

**Mohawk Solar**

**Case No. 17-F-0182**

**1001.27 Exhibit 27**

**Socioeconomic Effects**

**REDACTED**

## Table of Contents

EXHIBIT 27	SOCIOECONOMIC EFFECTS .....	1
(a)	Construction Workforce.....	7
(b)	Construction Payroll .....	8
(c)	Secondary Employment and Economic Activity Generated by Facility Construction .....	10
(d)	Workforce, Payroll, and Expenditures during Facility Operation .....	11
(e)	Secondary Employment and Economic Activity Generated by Facility Operation .....	12
(f)	Incremental School District Operating and Infrastructure Costs .....	12
(g)	Incremental Municipal, Public Authority, or Utility Operating and Infrastructure Costs .....	13
(h)	Jurisdictions that Will Collect Taxes or Benefits .....	14
(i)	Incremental Amount of Annual Taxes or Payments .....	14
(j)	Comparison of Incremental Costs and Incremental Benefits .....	16
(k)	Equipment or Training Deficiencies in Local Emergency Response Capacity .....	16
(l)	Effects on Property Values.....	16
(m)	Consistency with State Smart Growth Public Infrastructure Criteria .....	18

## List of Tables

Table 27-1.	Demographic Information.....	1
Table 27-2.	Adjustments Made to JEDI Model Cost Inputs.....	5
Table 27-3.	Estimate of Annual Direct Non-Payroll Expenditures during Construction.....	5
Table 27-4.	Estimate of Annual Direct Non-Payroll Expenditures during Operation .....	6
Table 27-5.	Summary of Estimated Results of Statewide Jobs and Economic Impact Analysis.....	6
Table 27-6.	Summary of Estimated Results of Countywide Jobs and Economic Impact Analysis.....	7
Table 27-7.	Estimated Quarterly Statewide Labor Averages .....	8
Table 27-8.	Estimated Quarterly Countywide Labor Averages .....	8
Table 27-9.	Estimated Annual Earnings by Trade Statewide During Construction Period (in \$ Millions).....	9
Table 27-10.	Estimated Annual Earnings by Trade Countywide During Construction Period (in \$ Millions).....	10
Table 27-11.	Estimated Annual and Total PILOT Amounts .....	15
Table 27-12.	Other Estimated Local Payments.....	15

## EXHIBIT 27 SOCIOECONOMIC EFFECTS

A Socioeconomic Report has been prepared that quantifies the potential countywide and statewide socioeconomic impacts of the Facility based on current socioeconomic conditions of the area (see Appendix 27-A). The Facility is located within the Towns of Canajoharie and Minden in Montgomery County. Information regarding population, educational attainment and race within the town is summarized in Table 27-1.

**Table 27-1. Demographic Information**

<i>Population</i>	<i>Canajoharie</i>	<i>Minden</i>
Population (2013-2017ACS 5-Year Estimate)	3,637	4,175
Median Age	37.2	41.4
<i>Educational attainment</i>		
% high school graduate or higher	88.3%	78.6%
Total housing units	1,595	1,985
Median household income	\$50,031	\$41,278
Foreign born population	2.3%	2%
Individuals below poverty level	21.1%	21.1%
Veterans	224	214
<i>Race and Hispanic Origin</i>		
White alone	3,547	4,058
Black or African American alone	148	85
American Indian and Alaska Native alone	11	9
Asian alone	46	119
Native Hawaiian & other Pacific Islander	0	0
Some other race	10	20
Two or more races	121	94
Hispanic or Latino (of any race)	113	61
Not Hispanic or Latino	3,524	4,114

<sup>1</sup> All data from the 2013-2017 American Community Survey 5-Year Estimates

The proposed Mohawk Solar Facility is anticipated to have local and statewide economic benefits. Solar power development, like other commercial development projects, can expand the local, regional, and statewide economies through both direct and indirect means. Income generated from direct employment during the construction and operation phases of the solar is used to purchase local goods and services, creating a ripple effect throughout the state and county. The employment and economic impacts of the Facility were assessed using the Job and Economic Impact (JEDI) solar model (version PV12.23.16r). Applying input assumptions of varying levels of confidence, the JEDI model

allows users to estimate the jobs and economic development impacts from solar power generation projects for both the construction and operation phases (USDOE NREL, 2017). These economic development impacts, categorized by the levels of impact and indicators described in Appendix A, include onsite jobs and earnings, economic output from these onsite earnings, PV panel/local revenue/supply chain jobs and earnings, economic output from these PV panel/local revenue/supply chain earnings, induced jobs and earnings, and economic output from these induced jobs and earnings. It calculates the aforementioned indicators for each level of impact using project-specific data provided by the Applicant 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, 2015).

This report analyzes three levels of impact that the proposed Facility may have on the economy:

- **On-site labor impacts:** These are the direct impacts experienced by the companies/individuals residing in New York and Montgomery County engaged in the onsite construction and operation of the Facility. These values represent expenditure of dollars on labor (wages, salaries and associated expenses) by Facility onsite construction personnel as well as operation and maintenance (O&M) personnel. On-site labor impacts do not reflect material expenditures. Most other input-output models consider this level as “direct impacts”, referring to changes in jobs, economic activity and earnings associated with the immediate impacts created by the investment, which would include the equipment and materials installed onsite. However, the immediate economic impacts of the physical items used onsite, normally included in direct impacts, typically occur at some geographic distance from the project itself. Because of JEDI's focus on the local impacts of a Facility, only the labor associated with the on-site location of the Facility (Construction, Construction-Related Services and Onsite Labor during Operational Years) is counted at this level.
- **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 PV panel components, project analysis, legal services, financing, insurance, etc. Most other input-output models consider this level as “indirect impacts”, referring to economic impacts associated with linked sectors in the economy that are upstream of the direct impacts, such as suppliers of hardware used to make the equipment and materials installed. However, because of JEDI's focus on the local impacts of the Facility, labor for components of this Facility (e.g. PV panel manufacturers) occurring at off-site locations is also counted in this level as a module and supply chain impact.

- **Induced impacts:** Induced impacts measure the estimated effect of increased household spending resulting from the project. Induced impacts reflect the reinvestment of earned wages, as measured throughout the first two levels of economic impact. This reinvestment can occur anywhere throughout the local, regional, or state economy on household goods, entertainment, food, clothing, transportation, etc.

Each of these three levels of impact can be estimated 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:

- **Jobs:** Jobs refer to the increase in employment demand because of facility development. These positions are measured across each level of impact, so 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 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 line, concrete, or motor vehicle fuel to the Applicant.

Calculating the number of jobs and economic output from a proposed facility using the JEDI model is a two-step process. The first step requires facility-specific data inputs (such as year of construction, size of facility, PV panel size and location). For purposes of the JEDI model, the Applicant has assumed the following inputs:

- Project Location: Montgomery County and New York
- Year of Construction: 2020-2021
- System Application: Utility-Scale
- Cell/Module Material: Crystalline silicon
- System Tracking: Single Axis Tracking (SAT)
- Average System Size: 125 000kW DC
- Number of Systems Installed: 1
- Total Project Size: 125,000kW DC

- Money Value (Dollar Year): 2018

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, statewide shares, and countywide 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 then determined whether they were appropriate for the project under review. In this case, the Applicant reviewed the default values for the various categories in the JEDI model to determine whether they were on par with the real costs as experienced by the Applicant's team of development and financial experts. As a result of that review, adjustments were made to specific default values (see Table 27.2). The remaining cost values were unknown at the time of analysis (April 2019); therefore, after the remaining JEDI default values were reviewed, the Applicant determined them to be reasonable estimates based on previous experience in solar energy development. Note that although the Applicant originally estimated a lower estimate of construction workers in the NYSEDA application, the analysis presented here is based on more precise estimates using current budget estimates.

It is also noted that the analysis of secondary employment and economic activity does not consider other related impacts, such as the economic impact associated with the cancellation of new power plants made unnecessary by the added solar capacity of the project and the economic impacts associated with possible changes in the price of electricity due to the Project. Such an analysis is more appropriately performed by the Commission or Department of Public Service staff, given that those impacts will result from State policies and the Clean Energy Standard, regardless of which specific renewable energy facilities are ultimately constructed. Moreover, a recent study identified that one of the most significant drivers of the closure of fossil fuel plants is the price of electricity, particularly the low price of natural gas, and regulation of the energy sector, not the development of renewable energy projects (US Department of Energy 2017). The largest number of recent fossil fuel plant retirements occurred in 2015, and corresponded with the deadline for coal and oil plants to implement pollution control equipment for mercury and air toxics, finalization of the Clean Power Plan, and "strong signals of future regulation," while the primary drivers of nuclear plant closures, aside from market conditions, were state policies/conflicts between states and nuclear generators, as well as looming significant plant maintenance issues). Furthermore, even if this analysis was not speculative in terms of "cancellation"

of projects, it is beyond the capabilities, control or responsibility of any individual developer to assess the overall economic impact of State energy policy on the energy system. It is Applicant's understanding that economic analyses of these scales of impact were performed in conjunction with adoption of the CES.

**Table 27-2. Adjustments Made to JEDI Model Cost Inputs**

Project Expenditure Categories	JEDI Default Value	Adjusted Value	Change
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	\$ [REDACTED]	\$ [REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] %	[REDACTED] %	[REDACTED]

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018); Cost values verified by the Applicant in April 2019.

Estimated non-payroll expenditures estimated to be made both within New York and within Montgomery County are listed in Table 27-3 (Construction Period) and Table 27-4 (Operation and Maintenance Period).

**Table 27-3. Estimate of Annual Direct Non-Payroll Expenditures during Construction**

Construction / Installation Expenditure Categories	Project Expenditures	State Share	Statewide Expenditures	County Share	County Expenditures
[REDACTED]					
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]					\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]
[REDACTED]	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]	[REDACTED] %	\$ [REDACTED]

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018); Cost values verified by the Applicant in April 2019.

**Table 27-4. Estimate of Annual Direct Non-Payroll Expenditures during Operation**

Operation & Maintenance Expenditure Categories	Project Expenditures	State Share	Statewide Expenditures	County Share	Countywide Expenditures
	\$	%	\$	%	\$
	\$	%	\$	%	\$
	\$	%	\$	%	\$
	\$	%	\$	%	\$

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018); Cost values verified by the Applicant in April 2019.

The analysis presented here used the most currently available multiplier data specific to New York (2016) and specific to Montgomery County (2016) to estimate potential impacts on a statewide and countywide basis. The results of this analysis, estimated for both the construction and operation phases of the proposed Facility, are presented in Tables 27-5 and 27-6 and described in the narrative that follows.

**Table 27-5. Summary of Estimated Results of Statewide Jobs and Economic Impact Analysis**

	Jobs	Earnings (Millions)	Output (Millions)
<b>Construction</b>			
Project Development and Onsite Labor Total	369	\$	\$
Construction & Interconnection Labor	295	\$	-
Construction-Related Services	74	\$	-
Module & Supply Chain Impacts	112	\$	\$
Induced Impacts	95	\$	\$
<b>Total Impacts</b>	<b>576</b>	<b>\$</b>	<b>\$</b>
<b>Annual Operation</b>			
Onsite Labor Impacts	3	\$	\$
Module & Supply Chain Impacts	1	\$	\$
Induced Impacts	3	\$	\$
<b>Total Impacts</b>	<b>7</b>	<b>\$</b>	<b>\$</b>

Notes: Earnings and Output values are millions of dollars in 2018 dollars. Totals may not add up due to independent rounding.

Source: NREL JEDI Model (version PV12.23.16r) (USDOE NREL, 2017); Cost values verified by the Applicant in April 2019.



**Table 27-6. Summary of Estimated Results of Countywide Jobs and Economic Impact Analysis**

	<b>Jobs</b>	<b>Earnings (Millions)</b>	<b>Output (Millions)</b>
<b>Construction</b>			
Project Development and Onsite Labor Total	106	\$ [REDACTED]	\$ [REDACTED]
Construction & Interconnection Labor	59	\$ [REDACTED]	-
Construction-Related Services	47	\$ [REDACTED]	-
Module & Supply Chain Impacts	45	\$ [REDACTED]	\$ [REDACTED]
Induced Impacts	21	\$ [REDACTED]	\$ [REDACTED]
<b>Total Impacts</b>	<b>172</b>	<b>\$ [REDACTED]</b>	<b>\$ [REDACTED]</b>
<b>Annual Operation</b>			
Onsite Labor Impacts	1	\$ [REDACTED]	\$ [REDACTED]
Module & Supply Chain Impacts	1	\$ [REDACTED]	\$ [REDACTED]
Induced Impacts	2	\$ [REDACTED]	\$ [REDACTED]
<b>Total Impacts</b>	<b>3</b>	<b>\$ [REDACTED]</b>	<b>\$ [REDACTED]</b>

Notes: Earnings and Output values are millions of dollars in 2018 dollars. Totals may not add up due to independent rounding.  
 Source: NREL JEDI Model (version PV12.23.16r) (USDOE NREL, 2017); Cost values verified by the Applicant in April 2019.

(a) Construction Workforce

Based upon JEDI model computations, it is anticipated that construction of the proposed Facility (estimated to last approximately 8 months) will generate employment of an estimated 369 FTE onsite Project Development and Onsite Labor positions for New York residents, 295 of which will be for Construction and Interconnection Labor and 74 of which will be Construction-Related Services (engineers and other professional services). At the county level, the Facility is estimated to generate employment of an estimated 106 FTE onsite Project Development and Onsite Labor positions for County residents, 59 of which will be for Construction and Interconnection labor and 47 will be Construction-Related Services.

The Applicant’s construction management team has further evaluated the estimated peak job numbers to be 590 FTE statewide construction jobs and 118 FTE countywide construction jobs. Furthermore, the following estimated distribution of average work force, by discipline, for each quarter during the construction year 2021 are summarized in Tables 27-7 and 27-8.

**Table 27-7. Estimated Quarterly Statewide Labor Averages**

Quarterly Period	Construction and Interconnection Labor Quarterly Average FTE Jobs	Construction-Related Services (Engineers and Other Professional Services) Quarterly Average FTE Jobs
Q1 (Jan-Mar)	49	12
Q2 (Apr-Jun)	344	87
Q3 (Jul-Sep)	590	149
Q4 (Oct-Dec)	197	50

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018), Evaluation by Applicant’s Construction Management Team in May 2019

**Table 27-8. Estimated Quarterly Countywide Labor Averages**

Quarterly Period	Construction and Interconnection Labor Quarterly Average FTE Jobs	Construction-Related Services (Engineers and Other Professional Services) Quarterly Average FTE Jobs
Q1 (Jan-Mar)	10	8
Q2 (Apr-Jun)	69	55
Q3 (Jul-Sep)	118	94
Q4 (Oct-Dec)	39	31

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018), Evaluation by Applicant’s Construction Management Team in May 2019

(b) Construction Payroll

The JEDI model estimates a total of \$ [REDACTED] million for annual earnings of the 369 onsite construction jobs for New York residents; \$ [REDACTED] million of which is the estimated for annual earnings of the 106 onsite construction jobs for Montgomery County residents. These estimates of the annual construction earnings by trade are listed in Tables 27-9 and 27-10. Estimated earnings represent total wages and salary compensation paid to New York and Montgomery County employees (i.e., wages plus [REDACTED]% average annual overhead costs including SSI, Medicare, workers’ compensation, and disability). Project Development and Onsite Labor earnings are realized by New York and Montgomery County residents who are engaged in the construction of the Facility, including the Construction, Engineering and Professional Services trades. Local Revenue, and Supply Chain earnings are estimated for New York and Montgomery County residents based on the increased demand for goods and services in industry sectors that supply or otherwise support the companies engaged in construction and operation (known as “backward-linked industries”). Induced earnings reflect the estimated increase in household spending by onsite employees due to an increase in their earnings, which is subsequently used to purchase local goods and services, creating a ripple effect throughout the Montgomery County and State.

**Table 27-9. Estimated Annual Earnings by Trade Statewide During Construction Period (in \$ Millions)**

	Project Development and Onsite Labor Earnings	Module & Supply Chain Earnings	Induced Earnings
Ag, Forestry, Fish & Hunting	–	\$0.0	\$0.0
Mining	\$0.0	\$0.0	\$0.0
Construction	\$0.0	\$0.0	\$0.0
Construction/Installations – Non-Residential	\$█	\$█	\$█
Construction/Installation Residential	\$0.0	\$0.0	\$0.0
Manufacturing	\$0.0	\$0.0	\$0.0
Fabricated Metals	\$0.0	\$0.0	\$0.0
Machinery	\$0.0	\$0.0	\$0.0
Electrical Equip	\$0.0	\$0.0	\$0.0
Battery Manufacturing	\$0.0	\$0.0	\$0.0
Energy Wire Manufacturing	\$0.0	\$0.0	\$0.0
Wholesale Trade	\$0.0	\$█	\$█
Retail trade	\$0.0	\$█	\$0.0
Transport., Communication & Utilities	\$0.0	\$█	\$0.0
Insurance and Real Estate	\$0.0	\$0.0	\$0.0
Finance	\$0.0	\$0.0	\$0.0
Other Professional Services	\$0.0	\$0.0	\$0.0
Office Services	\$█	\$█	\$█
Architectural and Engineering Services	\$█	\$█	\$█
Other services	\$0.0	\$█	\$█
Government	\$0.0	\$█	\$█
Semiconductor (solar cell/module) manufacturing	\$0.0	\$0.0	\$0.0
<b>Total</b>	\$█	\$█	\$█

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018);

Note: Earnings are independently rounded, and therefore may not add up directly to the integers shown in this table.

**Table 27-10. Estimated Annual Earnings by Trade Countywide During Construction Period (in \$ Millions)**

	Project Development and Onsite Labor Earnings	Module & Supply Chain Earnings	Induced Earnings
Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.0
Mining	\$0.0	\$0.0	\$0.0
Construction	\$0.0	\$0.0	\$0.0
Construction/Installations – Non-Residential	\$█	\$█	\$█
Construction/Installation Residential	\$0.0	\$0.0	\$0.0
Manufacturing	\$0.0	\$0.0	\$0.0
Fabricated Metals	\$0.0	\$0.0	\$0.0
Machinery	\$0.0	\$0.0	\$0.0
Electrical Equip	\$0.0	\$0.0	\$0.0
Battery Manufacturing	\$0.0	\$0.0	\$0.0
Energy Wire Manufacturing	\$0.0	\$0.0	\$0.0
Wholesale Trade	\$0.0	\$█	\$0.0
Retail trade	\$0.0	\$0.0	\$0.0
Transport., Communication & Utilities	\$0.0	\$0.0	\$0.0
Insurance and Real Estate	\$0.0	\$0.0	\$0.0
Finance	\$0.0	\$0.0	\$0.0
Other Professional Services	\$0.0	\$0.0	\$0.0
Office Services	\$█	\$█	\$█
Architectural and Engineering Services	\$█	\$█	\$█
Other services	\$0.0	\$█	\$█
Government	\$0.0	\$█	\$█
Semiconductor (solar cell/module) manufacturing	\$0.0	\$0.0	\$0.0
<b>Total</b>	\$█	\$█	\$█

Source: Jobs and Economic Development Impact Model (USDOE NREL, 2018)

Note: Earnings are independently rounded, and therefore may not add up directly to the integers shown in this table.

(c) Secondary Employment and Economic Activity Generated by Facility Construction

As estimated by the JEDI model, solar facility manufacturing and supply chain industries could in turn generate an additional 112 jobs (with a total \$█ million in earnings) in New York and 45 jobs (with a total \$█ million in earnings) in Montgomery County over the course of Facility construction. In addition, Facility construction could induce demand for 95 jobs (with a total \$█ million in earnings) statewide and 21 jobs (with a total \$█ million in earnings) countywide through the spending of additional household income. The total estimated impact of 576 new jobs statewide during construction could result in up to \$█ million of earnings, assuming a 2021 construction schedule and wage rates consistent with statewide averages. Montgomery County residents are estimated to obtain 172 of those construction jobs, resulting in up to \$█ million of earnings countywide. Facility construction labor wages are comparable to similar positions within New York, which average approximately \$26 per hour for installation,

maintenance and repair occupations (U.S. Department of Labor Bureau of Labor Statistics, 2019). Local, regional, and statewide employment during the construction phase will primarily benefit those in the construction trades, including equipment operators, truck drivers, laborers, and electricians. Facility construction will also require workers with specialized skills, such as crane operators, solar energy facility assemblers, specialized excavators, and high voltage electrical workers. It is anticipated that many of the highly-specialized workers will come from outside the 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 statewide 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 Facility construction is estimated to be \$[REDACTED] million statewide and \$[REDACTED] million countywide. Between workers' additional household income and industries' increased production, the impacts associated with the Facility are likely to be experienced throughout many different sectors and regions of the statewide economy.

(d) Workforce, Payroll, and Expenditures during Facility Operation

Based upon JEDI model computations, the operation and maintenance of the proposed Facility is estimated to generate three full-time jobs for New York residents with combined estimated annual earnings of approximately \$[REDACTED] million. Montgomery County residents are anticipated to hold one of these onsite operational jobs, with total anticipated earning yielding \$[REDACTED] million. These three positions have been verified as reasonable by the Applicant based on actual job numbers at other facilities and are anticipated to be comprised of technician positions. Projected wage rates are anticipated to be consistent with the higher statewide averages for renewable energy service technicians, which are estimated to be approximately \$78,000 per year (U.S. Department of Labor Bureau of Labor Statistics, 2019). According to the Applicant's construction management team, wages for the three operational staff members will average approximately \$[REDACTED]/hour or \$[REDACTED] per year. These three full-time local jobs generated by the solar energy facility comprise the Facility's onsite long-term employment impact.

Operation and maintenance should also generate new jobs in other sectors of the statewide economy through secondary employment, consisting of supply chain and local revenue impacts and the expenditure of new and/or increased household earnings. In total, while in operation, the Facility is estimated to generate a secondary employment demand of four jobs statewide with annual earnings of approximately \$[REDACTED] million and two jobs countywide with annual earnings of approximately \$[REDACTED] million. This secondary employment is estimated to have an economic output of \$[REDACTED] million annually statewide and \$[REDACTED] million annually countywide. Total economic output is projected to increase by an

estimated \$[REDACTED] million statewide and \$[REDACTED] million countywide as a result of Facility operation and maintenance (see Tables 27-5 and 27-6).

In addition to the economic benefits of Facility-related jobs, operation of the Facility also will result in payment to local landowners in association with the lease and easement agreements executed to host Facility components. These annual lease and easement payments will offer direct benefits to participating landowners, in addition to any income generated from the existing underlying land use (e.g., agricultural and timber production). As indicated above, the Applicant has estimated these payments to be \$600,000 annually. These lease and easement payments will have a positive impact on the region to the extent that landowners spend their revenue locally.

Thus, the local economy will experience a positive increase in jobs, earnings, and local economic activity that will last during the operational years of the Facility.

(e) Secondary Employment and Economic Activity Generated by Facility Operation

Operation and maintenance should also generate new jobs in other sectors of the statewide economy through secondary employment, consisting of local revenue, and supply chain impacts and the expenditure of new and/or increased household earnings. In total, while in operation, the Facility is estimated to generate a secondary employment demand of 4 jobs statewide with annual earnings of approximately \$[REDACTED] and 3 jobs countywide with annual earnings of approximately \$[REDACTED]. This secondary employment is estimated to have an economic output of \$[REDACTED] million annually statewide and \$[REDACTED] million annually countywide. Total economic output is projected to increase by an estimated \$[REDACTED] million statewide and \$[REDACTED] million countywide as a result of Facility operation and maintenance (see Tables 27-5 and 27-6).

(f) Incremental School District Operating and Infrastructure Costs

The Facility is not expected to result in any additional operating or infrastructure costs to the local school districts. Although it's possible that some of the long-term Facility operation employees may have school-aged children, increases in school district services and expenditures would likely be recovered through those employees' property tax payments and the respective district's state aid. Moreover, the affected school districts will receive a considerable share of the PILOT Agreement payments. These payments will more than offset any possible increase in expenses incurred by the districts because of Facility employee children entering the school district.

(g) Incremental Municipal, Public Authority, or Utility Operating and Infrastructure Costs

Local Public Expenditures and Tax Revenues

The Mohawk Solar Facility will place little, if any, demand on municipal services and so will have virtually no impact on municipal expenses. As a preliminary matter, solar facilities do not require municipal water, sewer, or solid waste disposal services.

With respect to police services, as part of its Application, the Applicant has committed to developing and implementing security measures, including security lighting, fencing, locked gates, signage and other measures designed to restrict site access and deter trespassers during construction and operation of the Facility. The Applicant also will implement an emergency action plan that includes measures for responding to various emergencies, including those that could potentially involve the police. These measures, taken together, will limit the need for the Facility to utilize municipal police services.

With respect to fire, in the unlikely event that municipal fire services are utilized, the annual revenues from the Facility's fire district taxes to the Town of Minden's Fire District will be available to cover any costs.

With respect to emergency medical response, local emergency medical services may be called upon to respond to medical emergencies common to construction and/or operational projects generally. In the event of any situation involving a medical, natural, or security emergency, Project staff and/or subcontractors will call 911 and inform local first responders. First responders will evaluate the situation and help facilitate the correct courses of action. However, given the small number of employees required to operate and maintain the Facility, the potential financial burden on a particular town of providing such services is expected to be comparatively small.

Although transportation of major Facility components during construction could potentially impact certain roadways, the Applicant will address/mitigate these impacts in accordance with Road Use Agreements that will be entered into with the towns and Montgomery County. These agreements will require the Applicant to restore any roadways impacted by the transportation of Facility components during construction and operation of the Facility. By virtue of these agreements, the towns in which the Facility is located will not incur any additional highway maintenance costs related to the Facility other than normal wear and tear associated with the use of non-oversized/overweight vehicles required to transport workers and equipment to and from the Facility Site for operation and maintenance purposes.

More generally, some solar employees may elect to live in the towns in which the Facility is located. However, the impact of these employees and their facilities on town services are expected to be negligible. Moreover, any marginal increase in services is expected to be recovered through the employees' property tax payments.

(h) Jurisdictions that Will Collect Taxes or Benefits

The Facility is anticipated to result in economic benefits for the following taxing jurisdictions:

- Montgomery County
- Town of Canajoharie
- Town of Minden
- Canajoharie Central School District
- Fort Plain Central School District

(i) Incremental Amount of Annual Taxes or Payments

In exchange for a partial real property tax exemption, the Applicant expects to execute a PILOT Agreement, which will require annual PILOT payments to each taxing jurisdiction identified in Table 27-11 for the next 15 years and other payments. Taxing jurisdictions receiving various forms of payments include Canajoharie and Fort Plain Central School Districts, Montgomery County, Towns of Minden and Canajoharie, and the Minden Fire District. Although the terms of the PILOT Agreement have not been finalized, similar to other solar projects in New York, the Applicant plans to enter into a PILOT to total \$300,000 per year accumulating up to \$5.2 million over 15 years. The total amount will be distributed across five taxing jurisdictions.

The Applicant plans to execute PILOTs with the following taxing jurisdiction: the Towns of Minden and Canajoharie; the Fort Plain and Canajoharie Central School Districts; and Montgomery County. Table 27-11 summarizes the estimated PILOT payments projected to be made to each taxing jurisdiction, based on the Applicant's internal estimates using each municipality's share of combined tax rates and the share of the Facility's nameplate capacity in individual jurisdictions.



**Table 27-11. Estimated Annual and Total PILOT Amounts<sup>1</sup>**

Taxing Jurisdictions Receiving PILOTs	Estimated Annual Installed Capacity (MWac) within Jurisdiction <sup>2</sup>	Annual PILOT Estimate	15-Year PILOT Estimate
Town of Minden	23.36	\$ [REDACTED]	\$ [REDACTED]
Town of Canajoharie	67.14	\$ [REDACTED]	\$ [REDACTED]
Fort Plain Central School District	27.81	\$ [REDACTED]	\$ [REDACTED]
Canajoharie Central School District	62.69	\$ [REDACTED]	\$ [REDACTED]
Montgomery County	90.5	\$ [REDACTED]	\$ [REDACTED]
<b>Facility Total</b>	<b>90.5</b>	<b>\$300,000</b>	<b>\$5,188,025</b>

As reflected in Table 27-11, over the span of the 15-year PILOT Agreement, an estimated total of \$5,188,025 will be paid to the local taxing jurisdictions. Upon expiration of the PILOT Agreement, tax payments will be dependent upon the value of the Facility’s taxable assets at that time. Aside from the PILOT Payments, local taxing jurisdictions will also receive additional tax payments on an annual basis, as estimated in Table 27-12 per the Applicant’s internal estimates based on each municipality’s share of combined tax rates and the share of the Facility’s nameplate capacity in individual jurisdictions. Aside from the PILOT Payments, local taxing jurisdictions will also receive additional tax payments on an annual basis, as estimated in Table 27-12 per the Applicant’s internal estimates

**Table 27-12. Other Estimated Local Payments<sup>3</sup>**

Taxing Jurisdictions	Estimated Interconnection Switchyard Annual Payment	Estimated Annual Real Property Change of Use Payment	Estimated Annual Fire District Payment	15-Year Total <sup>4</sup>
Town of Minden		\$ [REDACTED]	--	\$ [REDACTED]
Town of Canajoharie	\$ [REDACTED]	\$ [REDACTED]	--	\$ [REDACTED]
Fort Plain Central School District		\$ [REDACTED]	--	\$ [REDACTED]
Canajoharie Central School District	\$ [REDACTED]	\$ [REDACTED]	--	\$ [REDACTED]
Montgomery County	\$ [REDACTED]	\$ [REDACTED]	--	\$ [REDACTED]
Minden Fire District	--	--	\$ [REDACTED]	\$ [REDACTED]
<b>Facility Total</b>	<b>\$75,000</b>	<b>\$30,000</b>	<b>\$15,000</b>	<b>\$2,055,210</b>

In addition to the annual payments over the 15-year span of the PILOT Agreement, each of the five taxing jurisdictions receiving PILOT payments will receive a one-time land use change fee totaling \$162,000 across all taxing jurisdiction. Please note that individual payments are preliminary estimates only, as the exact allocation across project parcels is not certain at this point. Preliminary estimates by taxing jurisdiction include the following:

<sup>1</sup> All values in this table are independently rounded, and therefore may not directly add up to the totals shown. All calculations utilized unrounded values.

<sup>2</sup> Annual nameplate capacity within jurisdictions is calculated by aggregating the installed capacity per parcel within each jurisdiction.

<sup>3</sup> All estimated values in this table are independently rounded, and therefore may not directly add up to the totals shown. All calculations utilized unrounded values.

<sup>4</sup> 15-Year Total assumes two percent (2%) annual inflation.

- Town of Minden: \$ [REDACTED]
- Town of Canajoharie: \$ [REDACTED]
- Fort Plain Central School District: \$ [REDACTED]
- Canajoharie Central School District: \$ [REDACTED]
- Montgomery County: \$ [REDACTED]

These estimates suggest that the construction and operation of the Mohawk Solar Facility will have a positive impact throughout the statewide and countywide economy through the provision of employment, spending of wages, and increase in industrial output. At the local level, direct payments will occur in the form of land leases, easements and other potential agreements (i.e., good neighbor agreements), as well as a number of local jobs and purchases of local goods.

(j) Comparison of Incremental Costs and Incremental Benefits

As indicated above, the Facility is not expected to result in any additional costs to local tax jurisdictions, but will result in significant benefit through implementation of a PILOT Agreement.

(k) Equipment or Training Deficiencies in Local Emergency Response Capacity

Exhibit 18: Safety and Security, along with the Preliminary Health and Safety Plan and Emergency Action Plan, provides specific details on the emergency equipment that the Applicant will keep on site to respond to a fire or medical emergency. These documents also contain fire and emergency responder training and communication plans that will address any training deficiencies.

Local first responders (i.e. Town fire departments, Montgomery County Emergency Services Department) were provided with a copy of the preliminary EAP on March 13, 2019, for review and comment. To date, no comments have been received in response. These agencies will also be provided with copies of the final EAP. The final EAP will include a list of all fire and emergency medical equipment that will be maintained at the Facility and describe the emergency response training provided to Facility personnel.

(l) Effects on Property Values

Within the host community and the nearby communities, property values are not anticipated to be impacted. Until very recently (i.e. prior to 2018), most assumptions related to property related impacts were extrapolated from the robust number of property value analyses from wind energy. These studies indicated that the impact of wind energy generation on neighboring property values was negligible (National Association of Realtors, 2019). The impacts on property values

caused by solar facilities were anticipated to be less than the impacts on wind facilities, even more so when combined with mitigation measures to reduce visual impacts through vegetative screening, since PV modules are mounted close to the ground (National Renewable Energy Laboratory, 2016).

Recently there has been research that has specifically analyzed the impacts to property values from utility-scale solar facilities. In an Exploration of Property Value Impacts near Utility-Scale Solar Installations, researchers from the University of Texas at Austin conducted a geospatial solar-siting analysis of 956 utility-scale solar sites to determine the characteristics of solar facilities on communities of varying densities and housing stock. To determine the scale and the direction of potential impacts on home prices, property assessors were surveyed from 37 counties, each having one or more utility-scale solar. Geospatial findings suggest that relatively few homes are located within distance enough to be potentially impacted by visibility, due to the rural nature of most solar facilities. Meanwhile, most assessors surveyed believed that proximity to solar installations have either no impact or a positive impact on home values in general. Detailed analyses showed that while the negative property value impacts were perceived when dense neighborhoods were in proximity to relatively large-scale utility solar facilities, most survey respondents did not estimate an impact of solar facilities to properties. Some assessors perceived solar installations may have positive impacts to property values, such as when trees or other vegetation screens were planted or when the land hosting the solar facilities had a previously unappealing use.

Finally, supporting the findings of this recent large-scale analysis, a number of site-specific property value impact studies have been published recently. These studies include paired sales analyses conducted for utility-scale solar facilities in North Carolina (Kirkland 2018), for nine existing solar facilities throughout the Midwest (CohnReznick 2018a) and five solar facilities within Illinois and Indiana (CohnReznick 2018b). These studies analyzed adjoining properties before and after the solar facility was developed (i.e. a matched pair analysis). All studies determined that no consistent negative impact occurred to adjacent properties that could be attributed to the proximity of adjacent solar facilities. In the North Carolina Study, this lack of impact applied to both occupied residential home values and vacant land values alike.

Numerous property value studies based on statistical analysis of real estate transactions have found that neither wind nor solar facilities have significant impact on property values (Hoen & Rand, 2018; Loomis & Alderman 2011; National Association of Realtors, 2019; Loomis & Rand, 2017; Kirkland, 2018; CohnReznick, 2018a; CohnReznick, 2018b). Given the results of these studies, it is reasonable to conclude that the proposed Facility will not have a significant adverse impact on local property values.

(m) Consistency with State Smart Growth Public Infrastructure Criteria

The New York Smart Growth Public Infrastructure Policy Act (hereinafter “Smart Growth Act”) is meant to maximize the social, economic, and environmental benefits from public infrastructure development by minimizing the impacts associated with unnecessary sprawl. Under the Smart Growth Act, State infrastructure agencies, such as the New York State Department of Transportation (NYSDOT), shall not approve, undertake, or finance a public infrastructure project, unless, to the extent practicable, the project is consistent with the smart growth criteria set forth in New York Environmental Conservation Law (ECL) § 6-0107.

Although the Facility will not result in the construction or operation of public infrastructure and will not result in unnecessary sprawl, approvals from the NYSDOT may be required to allow Facility components to cross state highways (e.g., Interstate 90). Therefore, this section provides a detailed statement regarding the Facility’s consistency with the smart growth criteria in ECL § 6-0107(2). As discussed below, the Facility is consistent with five applicable criteria while the remaining five criteria do not apply to the Facility.

1) Criterion 1: To advance projects for the use, maintenance, or improvement of existing infrastructure

The purpose of the Facility is to create an economically viable solar -powered electrical-generating facility that will provide a source of renewable energy to the New York grid, and in doing so, improve the State’s existing energy infrastructure. The Facility components include a solar field of PV panels producing direct current (DC) electricity; inverters placed throughout the Facility (internal to the panel arrays) to convert DC electricity to alternating current (AC) electricity; a medium voltage collection system that will aggregate the AC output from the inverters; access roads, and an operations & maintenance (O&M) facility. While these Facility components are not public infrastructure and are generally not expected to result in the utilization of public infrastructure, the Facility will contribute up to 90.5 MW of renewable energy to the New York grid. As reported by the Preliminary Scoping Statement (August 2017), total net generation delivered to National Grid’s existing St. Johnsville-Marshville 115-kV transmission line is expected to generate enough electricity to meet the average annual consumption of approximately 28,000 households in New York. Solar energy source is a resilient source of electricity; after disaster events, PV projects are able to re-start to support the grid faster than other forms of generation. Additionally, the Facility will use portions of existing State highway infrastructure to transport equipment. However, none of these activities are anticipated to have any long-term impact on existing infrastructure.

After careful consideration of its contribution to and utilization of both the New York power grid and transportation routes identified above, it has been determined the Facility is consistent with this smart growth criterion. Consequently, the necessary changes to the public infrastructure (contribution of renewable energy to power grid,

utilization of existing transportation routes and construction of access road intersections to existing roads) are also consistent with the criterion.

2) Criterion 2: To advance projects located in municipal centers

"Municipal centers" are defined in the Smart Growth Act as "areas of concentrated and mixed land uses that serve as centers for various activities, including, but not limited to, central business districts, main streets, downtown areas, brownfield opportunity areas, downtown areas of local waterfront revitalization program areas, transit-oriented development, environmental justice areas, and hardship areas," as well as "areas adjacent to municipal centers, which have clearly defined borders, are designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibit strong land use, transportation, infrastructure and economic connections to a municipal center; and areas designated in a municipal or comprehensive plan, and appropriately zoned in a municipal zoning ordinance, as a future municipal center."

Large-scale solar energy projects, such as the Facility, require extensive land; moreover, the requirement for interconnection to high-powered transmission lines restricts large-scale solar energy projects to comparatively isolated rural areas. Therefore, this criterion does not apply to the Facility.

3) Criterion 3: To advance projects in developed areas or areas designated for concentrated infill development in a municipally approved comprehensive land use plan, local waterfront revitalization plan and/or brownfield opportunity area plan

See discussion of Criterion 2 above. Large-scale solar energy projects such as the Facility cannot be located within areas designated for concentrated infill development nor are, they well-suited to developed waterfront areas and/or brownfield opportunity areas. Therefore, this criterion does not apply to the Facility.

4) Criterion 4: To protect, preserve and enhance the State's resources, including agricultural land, forests, surface and groundwater, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources

The Facility will generate up to 90.5 MW of clean, renewable energy without emitting any conventional air pollutants or greenhouse gases (GHGs), or consuming cooling water or generating wastewater<sup>5</sup>. In general, the Facility Site includes lands suitable for the construction of a solar facility and does not include unique environmental resources, Critical Environmental Areas, or unusual land uses relative to other locations in the surrounding region. As described in Exhibit 9 and throughout this Article 10 Application, the layout of the Facility was designed through an iterative process where the technical and economic requirements of the Facility were weighed against impacts to land use, aesthetics, cultural resources, environmental/ecological resources (such as forests, wetlands, and sensitive wildlife habitat), surface and groundwater, and public safety. Within the constraints of the permitting process and the inherent constraints on the Site, the proposed Facility layout avoids or minimizes environmental impacts to the greatest extent practicable while allowing the Applicant to construct a 90.5 MW solar facility in furtherance of the State's renewable energy goals. This Article 10 Application summarizes and includes analyses of the potential environmental impacts and benefits of the Facility, including analyses specifically associated with agricultural land, agricultural viability, forests, surface and groundwater, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources. In addition, a Visual Impact Assessment (VIA; see also Exhibit 24) has been prepared which assesses potential visual impacts within a 5-mile radius of the Facility Site. Based on these analyses, the Applicant believes that the Facility has avoided and minimized impacts to these resources to the maximum extent practicable (based on the layout as currently proposed), and that any remaining impacts are outweighed by the benefit provided by the Facility's generation of up to 90.5 MW of clean, renewable energy. Therefore, the Facility is consistent with this criterion.

- 5) Criterion 5: To foster mixed land uses and compact development; downtown revitalization; brownfield redevelopment; the enhancement of beauty in public spaces; the diversity and affordability of housing in proximity to places of employment, recreation, and commercial development; and the integration of all income and age groups.

See response to Criterion 2 above. The Facility must necessarily be located in a rural area well removed from any areas that would potentially experience compact development, downtown revitalization, or significant quantities of housing, etc. (e.g., villages and cities). Therefore, this criterion is not applicable.

- 6) Criterion 6: To provide mobility through transportation choices including improved public transportation and reduced automobile dependency

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<sup>5</sup> The Facility is expected to displace approximately 55,500 short tons of carbon dioxide (CO<sub>2</sub>) emissions from conventional power plants on an annual basis. This represents approximately 0.20% of all CO<sub>2</sub> emissions estimated to be produced by New York State in 2021. (See Exhibits 8 and 17 for a further discussion of air emissions).

The Facility does not directly or indirectly affect transportation options. Therefore, this criterion is not applicable.

7) Criterion 7: To coordinate between state and local government and inter-municipal and regional planning

The Applicant has conducted extensive public outreach to local government and planning agencies throughout the development and review of the Facility. This has included the public outreach conducted in accordance with the requirements of the Article 10 process and the Public Involvement Program (PIP) plan prepared specifically for the Facility, which includes frequent stakeholder consultation and other forms of engagement, public education, public meetings, ample notification periods, and public comment periods at key milestones. The Applicant also has reached out individually to each of the local governments that will be directly affected by the Facility. Moreover, the Article 10 process specifically requires outreach and coordination between the Applicant and State agencies with a role in reviewing the Application for the proposed Facility. To the extent applicable, these outreach efforts and municipal/agency consultations satisfy the criterion related to coordination between State and local governments.

8) Criterion 8: To participate in community-based planning and collaboration

The Applicant team has conducted and will continue to conduct extensive public outreach to community-based organizations throughout the development and review of the Facility. This has included the public outreach conducted in accordance with the requirements of the PIP. See response to Criterion 7 for additional detail. These outreach efforts satisfy the criterion related to participation in community-based planning and collaboration.

9) Criterion 9: To ensure predictability in building and land use codes

The Applicant has no role in or authority over the development or enforcement of building or land use codes in the Towns of Canajoharie and Minden. Therefore, this criterion does not apply to this Facility.

10) Criterion 10: To promote sustainability by strengthening existing and creating new communities which reduce greenhouse gas emissions and do not compromise the needs of future generations by among other means, encouraging broad-based public involvement in developing and implementing a community plan and ensuring the governance structure is adequate to sustain its implementation

The Facility is consistent with State policies designed to encourage initiatives that reduce greenhouse gas emissions and contribute to the transition of New York's energy markets by encouraging renewable alternatives. The Facility promotes the reduction of greenhouse gas emissions through the use of renewable energy. The Facility, therefore, supports this smart growth criterion.

#### 11) Smart Growth Attestation

The Smart Growth Act requires that the chief executive officer of a state infrastructure agency (or his or her designee) attest in writing that the project under review, to the extent practicable, meets the relevant smart growth criteria in ECL § 6-0107(2). As previously noted, the Facility will not result in the construction or operation of public infrastructure as that term is used in the Smart Growth Act. As a result, the requirement to obtain an attestation from the chief executive officer of a state infrastructure agency does not apply to the Facility.