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FLAGGY RUN SOLAR 1, LLC

ECONOMIC AND FISCAL CONTRIBUTION TO
SOUTHAMPTON COUNTY, VIRGINIA



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About Mangum Economics, LLC

Mangum Economics, LLC is a Richmond, Virginia based firm that specializes in producing objective economic, quantitative, and qualitative analysis in support of strategic decision making. Much of our recent work relates to IT & Telecom Infrastructure (data centers, terrestrial and subsea fiber), Renewable Energy, and Economic Development. Examples of typical studies include:

POLICY ANALYSIS

Identify the intended and, more importantly, unintended consequences of proposed legislation and other policy initiatives.

ECONOMIC IMPACT ASSESSMENTS AND RETURN ON INVESTMENT ANALYSES

Measure the economic contribution that businesses and other enterprises make to their localities.

WORKFORCE ANALYSIS

Project the demand for, and supply of, qualified workers.

CLUSTER ANALYSIS

Use occupation and industry clusters to illuminate regional workforce and industry strengths and identify connections between the two.

The Project Team

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Executive Summary

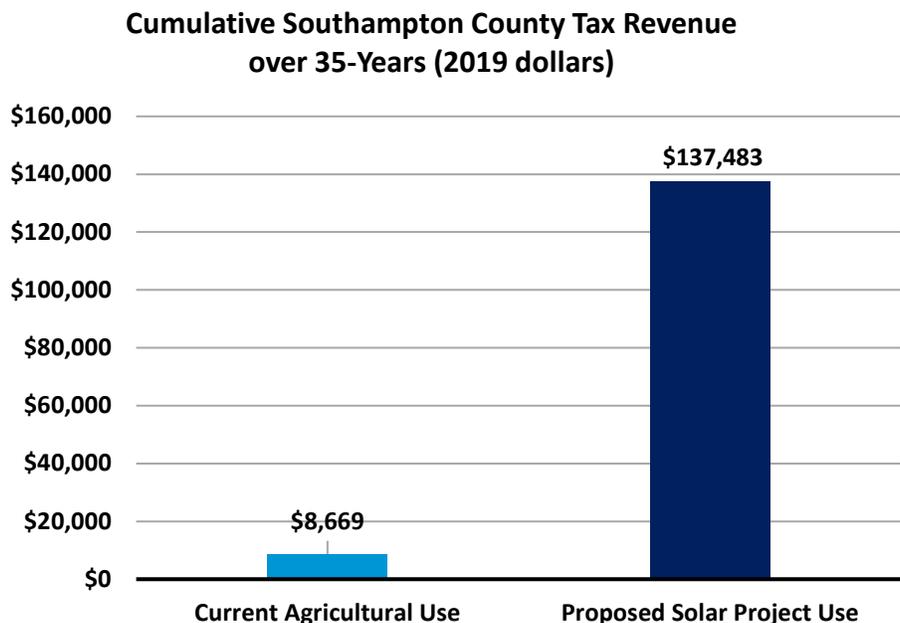
This report assesses the economic and fiscal contribution that the proposed Flaggy Run Solar project would make to Southampton County, Virginia. The primary findings from that assessment are as follows:

- 1) **Flaggy Run Solar is a 5-Megawatt (MW) solar project that would be located east of Courtland and north of Route 58 in Southampton County, Virginia. The lease encompasses approximately 68.2 acres that are currently primarily used for agriculture. The actively used, fenced-in portion for the solar site would be approximately 39 acres.**
- 2) **The proposed Flaggy Run Solar project would make a substantial economic contribution to Southampton County:**
 - The proposed Flaggy Run Solar project would provide an estimated one-time pulse of economic activity to Southampton County during its construction phase of approximately:
 - 16 full-time-equivalent jobs.
 - \$478,207 million in associated labor income.
 - \$1.5 million in economic output.
 - The proposed Flaggy Run Solar project would provide an estimated annual economic impact to Southampton County during its ongoing operational phase of approximately:
 - < 1 full-time-equivalent job.
 - \$9,847 in associated labor income.
 - \$36,376 in economic output.
 - In comparison, our analysis indicates that in its current agricultural use the property that would be occupied by Flaggy Run Solar provides an estimated annual economic impact of approximately:
 - < 1 full-time-equivalent job.
 - \$5,247 in associated labor income.
 - \$30,064 in economic output.
- 3) **The proposed Flaggy Run Solar project would also make a significant fiscal contribution to Southampton County. We estimate that the proposed project would generate approximately:**
 - \$47,494 in state and local tax revenue from the one-time pulse of economic activity associated with the project's construction.
 - \$137,483 in cumulative county revenue over the facility's anticipated 35-year operational life.



4) The proposed Flaggy Run Solar project will have a significantly greater fiscal impact on Southampton County than the property generates in its current agricultural use:

- The proposed Flaggy Run Solar project will generate approximately \$137,483 in cumulative county revenue over the facility’s anticipated 35-year operational life, as compared to approximately \$8,669 in cumulative county revenue in the property’s current agricultural use – a difference of approximately \$128,814.



The estimates provided in this report are based on the best information available and all reasonable care has been taken in assessing that information. However, because these estimates attempt to foresee circumstances that have not yet occurred, it is not possible to provide any assurance that they will be representative of actual events. These estimates are intended to provide a general indication of likely future outcomes and should not be construed to represent a precise measure of those outcomes.

Introduction

This report assesses the economic and fiscal contribution that the proposed Flaggy Run Solar project would make to Southampton County, Virginia. This report was commissioned by North Carolina Renewable Energy (NCRE) and produced by Mangum Economics.

The Project

Flaggy Run Solar is a 5-Megawatt (MW) solar project that would be located east of Courtland and north of Route 58 in Southampton County, Virginia. The lease encompasses approximately 68.2 acres that are currently primarily used for agriculture. The actively used, fenced-in portion for the solar site would be approximately 39 acres.

Local Economic Profile

In this section, we provide context for the economic and fiscal impact assessments to follow by profiling the local economy of Southampton County, Virginia.

Total Employment

Figure 5 depicts the trend in total employment in Southampton County from March 2014 to March of 2019. As these data show, total employment in the county trended upward during the beginning of the period and peaked in 2015. Employment dropped thereafter and, aside from seasonal variation, has stagnated since. As of March 2019, county employment stood at 3,684 jobs. This represents a 159 job, or 4.5 percent, increase in employment over the period as a whole. To put this number in perspective, over this same period total statewide employment in Virginia increased by 8.0 percent.¹

¹ Data Source: U.S. Bureau of Labor Statistics.



Figure 5: Total Employment in Southampton County – March 2014 to March 2019²

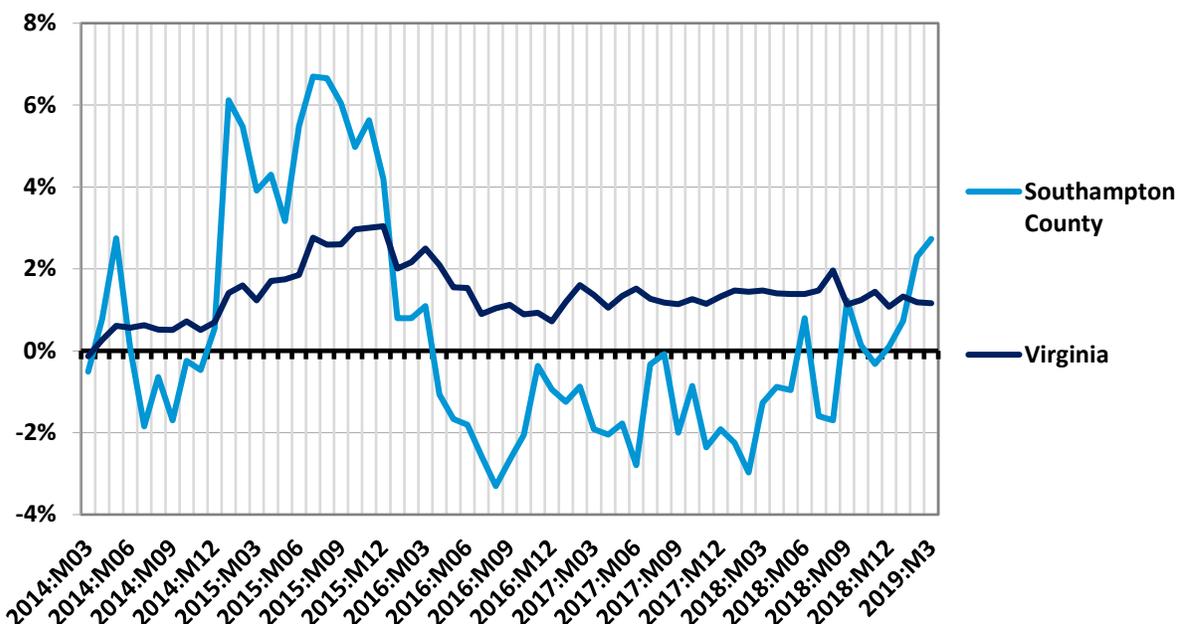


To control for seasonality and provide a point of reference, Figure 6 compares the year-over-year change in total employment in Southampton County to that of the state of Virginia as a whole over the same five-year period. Any point above the zero line in this graph indicates an increase in employment, while any point below the zero line indicates a decline in employment. As these data show, year-over-year employment growth in Southampton County surpassed statewide growth rates during 2015 but subsequently underperformed the statewide trend with a multi-year period of year-over-year decline in employment. Since late 2018, the Southampton’s year-over-year employment growth has returned to positive growth and as of March 2019 it was 2.7 percent the County as compared to 1.2 percent statewide in Virginia.

² Data Source: U.S. Bureau of Labor Statistics.



Figure 6: Year-Over-Year Change in Total Employment – March 2014 to March 2019³



Employment and Wages by Major Industry Sector

To provide a better understanding of the underlying factors motivating the total employment trends depicted in Figures 5 and 6, Figures 7 through 9 provide data on private employment and wages in Southampton County by major industry sector.

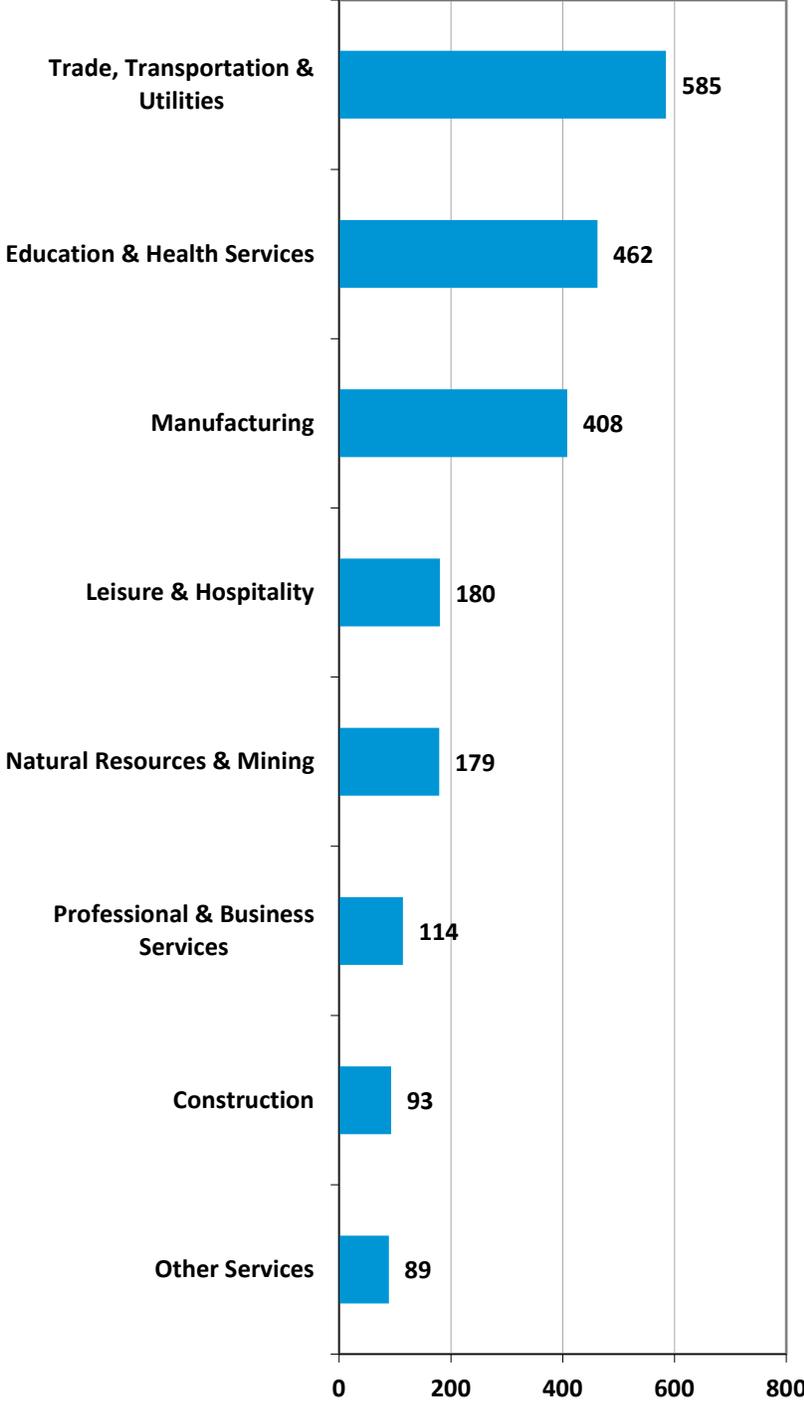
Figure 7 provides an indication of the distribution of private sector employment across major industry sector in Southampton County in 2018. As these data indicate, the county’s largest industry sector that year was Trade, Transportation and Utilities (585 jobs), followed by Education and Health Services (462 jobs), and Manufacturing (408 jobs).

Figure 8 provides a similar ranking for average private sector weekly wages by major industry sector in Southampton County in 2018. As these data show, the highest paying industry sectors that year were Manufacturing (\$1,008 per week), Construction (\$823 per week) and Natural Resources and Mining (\$763 per week). To provide a point of reference, the average private sector weekly wage across all industry sectors in Southampton County in 2018 was \$701 per week.

³ Data Source: U.S. Bureau of Labor Statistics.



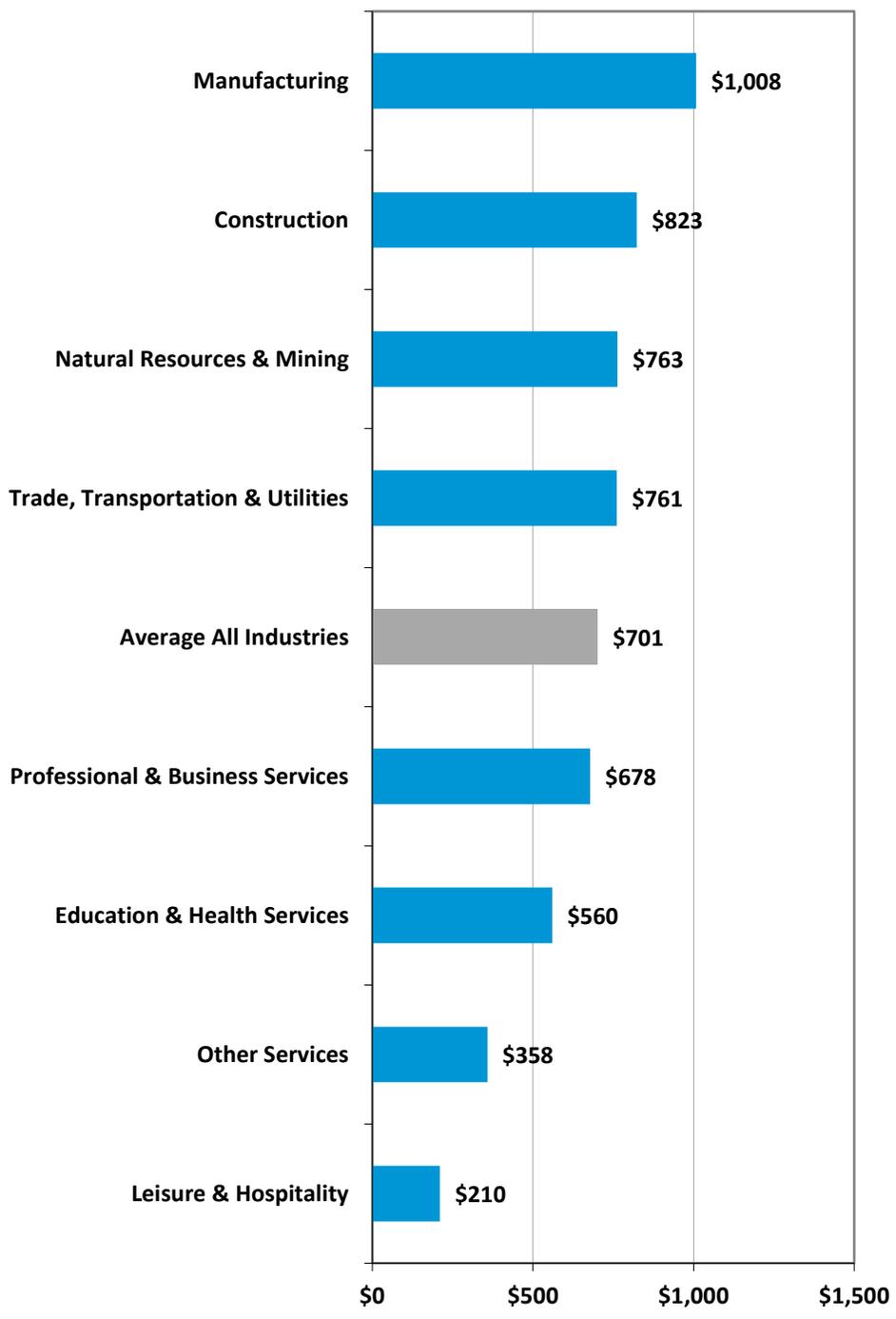
Figure 7: Private Employment by Major Industry Sector in Southampton County in 2018⁴



⁴ Data Source: U.S. Bureau of Labor Statistics. *Data for the Information and Financial Activities sectors is suppressed because of data confidentiality.*



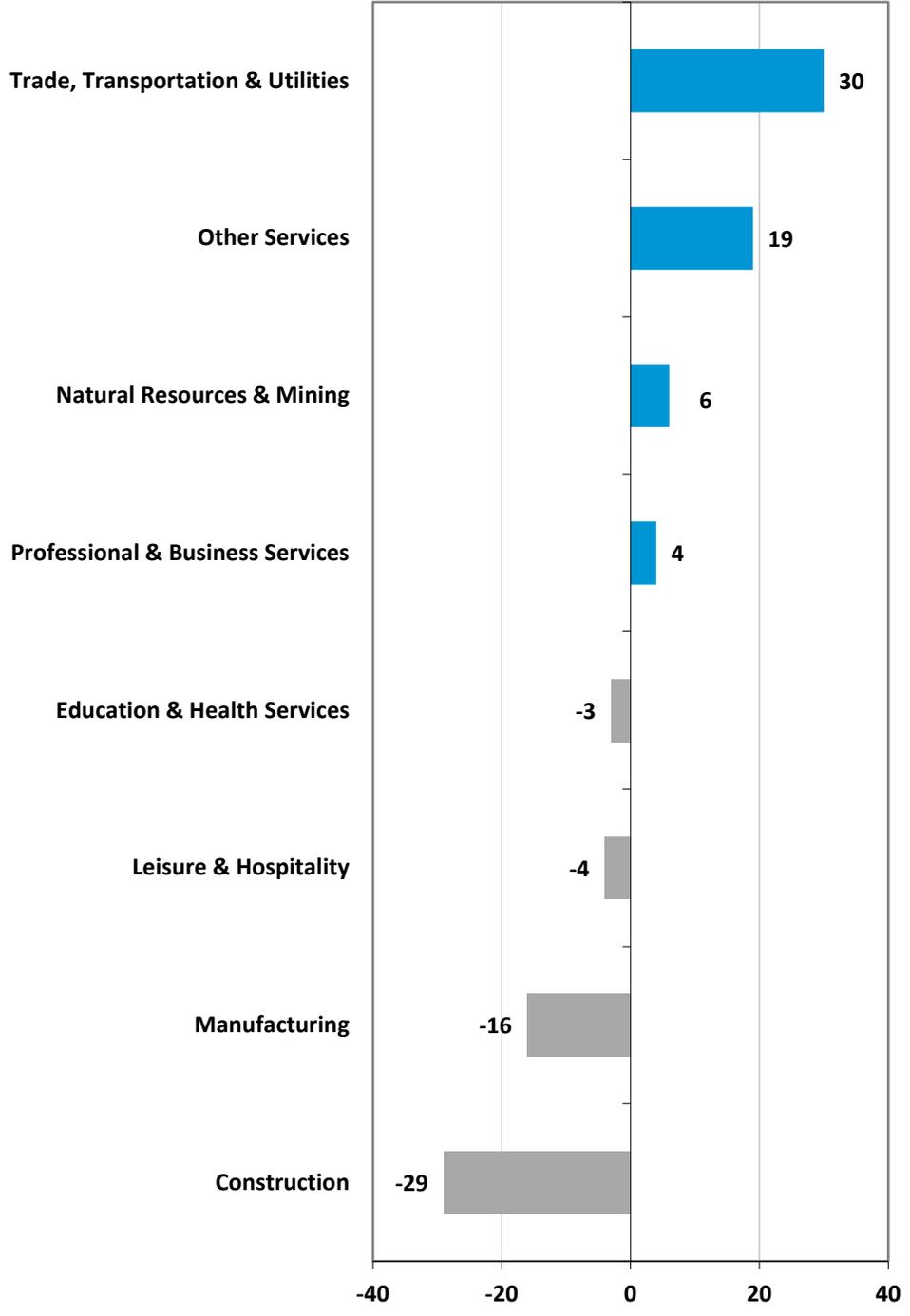
Figure 8: Average Private Weekly Wages by Major Industry in Southampton County in 2018⁵



⁵ Data Source: U.S. Bureau of Labor Statistics. *Data for the Information and Financial Activities sectors is suppressed because of data confidentiality.*



Figure 9: Change in Private Employment by Major Industry in Southampton County from 2017 to 2018⁶



⁶ Data Source: U.S. Bureau of Labor Statistics. Data for the Information and Financial Activities sectors is suppressed because of data confidentiality.

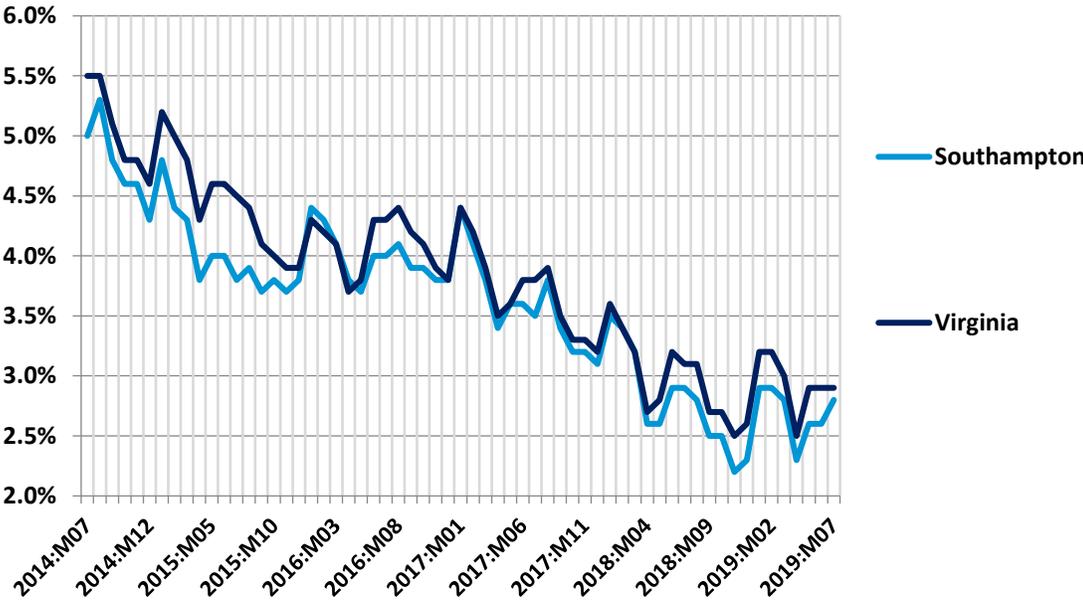


Lastly, Figure 9 details the year-over-year change in private sector employment between 2017 and 2018 in Southampton County by major industry sector. Over this period, the largest employment gains occurred in the Trade, Transportation and Utilities (up 30 jobs) and Other Services (up 19 jobs) sectors. While the largest employment loss occurred in the Construction (down 29 jobs) and Manufacturing (down 16 jobs) sectors.

Unemployment

Figure 10 illustrates the trend in Southampton County’s unemployment rate over the five-year period from July 2014 through July 2019 and benchmarks those data against the statewide trend for Virginia. As these data show, unemployment rates in Southampton County generally tracked closely with statewide trends but at rates slightly below the statewide rate throughout this period. As of July 2019, unemployment stood at 2.8 percent in Southampton County and 2.9 percent in Virginia as a whole.

Figure 10: Unemployment Rate – July 2014 to July 2019⁷



⁷ Data Source: Bureau of Labor Statistics.

Economic and Fiscal Impact

In this section, we quantify the economic and fiscal contribution that the proposed Flaggy Run Solar project would make to Southampton County. Our analysis separately evaluates the one-time pulse of economic activity that would occur during the construction phase of the project, as well as the annual economic activity that the project would generate during its ongoing operations phase.

Method

To empirically evaluate the likely local economic impact attributable to the proposed Flaggy Run Solar project, we employ a regional economic impact model called IMPLAN.⁸ The IMPLAN model is one of the most commonly used economic impact simulation models in the U.S., and in Virginia is used by UVA's Weldon Cooper Center, the Virginia Department of Planning and Budget, the Virginia Employment Commission, and other state agencies and research institutes. Like all economic impact models, the IMPLAN model uses economic multipliers to quantify economic impact.

Economic multipliers measure the ripple effects that an expenditure generates as it makes its way through the economy. For example, as when the Flaggy Run Solar project purchases goods and services – or when contractors hired by the facility use their salaries and wages to make household purchases – thereby generating income for someone else, which is in turn spent, thereby becoming income for yet someone else, and so on, and so on. Through this process, one dollar in expenditures generates multiple dollars of income. The mathematical relationship between the initial expenditure and the total income generated is the economic multiplier.

One of the primary advantages of the IMPLAN model is that it uses regional and national production and trade flow data to construct region-specific and industry-specific economic multipliers, which are then further adjusted to reflect anticipated actual spending patterns within the specific geographic study area that is being evaluated. As a result, the economic impact estimates produced by IMPLAN are not generic. They reflect as precisely as possible the economic realities of the specific industry, and the specific study area, being evaluated.

In the analysis that follows, these impact estimates are divided into three categories. First round direct impact measures the direct economic contribution of the entity being evaluated (e.g., own employment, wages paid, goods and services purchased by the Flaggy Run Solar project). Second round indirect and induced impact measures the economic ripple effects of this direct impact in terms of business to business, and household (employee) to business, transactions. Total impact is simply the sum of the preceding two. These categories of impact are then further defined in terms of employment (the jobs that are created), labor income (the wages and benefits associated with those jobs), and economic output (the total amount of economic activity that is created in the economy).

⁸ IMPLAN v.3 is produced by Minnesota IMPLAN Group, Inc.

Construction Phase

In this portion of the section, we assess the economic and fiscal impact that the one-time pulse of activity associated with construction of the proposed Flaggy Run Solar project would have on Southampton County.

Assumptions

In conducting our analysis, we employ the following assumptions:

- For ease of analysis, all construction expenditures are assumed to take place in a single year.
- Total investment in the Flaggy Run Solar project is estimated to be \$7.5 million.⁹
- Of that total:
 - Architecture, engineering, site preparation, and other development and construction costs are estimated to be \$3.4 million.¹⁰ It is estimated that approximately 37 percent of that total would be spent with vendors in Southampton County.¹¹
 - Capital equipment costs are estimated to be \$4.1 million.¹² It is anticipated that no capital equipment will be purchased from vendors in Southampton County.¹³

Results

By feeding these assumptions into the IMPLAN model, we obtain the following estimates of one-time economic and fiscal impact. As shown in Table 1, construction of the proposed Flaggy Run Solar project would directly provide a one-time pulse of approximately: 1) 14 full-time-equivalent jobs, 2) \$424,554 in labor income, and 3) \$1.3 million in economic output to Southampton County (in 2019 dollars).

Taking into account the economic ripple effects that direct investment would generate, we estimate that the total one-time impact on Southampton County would be: 1) 16 full-time-equivalent jobs, 2) \$478,207 in labor income, 3) \$1.5 million in economic output, and 4) \$47,494 in state and local tax revenue (in 2019 dollars).

⁹ Data Source: NCRE.

¹⁰ Data Source: NCRE.

¹¹ Data Source: IMPLAN.

¹² Data Source: NCRE.

¹³ Data Source: IMPLAN.

Table 1: Estimated One-Time Economic and Fiscal Impact on Southampton County from Construction of the Flaggy Run Solar Project (2019 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	14	\$424,554	\$1,255,746
2nd Round Indirect and Induced Economic Activity	2	\$53,653	\$253,866
Total Economic Activity	16	\$478,207	\$1,509,612
Fiscal Impact			
State and Local Tax Revenue			\$47,494

Ongoing Operations Phase

In this portion of the section, we assess the annual economic and fiscal impact that the proposed Flaggy Run Solar project would have on Southampton County during its anticipated 35-year operational phase.

Assumptions

In conducting our analysis, we employ the following assumptions:

- The Flaggy Run Solar project would spend approximately \$29,000 each year for vegetative control and maintenance and repair expenditures.¹⁴
- The proposed Flaggy Run Solar project would be situated on an approximately 39-acre tract of land.
- The Flaggy Run Solar project would generate \$3,099 in roll back real property taxes for Southampton County and \$3,840 in annual real estate taxes.¹⁵
- The Flaggy Run Solar project would generate confidential lease payments to a landowner in Southampton County.

¹⁴ Data Source: NCRE.

¹⁵ Data Source: Derived from data on Southampton County's Real Property Assessments retrieved from the Virginia Mass Appraisal Network database. Roll back taxes are computed as "the difference between the land use value assessment tax and the tax on the fair market value, for the present and each of the five most recent complete tax years."

Results – Economic Impact

By feeding these assumptions into the IMPLAN model, we obtain the following estimates of annual economic impact. As shown in Table 2, annual operation of the proposed Flaggy Run Solar project would directly provide approximately: 1) < 1 full-time-equivalent job, 2) \$6,890 in labor income, and 3) \$19,224 in economic output to Southampton County (in 2019 dollars). Taking into account the economic ripple effects that direct impact would generate, we estimate that the total annual impact on Southampton County would be: 1) < 1 full-time-equivalent job, 2) \$9,847 in labor income, and 3) \$36,376 in economic output (in 2019 dollars).¹⁶

Table 2: Estimated Annual Economic Impact on Southampton County from the Ongoing Operation of the Flaggy Run Solar Project (2019 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	< 1	\$6,890	\$19,224
2nd Round Indirect and Induced Economic Activity	< 1	\$2,957	\$17,152
Total Economic Activity	< 1	\$9,847	\$36,376

Results – Fiscal Impact

In this portion of the section, we quantify the direct fiscal contribution that the proposed Flaggy Run Solar project would make to Southampton County. It should be noted at the outset, however, that there is at least one reason to assume that the analysis that follows understates the actual fiscal impact that the Flaggy Run Solar project would have on Southampton County, as our analysis only evaluates the direct fiscal impact that the Flaggy Run Solar project would have on Southampton County. It does not take into account any additional tax revenue that would be generated as a result of the indirect economic activity attributable to the ongoing operation of the Flaggy Run Solar project.

Table 3 details the revenue that the proposed Flaggy Run Solar project would generate for Southampton County over a 35-year period from the increased property assessments associated with simply reclassifying the affected 39 acres of property out of land use to an industrial use.¹⁷ As the data in Table 3 indicate, we estimate the total county real estate tax revenue from the project after reclassification to be approximately \$3,840 per year, for a cumulative total of approximately \$134,384 (in 2019 dollars) over the project’s anticipated 35-year operational life expectancy. Adding one-time rollback taxes of \$3,099 increases that cumulative total to \$137,484.

¹⁶ Includes the impact of confidential lease payments to property owner.

¹⁷ Data Source: NCRE. Land used for solar purposes will be re-assessed to industrial use at \$11,000 per acre.

Table 3: Estimated County Revenue Generated by the Proposed Flaggy Run Solar Project over 35-Years from Real Estate Taxes (2019 Dollars)

Estimated Appraised Value of Property under Solar Use	\$429,000
Southampton County Real Estate Tax Rate	0.00895
Annual County Real Estate Tax – Solar Use	\$3,840
Cumulative Revenue over 35 years	\$134,384
One-time Rollback Taxes	\$3,099
TOTAL Cumulative Revenue over 35 years	\$137,483

Current Agricultural Use

In this section, we provide a benchmark for the previous estimates of the economic contribution that the proposed Flaggy Run Solar project would make to Southampton County by estimating the economic contribution that the site makes to the county in its current agricultural use. In conducting that analysis, we employ the following assumptions:

- The proposed Flaggy Run Solar project would be situated on an approximately 39-acre tract of land.
- Average annual revenue per acre for Southampton County farmland is approximately \$596.73.¹⁸
- Real property tax payments by current landowners to Southampton County are approximately \$256 each year.¹⁹

By feeding these assumptions into the IMPLAN model, we obtain the following estimates of annual economic and fiscal impact. As shown in Table 4, in its current agricultural use we estimate that the proposed Flaggy Run Solar project site directly provides approximately: 1) < 1 full-time-equivalent job, 2) \$2,148 in labor income, and 3) \$23,272 in economic output to Southampton County. Taking into account the economic ripple effects that direct impact generates, we estimate that the total annual impact on Southampton County is approximately: 1) < 1 full-time-equivalent job, 2) \$5,247 in labor income, 3) \$30,064 in economic output, and 4) \$256 in direct real property tax payments to Southampton County, for a cumulative total of \$8,669 over 35-years.

¹⁸ Data Source: Estimated based on data from the U.S. Department of Agriculture 2017 Census.

¹⁹ Data Source: Derived from Southampton County, Real Estate Assessor’s Office property assessment data on the Virginia Mass Appraisal Network database. Land is currently in land-use.

Table 4: Total Annual Economic Impact of the Flaggy Run Solar Project site on Southampton County – Current Agricultural Use (2019 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	< 1	\$2,148	\$23,272
2nd Round Indirect and Induced Economic Activity	< 1	\$3,099	\$6,792
Total Economic Activity	< 1	\$5,247	\$30,064
Fiscal Impact			
Local Tax Revenue			\$256
Cumulative Local Tax Revenue over 35-Years			\$8,669

The estimates provided in this report are based on the best information available and all reasonable care has been taken in assessing that information. However, because these estimates attempt to foresee circumstances that have not yet occurred, it is not possible to provide any assurance that they will be representative of actual events. These estimates are intended to provide a general indication of likely future outcomes and should not be construed to represent a precise measure of those outcomes.