

Appendix 18-A Economic Impacts of Hecate Energy LLCs Proposed Solar Development in Genesee County, New York REDACTED: Competitively Sensitive Information / FOIL-Exempt



Economic Impacts of Hecate Energy LLCs Proposed Solar Development in Genesee County, New York

FINAL REPORT

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Prepared for Hecate Energy LLC

Prepared by

BBC Research & Consulting 1999 Broadway, Suite 2200 Denver, Colorado 80202-9750 303.321.2547 fax 303.399.0448 www.bbcresearch.com



ECONOMIC IMPACTS OF HECATE ENERGY'S PROPOSED SOLAR DEVELOPMENT IN NEW YORK STATE

Background

This report will describe the projected employment, labor income, and economic output impacts that would result from the construction, operations, and maintenance of a 500 megawatt (MW) solar installation in Genesee County in New York State. Hecate Energy (Hecate), a developer, owner, and operator of solar projects, is proposing to construct and operate a solar farm (the Project) in the towns of Elba and Oakfield, in Genesee County. The company plans on using local labor and purchasing goods and services from local businesses whenever possible.

BBC Research & Consulting (BBC) calculated the direct and secondary employment, output, and labor income impacts that would be created by Hecate's proposed photovoltaic (PV) solar project. This report presents the findings of the potential impacts on the economies of Genesee County, Western New York spanning approximately 17 counties and New York State. The IMPLAN-based analysis quantifies the direct and secondary economic impacts that would occur within each geographic region outlined above.

Summary of Findings

Economic Impacts. Hecate's proposed solar farm will be in Genesee County, but economic impacts from construction, operations and maintenance will occur throughout New York State, Western New York, ¹ and Genesee County. In cumulative terms, the Project's activities would generate 3,440 job-years of employment in New York State, where a job-year is the impact of creating one job for a period of one year. This includes 859 direct job-years of employment and 2,581 secondary job-years of employment during the 1.5-year construction phase of the project as well as the subsequent 30-year period of operations and maintenance (Figure 1). These jobs would create approximately \$150.0 million in labor income over that period and generate a cumulative \$380.4 million of economic output.

¹ Western New York includes Allegany County, Cattaraugus County, Chautauqua County, Chemung County, Erie County, Genesee County, Livingstone County, Monroe County, Niagara County, Ontario County, Orleans County, Schuyler County, Seneca County, Steuben County, Wayne County, Wyoming County, and Yates County.

Figure 1.

Direct and Secondary Cumulative Impacts from Construction and Operations Hecate Energy's Proposed Solar Energy Project, Genesee County

		Region				
Impact	Metric	New York State	Western New York	Genesee County		
	Employment	859	749	589		
Direct Impacts	Labor income	\$61,191,330	\$53,656,428	\$42,140,302		
	Output	\$133,016,989	\$87,511,378	\$60,869,360		
	Employment	2,581	2,259	1,906		
Secondary Impacts	Labor income	\$88,770,926	\$59,081,806	\$41,032,448		
	Output	\$247,413,934	\$179,744,248	\$132,633,771		
	Employment	3,440	3,008	2,495		
Total Impacts	Labor income	\$149,962,256	\$112,738,234	\$83,172,751		
	Output	\$380,430,923	\$267,255,626	\$193,503,131		

Note: 2021 dollars

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting

Additionally, the construction and operations of the 500 MW solar facility would create 749 direct jobs and 2,259 secondary jobs within the region of Western New York, spanning 17 counties. For Genesee County, the cumulative impact of the construction and operations of the facility is reflected in a total of 2,495 job-years of employment, \$83.2 million in labor income and \$193.5 million in additional economic output.

Project Description

Figure 2 shows the direct employment and expenditure projections for Hecate's proposed 500 MW solar project in New York State, the 17-county Western New York region, and Genesee County. The project would occur in two phases: construction and operations and maintenance.

Construction Labor and Payroll. The facility would be constructed over the course of one and a half years. During this time, Hecate estimates that approximately 499 full-time equivalent (FTE) workers would be needed for construction.² Of this total, all of the workers would be hired from New York State, 90 percent of workers would be hired from Western New York, and 70 percent from Genesee County. These construction jobs are expected to generate total income of about \$40.4 million over the one and half year construction period, of which \$36.4 million would be paid to workers in Western New York, and \$28.3 million would be paid to workers in Genesee County.

Operations and Maintenance Labor and Payroll. Figure 2 also shows employment projections for operations and maintenance over the 30-year operational life of the site. Hecate

² Full-time equivalent (FTE) positions are measured in terms of year-long employment assuming 2,080 hours of work in a year.

anticipates that 17 full-time positions will be required to operate and maintain the site each year, with an average annual income of for each position. Of those positions, approximately 12 are anticipated to be located in New York state, 10 are anticipated to be located in Western New York, and 8 are anticipated to be located in Genesee County. These jobs would generate approximately \$500,000, \$600,000, and \$700,000 in labor income in Genesee County, Western New York, and New York state each year, respectively.

Figure 2.

Direct Employment and Expenditure Impacts for Hecate Energy's Proposed Solar Energy Project in Genesee County, New York

	Impact Region			
		Western		Duration
Direct Impact	New York State	New York	Genesee County	(years)
Employment and Payroll				
Construction of solar farm (jobs, FTE) ⁽¹⁾	499	449	349	1.5
Construction of solar farm (payroll) ⁽¹⁾	\$40.4 million	\$36.4 million	\$28.3 million	1.5
Operations and maintenance (jobs, FTE)	12	10	8	30
Operations and maintenance (payroll)	\$0.8 million	\$0.6 million	\$0.5 million	30
Expenditures*				
Construction of solar farm (goods, services, and materials) ⁽¹⁾	\$79.0 million	\$71.1 million	\$55.3 million	1
Operations and maintenance (goods, services and payments) $^{(2)}$	\$7.8 million	\$7.8 million	\$7.8 million	30

Note: (1) Annual employment, income, and construction expenditures correspond to 100%, 90% and 70% in New York State, Western New York and Genesee County, respectively.

(2) Direct operations and maintenance expenditures on goods, services, and payments correspond to 100% in Genesee County. Jobs are expressed in terms of year-long, full-time equivalent (FTE) positions assuming 2,080 hours of work per year.

Source: Hecate Energy.

Construction Expenditures. The Project will make expenditures on construction-related goods and services, including about \$79.0 million spent within the New York State, \$71.1 million within Western New York, and \$55.3 million in Genesee County (Figure 2). These expenditures include purchases for

Operations and Maintenance Expenditures. Ongoing operations and maintenance will require annual spending about annually over the 30-year operating life of the site for materials and operation supplies and landscaping services. In addition, the Project will also make annual lease payments of to local landowners for use of their land. These payments will constitute additional income for landowners (Figure 2).

Methods for Analysis

BBC used the IMPLAN regional economic modeling system to estimate the direct and secondary regional economic effects from the construction and operations of Hecate's proposed project as described in Figure 3. IMPLAN is an input-output model originally developed by the U.S. Forest Service that is now widely used for impact analysis by public and private sector economists throughout the United States. IMPLAN is also the source of economic impact data used in the

Jobs and Economic Development Impact Model (JEDI) from the National Renewable Energy Lab. The JEDI model was designed to be an easy-to-use, excel based calculator which uses IMPLAN's economic multipliers to estimate the economic impacts of constructing and operating power generation and biofuel plants at the local and state level. However, according to correspondence between BBC and the National Renewable Energy Lab (NREL), who operates JEDI, the model was taken offline in 2018 because it had become outdated. NREL indicated that the model should not be use without manually changing all of the cost inputs, updating local content percentages, and purchasing IMPLAN multipliers. For this reason, BBC chose to model impacts using the IMPLAN model.

Input-output analysis is a means of representing an economy by examining relationships between types of businesses as well as between businesses and final consumers. The analysis captures all monetary market transactions for consumption in a given period. The resulting mathematical representation allows examination of the effect of a change in one or more economic activities on an entire economy, with all other factors held constant. Input-output analysis also provides multipliers, which are used to estimate secondary effects.

In an input-output analysis, direct effects refer to the initial round of spending from the activity being studied (e.g., the payroll and supplies, materials, and services purchased for the project). Secondary effects refer to the economic activity which results from the purchase of goods and services by the other local businesses that receive payments from the directly-affected operation (in this case, Hecate's solar energy project). Secondary effects also include the economic activity which results from the purchase of household goods and services by employees of the project and the indirectly-affected businesses as well as goods and services purchased by landowners receiving lease payments from the Project.

The most common metrics used to analyze impacts are *employment*, *labor income*, and *output* (Figure 3). Employment simply measures the number of full and part-time jobs created by an event. Labor income represents the compensation received by workers and proprietors. Economic output represents the gross value industry production. For industries that do not hold inventory, output equals revenues (sales). For industries that do hold inventory, output equals revenues plus any net change in inventory.

Output					
	Value Added				
	Labor Income				
Intermediate Inputs	Employee Compensation	Proprietor Income	Taxes on Production and Imports	Other Property Income	

Figure 3. Impact Metrics of the IMPLAN Model

Source: IMPLAN.

Study Area. BBC constructed IMPLAN models that estimate the total economic effects of both the construction and operation of Hecate's proposed solar farm in Genesee County, New York. Hecate anticipates that many of the goods and services required for the project will be purchased from firms in the New York State. While some of these firms may be located in Genesee County, some may not. When goods and services are purchased outside of the county, it is considered leakage from the local economy; those outside effects do not produce economic impacts in the model. However, the model captures more of the project's economic impacts by expanding the scale of analysis to Western New York and the state of New York. Moreover, the business model is designed to reduce leakage, although some of the materials required for the project may need to be purchased from outside the counties of Western New York and potentially from outside the state. The IMPLAN model accounts for such leakages.

Impacts in New York State

BBC analyzed the economic impacts of constructing and operating the Project's 500 MW solar facility in New York State. The impacts that each activity would have on the State's economy are shown and discussed below.

Construction. As shown in Figure 4, construction of the proposed solar project would create approximately 1,291 FTE jobs, \$82.5 million in labor income, and \$244.2 million in economic output in the state of New York. The proposed project would directly create 499 FTE positions in New York State and generate \$40.4 million in labor income during the 1.5-year construction-phase of the project. Labor income includes salaries, wages, and benefits. The project would directly increase economic output in the state by approximately \$133.0 million.

Impact	Employment	Labor Income	Output
Direct Impact	499	\$40,414,200	\$133,016,989
Secondary Impact	792	\$42,090,511	\$111,133,167
Total	1,291	\$82,504,711	\$244,150,157

Figure 4.

Direct and Secondary Impacts from Construction of Hecate Energy's Proposed Solar Energy Project, New York State

Note: 2021 dollars

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Jobs are expressed in terms of year-long, full-time equivalent (FTE) positions assuming 2,080 hours of work per year

Source: IMPLAN; BBC Research & Consulting.

During the construction phase of the project, some goods and services would be purchased from firms located within New York State, creating secondary economic impacts. The Project's 499 direct employees would also spend a percentage of their income to purchase goods and services from businesses within the state. Together, this spending would create 792 additional FTE jobs in the state, which would generate approximately \$42.1 million in labor income and more than \$111.1 million of additional economic output.

Operations. Following construction, the Project would operate and maintain the site for a period of 30 years. During this time, the Project would directly employ 12 people in New York

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State for operations and maintenance, earning a total of about per year. Additionally, the Project will spend approximately per year on landscaping services and materials and supplies. The Project will also make lease payments of approximately to landowners. In total, operations and maintenance activities and lease payments would increase demand for goods and services in the state, creating approximately 72 jobs, \$2.2 million in labor income, and \$4.5 million in total output, during each year of operations (Figure 5).

Figure 5.

Direct and Secondary Annual Impacts from Operations and Maintenance of Hecate Energy's Proposed Solar Energy Project, New York State

Impact	Employment	Labor Income	Total Output
Direct Impact	12	\$692,571	-
Secondary Impact	60	\$1,556,014	\$4,542,692
Total	72	\$2,248,585	\$4,542,692

Note: 2021 dollars.

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

Cumulative Impact. The cumulative effects of the Project's proposed activities in New York State are shown in Figure 6. The cumulative impacts include the 1.5-year construction phase of the project as well as the operations and maintenance work spanning 30 years. In total, the project would create 3,440 job-years³ of employment in New York State, where a job-year is the impact of creating one job for a period of one year. These jobs would create \$150.0 million of labor income and \$380.4 million in total additional output in the state. The 500 MW solar facility would directly create 859 job-years of employment, generating \$61.2 million in labor income and \$133.0 million of direct total output. Cumulative output only measures the economic impact of construction activities since operational output is considered proprietary information.

Figure 6.

Direct and Secondary Cumulative Impacts from Construction and Operations of Hecate Energy's Proposed Solar Energy Project, New York State

Impact	Employment	Labor Income	Total Output
Direct Impact	859	\$61,191,330	\$133,016,989
Secondary Impact	2,581	\$88,770,926	\$247,413,934
Total	3,440	\$149,962,256	\$380,430,923

Note: 2021 dollars

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

³ Job years were derived from employment estimates during construction and operations. Employment estimates for the operation phase of the project were multiplied by 30 to reflect the number of years the site is expected to operate following construction. This total was added to the number of jobs created during construction to estimate the number of job-years of employment.

Additionally, there would also be significant secondary impacts from the construction and operations of the solar facility in New York State. This is induced by the flow of money from the Project to local businesses through the purchase of goods and services, the money spent by the company's employees, and the money spent by landowners receiving lease payments. The cumulative secondary impacts of the solar facility would create an additional 2,581 job-years of employment, \$88.8 million in labor income, and \$247.4 million in additional output.

Impacts in Western New York Region

BBC analyzed the economic impacts of construction, and the operations and maintenance phase of Hecate's proposed solar facility in the 17-county Western New York region. The impacts of each phase as well as the cumulative impacts are described in detail below.

Construction. As shown in Figure 7, the 1.5-year construction phase of the proposed project would create a total of 950 FTE jobs, \$55.1 million of labor income, and \$145.0 million of economic output in Western New York. The direct impacts of construction include 449 FTE jobs, \$36.3 million in labor income, and \$87.5 million in economic output.

Figure 7. Direct and Secondary Impacts from Construction of Hecate Energy's Proposed Solar Energy Project, Western New York

Impact	Employment	Labor Income	Output
Direct Impact	449	\$36,342,138	\$87,511,378
Secondary Impact	501	\$18,722,446	\$57,472,324
Total	950	\$55,064,583	\$144,983,702

Note: 2021 dollars

Labor income is a component of total output and includes income paid to proprietors.

Jobs are expressed in terms of year-long, full-time equivalent (FTE) positions assuming 2,080 hours of work per year

Source: IMPLAN; BBC Research & Consulting.

During the construction phase, the Project would purchase some goods and services from firms located within Western New York, creating secondary impacts. The Project's 449 direct employees would also spend a percentage of their income to purchase goods and services from businesses in the region. Together, this spending would create 501 additional FTE jobs, \$18.7 million in labor income and more than \$57.4 million of additional economic output.

Operations. Following construction, the Project would operate and maintain the site for a period of 30 years. During this time, the Project would directly employ 10 people in Western New York for operations and maintenance, earning a total of about **Section Period** per year. Additionally, the Project will spend approximately **Section Period** per year on landscaping services and materials and supplies. The Project will also make lease payments of approximately **Section Period** to landowners. This spending and its associated effects will generate an additional 59 jobs, \$1.3 million in labor income, and \$4.1 million in economic output (Figure 8).

Figure 8.

Direct and Secondary Annual Impacts from Operations of Hecate Energy's Proposed Solar Energy Project, Western New York

Impact	Employment	Labor Income	Total Output
Direct Impact	10	\$577,143	-
Secondary Impact	59	\$1,345,312	\$4,075,731
Total	69	\$1,922,455	\$4,075,731

Note: 2021 dollars.

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

Cumulative Impact. The cumulative impacts of the proposed solar project in the Western New York region are shown in Figure 9. The cumulative impacts include the 1.5-year construction phase of the project as well as the operations and maintenance work spanning 30 years. In total, the direct and secondary impacts would create 3,008 job-years of employment in Western New York from the construction, operations, and maintenance of the 500 MW solar farm. This would create \$112.7 million of labor income and \$267.3 million in total additional output. This includes 749 direct job-years of employment, generating \$53.7 million in direct labor income and \$87.5 million of direct economic output in Western New York. Cumulative output only measures the economic impact of construction activities since operational output is considered proprietary information.

Figure 9.

Direct and Secondary Cumulative Impacts from Construction and Operations of Hecate Energy's Proposed Solar Energy Project, Western New York

Impact	Employment	Labor Income	Total Output
Direct Impact	749	\$53,656,428	\$87,511,378
Secondary Impact	2,259	\$59,081,806	\$179,744,248
Total	3,008	\$112,738,234	\$267,255,626

Note: 2021 dollars

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

Additionally, there would be significant secondary impacts from the construction and operations of the solar facility. This is induced by the flow of money from the Project to local businesses through the purchase of goods and services, the money spent by the project's employees, and the money spent by landowners receiving lease payments. The cumulative secondary impacts of the solar facility include 2,259 job-years of employment, \$59.1 million in labor income and \$179.7 million in additional output within Western New York.

Impacts in Genesee County, New York

BBC analyzed the economic impacts of constructing and operating the proposed solar facility in Genesee County, New York. The impacts that each activity would have on the county's economy are discussed below.

Construction. As shown in Figure 10, the 1.5-year construction phase would create 521 FTE jobs, \$33.3 million of labor income, and \$77.9 million of economic output in Genesee County. The project would directly employ 349 FTE workers who would receive \$28.3 million in labor income during the 1.5-year construction phase. Total direct economic output would increase in Genesee County by approximately \$60.9 million.

Figure 10.

Direct and Secondary Impacts from Construction of Hecate Energy's Proposed Solar Energy Project, Genesee County

Impact	Employment	Labor Income	Output
Direct Impact	349	\$28,288,882	\$60,869,360
Secondary Impact	172	\$5,056,653	\$17,032,747
Total	521	\$33,345,536	\$77,902,107

Note: 2021 dollars.

Labor income is a component of total output and includes income paid to proprietors.

Jobs are expressed in terms of year-long, full-time equivalent (FTE) positions assuming 2,080 hours of work per year

Source: IMPLAN; BBC Research & Consulting.

During this time, the Project would purchase some goods and services from firms located within Genesee County, creating secondary impacts. The project's 349 direct FTE employees would also spend a percentage of their income to purchase goods and services from businesses in the county. Together, this spending would create 172 additional FTE jobs in the county, which would generate approximately \$5.1 million in labor income and more than \$17.0 million of additional economic output.

Operations. The operations and maintenance of the site and lease payments to local landowners would create a total of 66 jobs, \$1.7 million in labor income, and about \$3.8 million in total output, on an annual basis (Figure 11). This includes direct impacts of 8 employees and **Example 1** in labor income. The direct output of these employees is equal to the gross revenues generated by the facility, but this information is proprietary and not included in this analysis. Additionally, the Project will spend approximately **Example 1** per year on landscaping services and materials and supplies. The Project will also make lease payments of approximately **Example 1**

to landowners that would increase household income. This spending and its associated effects will generate an additional 58 jobs, \$1.2 million in labor income, and \$3.9 million in economic output.

Figure 11. Direct and Secondary Annual Impacts from Operations of Hecate Energy's Proposed Solar Energy Project, Genesee County

Impact	Employment	Labor Income	Total Output
Direct Impact	8	\$461,714	-
Secondary Impact	58	\$1,199,193	\$3,853,367
Total	66	\$1,660,907	\$3,853,367

Note: 2021 dollars.

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

Cumulative Impact. The cumulative impacts of the proposed solar project in the Genesee County are shown in Figure 12. The cumulative impacts include the 1.5-year construction phase of the project and the operations and maintenance of the site over the 30-year operating period. In total, the direct and secondary impacts would create 2,495 job-years of employment in Genesee County. This would create \$83.2 million of labor income and \$193.5 million in economic output. This includes 589 direct job-years of employment, generating \$42.1 million in direct labor income and \$60.9 million of direct economic output. Cumulative output only measures the economic impact of construction activities since operational output is considered proprietary information.

Figure 12.

Direct and Secondary Cumulative Impacts from Construction and Operations Hecate Energy's Proposed Solar Energy Project, Genesee County

Impact	Employment	Labor Income	Total Output
Direct Impact	589	\$42,140,302	\$60,869,360
Secondary Impact	1,906	\$41,032,448	\$132,633,771
Total	2,495	\$83,172,751	\$193,503,131

Note: 2021 dollars.

Labor income is a component of total output.

Total Direct Output reflects Hecate's combined investment in labor and materials.

Source: IMPLAN; BBC Research & Consulting.

Additionally, there would be significant secondary impacts from the construction and operations of the solar facility. This is induced by the flow of money from the Project to local businesses through the purchase of goods and services, the money spent by the project's employees, and the money spent by landowners receiving lease payments. The cumulative secondary impacts of the solar facility include 1,906 job-years of employment, \$41.0 million in labor income and \$132.6 million in additional output within Genesee County.