to local taxing jurisdictions.

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## FIGURES



## Ross County Solar

### Buckskin and Paint Townships, Ross County, Ohio

#### Figure 1: 5-Mile Study Area

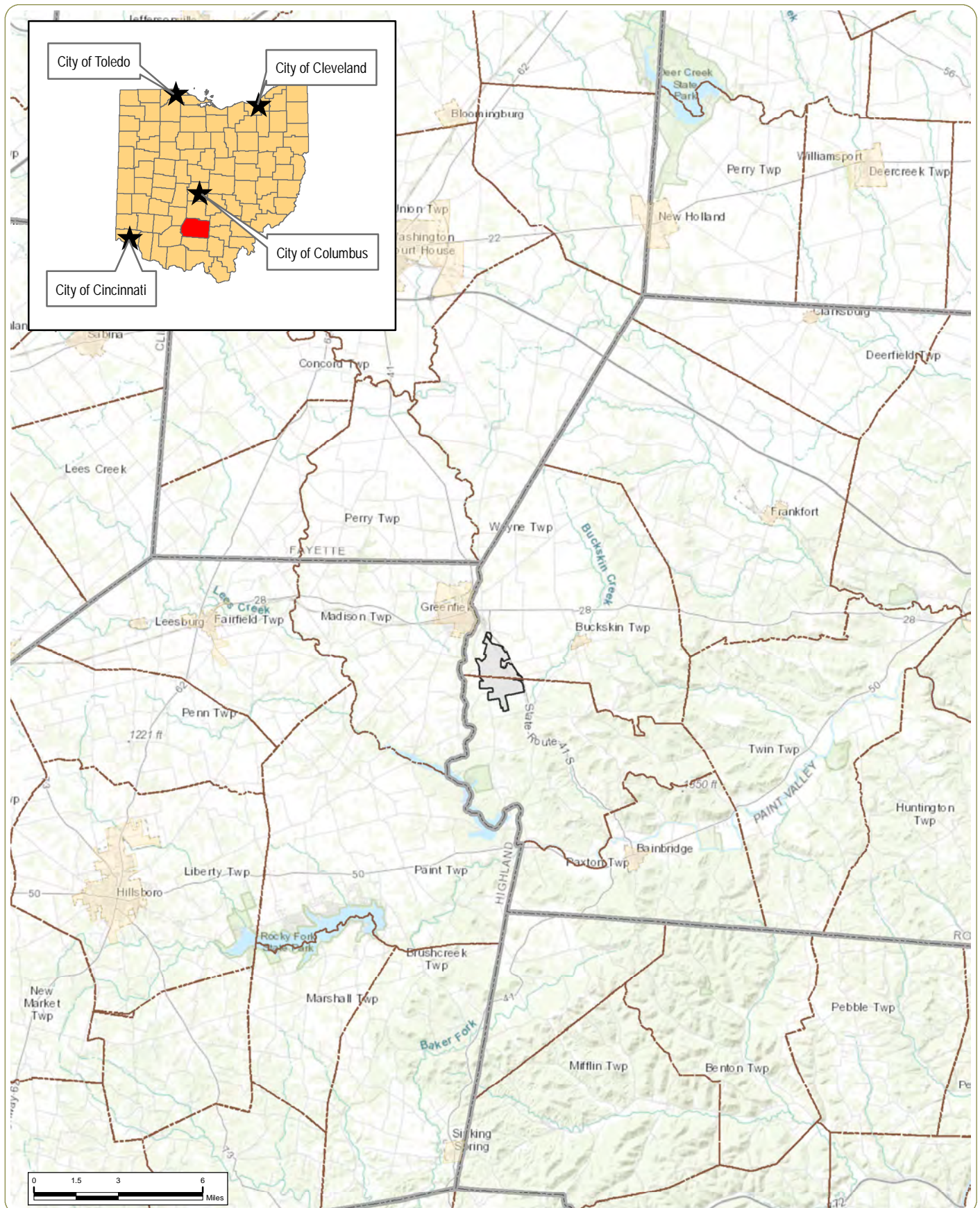
**Notes:** 1. Basemap: Esri StreetMap North America, 2008. 2. This map was generated in ArcMap on October 20, 2020. 3. Project area provided by Ross County Solar, LLC. 4. Map created by Environmental Design and Research on behalf of Ross County Solar, LLC. 5. This is a color graphic. Reproduction in grayscale may misrepresent the data. 6. Map Scale: 1:120,000.

- Major Road
- + Railroad
- Rivers
- Lakes
- Project Area
- - - 5-Mile Study Area
- City/Village Boundary
- - - Township Boundary
- - - County Boundary



[nationalgridrenewables.com/ross-county](http://nationalgridrenewables.com/ross-county)









## Ross County Solar

### Buckskin and Paint Townships, Ross County, Ohio Figure 2: Regional Facility Location

**Notes:** 1. Basemap: Esri ArcGIS Online "World Topographic Map" map service. 2. This map was generated in ArcMap on October 20, 2020. 3. Project Area provided by Ross County Solar, LLC. 4. Map created by Environmental Design and Research on behalf of Ross County Solar, LLC. 5. This is a color graphic. Reproduction in grayscale may misrepresent the data. 6. Map Scale: 1:300,000.

-  City/Village Boundary
-  County Boundary
-  Township Boundary
-  Project Area



**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**10/30/2020 3:58:34 PM**

**in**

**Case No(s). 20-1380-EL-BGN**

Summary: Application Application Exhibit K (redacted) electronically filed by Mr. Michael J. Settineri on behalf of Ross County Solar, LLC