Economic Impact Analysis of a Community Solar Program in the State of Ohio

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Executive summary

This report examines the economic impacts of a community solar program in the State of Ohio as requested by the Coalition for Community Solar Access (CCSA). Our findings indicate that such a community solar program could contribute **$5.6 billion in gross output** (Table ES1) on average and bring up to **$409.5 million in local tax revenue** (Table ES2) over its total lifetime.

If enacted, Ohio's Community Solar Pilot Program would establish a three-pronged approach for the development of community solar in Ohio. This "Community Solar Pilot Program" in Ohio would allow for the installation of 1750MW$_{AC}$[1] of new capacity, including the installation of 500MW$_{AC}$ of new capacity specifically on brownfield sites. An additional installation of 250MW$_{AC}$ of new capacity will be allotted for construction in a qualifying Appalachian region site. These sites include brownfields, parcels in a new market tax credit area, landfills, solid waste facilities, mine-scarred lands, or lands owned by a land reutilization corporation in one of the 32 Appalachian Counties of Ohio. For the installation of 1000MW$_{AC}$ of new capacity, 250MW$_{AC}$ will be allocated to projects each year over the course of four years. Facilities will have a capacity of up to 10MW$_{AC}$. For the brownfield sites, facilities will have a capacity of up to 20MW$_{AC}$. All construction is expected to be completed within 5 years. After construction is completed, each facility will have an expected lifespan of 25 years. In 2021, total retail sales of electricity in Ohio was approximately 148 million megawatt-hours. Once the community solar program build-out of 1750MW$_{AC}$ is complete, we expect the program to produce 3 million megawatt-hours annually or 2% of the current total retail sales in Ohio, a relatively small portion[2].

Although the true distribution of the size of facilities for each section of this program is unknown, we have developed potential scenarios of distribution (see Tables ES4-ES6). It is likely that the economic contribution will fall in the range of the scenarios provided. The entire program is expected to support 27,254 Ohio job years, contribute $3.5 billion to the state GSP (Table ES1), and bring between $318.5 million and $409.5 million to local tax revenue

[1]The Ohio's Community Solar Pilot Program sets the thresholds using Alternating Current (AC) over Direct Current (DC). We use a conversion factor of 1.3 to convert AC to DC for the purposes of using NREL and IMPLAN for the analysis, but continue to MW$_{AC}$ for reporting as to keep consistency with the requirements of the Community Solar Pilot Program.

[2]More information can be found at http://www.eia.gov/electricity/state/ohio/.

(Table ES2). However, the true impact will be dependent on the distribution of project sizes implemented under the program. Additional scenarios can be calculated using Table ES3.

Table ES1: Expected economic impacts of the Ohio Community Solar Pilot Programs

Program	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
1000MW$_{AC}$ on various types of site	15,007	1,432,316,341	2,016,420,023	3,216,685,435
500MW$_{AC}$ on brownfields	8,165	701,319,391	983,663,497	1,567,091,339
250MW$_{AC}$ in Appalachian Ohio	4,082	350,659,695	491,831,748	783,545,669
Total	27,254	2,484,295,427	3,491,915,268	5,567,322,444

Table ES2: Potential lifetime tax revenues from the Ohio Community Solar Pilot Programs

Program	Minimum tax revenue ($)	Maximum tax revenue ($)
1000MW$_{AC}$ on various types of site	182,000,000	234,000,000
500MW$_{AC}$ on brownfields	91,000,000	117,000,000
250MW$_{AC}$ in Appalachian Ohio	45,500,000	58,500,000
Total	318,500,000	409,500,000

Table ES3 shows the summation of the economic impact results over the construction period and operations over 25-year lifespan of an individual PV project for three sizes of project: 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$.

Table ES3: Lifetime Economic Contribution of Construction and Operation of an Individual Solar Project

Size of Solar Project	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
5MW$_{AC}$	67	7,341,900	10,379,938	16,583,921
10MW$_{AC}$	167	13,911,007	19,483,428	31,022,869
20MW$_{AC}$	392	26,600,828	36,944,261	58,646,495

Additionally, for each section of the Community Solar Pilot Program in Ohio (1000MW$_{AC}$ New Capacity, 500MW$_{AC}$ New Capacity on Brownfields, and 250MW$_{AC}$ New Capacity in Appalachian Ohio), the lifetime economic contribution was calculated based upon scenarios of installation of 5MW $_{AC}$, 10MW$_{AC}$, and 20MW $_{AC}$ facilities in keeping with the MW$_{AC}$ caps

set by the program. Tables ES4-ES6 share the results of the analysis for each scenario. The scenarios in each table are ordered by greatest contribution to GSP.

Table ES4: Lifetime Economic Contribution of Construction and Operation of Three Scenarios of 1000MW$_{AC}$ New Capacity Installation

1000MW$_{AC}$ New Capacity Scenario	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Scenario 1: Fifty 5MW projects per year for 4 years	13,494	1,468,380,004	2,075,987,578	3,316,784,129
Scenario 3: Thirty 5MW projects & ten 10MW projects per year for 4 years	14,791	1,437,468,293	2,024,929,674	3,230,985,249
Scenario 2: Twenty-five 10MW projects per year for 4 years	16,736	1,391,100,727	1,948,342,817	3,102,286,929

Table ES5: Lifetime Economic Contribution of Construction and Operation of Three Scenarios of 500MW$_{AC}$ New Capacity Installation on Brownfield Site

500MW$_{AC}$ New Capacity on Brownfield Sites Scenario	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Scenario 1: Eleven 5MW projects, five 10MW projects, & one 20MW project per year for 4 years	7,883	707,667,059	994,162,875	1,584,735,875
Scenario 2: Nine 5MW projects, four 10MW projects, & two 20MW projects per year for 4 years	8,241	699,691,142	980,966,703	1,562,559,015
Scenario 3: Seven 5MW projects, five 10MW projects, & two 20MW projects per year for 4 years	8,370	696,599,971	975,860,913	1,553,979,127

Table ES6: Lifetime Economic Contribution of Construction and Operation of Three Scenarios of 250MW$_{AC}$ New Capacity Installation in Appalachian Ohio Site

250MW$_{AC}$ New Capacity in Appalachian Ohio Scenario	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Scenario 1: Eleven 5MW projects, five 10MW projects, & one 20MW project per year for 2 years	3,941	353,833,529	497,081,437	792,367,938
Scenario 2: Nine 5MW projects, four 10MW projects, & two 20MW projects per year for 2 years	4,120	349,845,571	490,483,351	781,279,507
Scenario 3: Seven 5MW projects, five 10MW projects, & two 20MW projects per year for 2 years	4,185	348,299,985	487,930,456	776,989,563

Contents

List of Tables

1 Introduction

On October 12, 2021, Ohio's Community Solar Pilot Program was introduced to the Ohio House of Representatives during the 134^{th} General Assembly of the Ohio Legislature. The program aims to "[a]llow development of community solar projects[3]. A community solar program is any solar project that benefits multiple customers. Typically, customers are benefited from lower electricity costs through the generation of solar energy at off-site arrays. This allows customers to receive the benefits of using solar energy without the costly start-up costs involved with the installation of solar panels on personal property, such as the roofs of homes or businesses. Community solar also opens access to customers who do not own their own homes or who do not have the necessary solar resources at their location[4]. The Ohio's Community Solar Pilot Program would create allotments for three sets of community solar projects:

1. 1000MW$_{AC}$ of New Capacity on various site types
2. 500MW$_{AC}$ of New Capacity on Brownfield Sites
3. 250MW$_{AC}$ of New Capacity in the Appalachian Region

Additionally, the Ohio's Community Solar Pilot Program set caps of 10MW$_{AC}$ for projects not on brownfields, and 20MW$_{AC}$ for projects at brownfield sites.

This economic impact analysis focuses on two aspects of the community solar program: construction and operation & management (O&M). The construction phase captures the temporary impact of the installation of each project, while the O&M phase captures the long-lasting impacts of each project over the 25-year lifespan. This analysis assumes that construction of a 5MW$_{AC}$ project will take 6 months, construction of a 10MW$_{AC}$ project will take 9 months, and construction of the 20MW$_{AC}$ projects will take 1 year. The total period of construction for all projects is no more than five years from the start of the program. It is assumed that each Photovoltaic (PV) installation will use monocrystalline silicon PV modules with tracking on 1-axis.

The purpose of this report is to estimate the potential economic impacts this community solar program may have on the State of Ohio. As solar generation expands throughout the

[3]More information regarding the Ohio's Community Solar Pilot Program may be found at https://www.legislature.ohio.gov/legislation/134/hb450

[4]https://www.energy.gov/eere/solar/community-solar-basics

state, other sources of energy generation may decline. However, we do not model the impact an increase in solar generation will have on fossil fuel nor any other source of electricity generation. Additionally, as the expansion of solar generation occurs, we expect to see shifts in employment from one sector to another, rather than the creation of new jobs. Likewise, the same holds true for the value added to the state. As such, we consider this analysis to be a measure of the solar program's contribution to the state of Ohio's economy. We begin by estimating the potential impact of 1 year of construction and 1 year of operations and management (O&M) for a single project at three potential sizes: 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$. We then estimate the lifetime impact according to various scenarios regarding the distribution of facility size for each section of the program.

In order to calculate the impacts more precisely, we combined two methods for economic impact analysis: National Renewable Energy Laboratory (NREL)'s Jobs and Economic Development Impact (JEDI) Photovoltaics Model[5] for estimating construction impacts, and IMPLAN[6] for estimating the O&M of the facilities. Additionally, developers of community solar projects were surveyed in order to adjust inputs for the models that more accurately reflect the true costs associated with PV installation and operations in the state of Ohio.

The JEDI model was chosen for construction over IMPLAN as it could be tailored to the construction of Photovoltaics where IMPLAN did not have the same level of specification for their construction categories. However, the JEDI uses IMPLAN as a basis for calculating its own multipliers. IMPLAN was chosen to model the economic impact of O&M using "Generation of Solar Power" as the specification. Both models are I-O models or Input-Output models and are therefore subject to the same sorts of limitations. As such, we do not consider the feasibility of construction or O&M in terms of scarcity of resources or other supply chain constraints. Likewise, the model only examines backward linkages and does not consider what happens to the product once it is sold, e.g. we do not model an increase in household spending resulting from lower energy costs. Nor do we model the offset in other energy producing sectors as a result of the community solar project[7]. Furthermore, it is expected that sites involved with the

[5]Further information about the Photovoltaics JEDI model, data, and methodology can be found on NREL's website at https://www.nrel.gov/analysis/jedi/pv.html

[6]Further information about IMPLAN's model, data, and methodology can be found on IMPLAN's website at https://support.implan.com/hc/en-us/articles/360044985833-About-IMPLAN

[7]More details regarding the limitations of I-O modeling can be found at https://support.implan.com/hc/en-us/articles/360044458734-Overview-of-Assumptions-of-Input-Output-Analysis or at https://www.nrel.gov/analysis/jedi/limitations.html

community solar program will be leased from the landowners rather than purchased. As such, we do include the costs associated with leasing the land as part of the analysis. As the lease payment goes directly to landowners, the only impact it creates is the induced impact from new household spending. However, we do not model the opportunity costs associated with using the land for something other than solar generation, such as farming or agriculture for greenfield sites nor alternative uses for distressed sites. Finally, we assume static prices for the analysis[8].

Definition of Terms

Throughout this report we use several reoccurring terms, which we define as follows:

- Direct effects — effects resulting from the change in activity of a specified industry or new policy, such as the Community Solar Pilot Program effect on PV construction and operations.
- Indirect effects — effects resulting from purchases made by the specified industries from supply chain businesses in the region (Ohio).
- Induced effects — effects resulting from the spending of new household income by employees of the industries affected by the direct and indirect effects.
- Job Years — the equivalency of employment for 12 months. In cases where the job is expected to last less than one year, the reported Job Years are adjusted. Additionally, Job Years does not account for positions that last for more than one year, e.g. if the same operations manager is employed for 25 years, it is considered 25 Job Years, rather than one employee. Likewise, the same construction worker may work on more than one project over the course of the construction phase as construction on one project ends and construction on another project begins. By counting Job Years instead of new employees, we are able to mitigate this potential double counting.
- Earnings — The labor income, or employee compensation with benefits including payroll taxes paid by employers and the proprietors' income.
- GSP — The contribution to Gross State Product for the State of Ohio, or the value added to Ohio.
- Gross Output — The total value of the industries' production.

[8] All dollar values in this report are expressed in 2023 dollars.

2 Data and Assumptions

2.1 Data

The National Renewable Energy Laboratory (NREL) uses a benchmarking method to model the necessary costs incurred when installing a system using photovoltaic (PV) technology and monofacial monocrystalline silicon PV modules. The NREL estimated construction costs are broken into three main categories: Materials and Equipment, Labor, and Other Costs, including permitting fee, sale tax, contingency, interconnecting fee, and business overhead and profit. Their method accounts for all necessary system and project development costs at the national average. However, project pricing depends highly on region and project specifics such as local retail electricity rate structures, local rebate and incentive structures, competitive environment, and overall project or deal structures (Ramasamy et al., 2021).

In this report, we asked developers of community solar projects, who are familiar with the region, to provide their expected cost of construction using the same cost category from NREL. We averaged the responses and got the expected cost of construction for a 10MW$_{AC}$ project. We then applied the conversion rate from NREL to get the average construction costs for a 5MW$_{AC}$ project and a 20MW$_{AC}$ project (Table 1). To protect proprietary information, we do not provide detailed categorical costs. However, our cost proportions are comparable to the costs provided by NREL. We also assume the average construction durations for a 5MW$_{AC}$ project, 10MW$_{AC}$ project, and 20MW$_{AC}$ project are six months, nine months, and twelve months, respectively (Table 1).

Table 1: Expected total cost of construction

Construction phase data description	5MW Project	10MW Project	20MW Project
Construction duration	6 months	9 months	12 months
Total construction phase employee compensation ($)	2,665,000	5,330,000	10,660,000
Total construction Materials and Equipment Cost ($)	6,500,000	12,480,000	23,920,000
Permitting fees and taxes ($)	1,040,000	1,560,000	2,340,000
Business overhead ($)	2,080,000	3,380,000	5,460,000
Other costs ($)	1,040,000	2,080,000	4,160,000
Total cost of construction ($)	**13,325,000**	**24,830,000**	**46,540,000**
Land lease agreement ($)	21,074	63,221	168,588
Total ($)	**13,346,074**	**24,893,221**	**46,708,588**

On average, direct land use requirements for 1-axis tracking PV installations range from 4.2 to 10.6 acres/MW, with a capacity-weighted average of 6.3 acres/MW (Ong et al., 2013). Therefore, a 5MW project requires 31.5 acres, a 10MW project requires 63 acres, and a 20MW project requires 126 acres. The average annual leasing rate in Ohio is $1,338 per acre[9]. The surveys from developers indicate no difference in the costs of leasing green fields and brownfields (distressed fields).

We estimate the economic impacts of the construction phase for different project sizes using the JEDI model. We assume that the materials and equipment needed for the construction phase are not manufactured in Ohio. However, 50% of the equipment and materials are purchased locally in Ohio. We assume that 80% of the labor is sourced from Ohio as is required by USSEC to enter into Ohio's Payment in Lieu of Taxes (PILOT) agreement[10]. We also assume the permitting fees and taxes are spent 100% in Ohio, and all other costs are spent in Ohio at the rate of 80%. All dollar values are expressed in 2023 dollars.

On average, a single solar project has a lifespan of 25 years. To measure the economic impacts of the operation and maintenance (O&M) phase, we averaged the expected operation and maintenance costs provided by developers. Our annual O&M cost estimate is roughly $13.1 per kilowatt ($kW_{AC}$). 60% of the estimated O&M expense goes toward labor, and 40% of the estimate goes toward materials and equipment. It costs roughly $127,297 per year to operate a $5MW_{AC}$ PV solar project, $254,594 to operate a $10MW_{AC}$ project, and $509,188 to operate a $20MW_{AC}$ project, including leasing costs (Table 2).

Table 2: Expected annual O&M cost for $5MW_{AC}$, 10 MW_{AC}, and $20MW_{AC}$ projects

Project size	Labor cost ($)	Materials and equipment cost ($)	Land lease agreement ($)	Total O&M cost ($)
5 MW	51,090	34,060	42,147	127,297
10 MW	102,180	68,120	84,294	254,594
20 MW	204,360	136,240	168,588	509,188

[9]Information provided by developers of community solar projects.

[10]Ohio General Assembly Reforms Renewable and Advanced Energy Tax Policy. http://www.bricker.com/documents/publications/2223.pdf

2.2 Hypothetical solar rollout scenarios

The community solar program will allow 1000MW$_{AC}$ of new capacity on various types of sites with a project cap of 10MW$_{AC}$ and the installation of 500MW$_{AC}$ of new capacity on brownfield sites with a project cap of 20MW$_{AC}$. An additional installation of 250 MW$_{AC}$ of new capacity will be allotted for construction in qualifying Appalachian region sites. All the projects in the Appalachian community solar program will be on brownfields.

This section presents some hypothetical solar rollout scenarios for the community solar and the Appalachian community solar program. We offer economic impact analysis for a combination of small (5MW$_{AC}$) and large (10WM$_{AC}$) projects in each rollout scenario. Tables 3, 4, and 5 show the hypothetical rollout scenarios for the 1000MW$_{AC}$ on various types of sites with a project cap of 10MW$_{AC}$. Tables 6, 7, and 8 show the hypothetical rollout scenarios for the 500MW$_{AC}$ on brownfields with a project cap of 20MW$_{AC}$. Tables 9, 10 and 11 show the hypothetical rollout scenarios for the 250MW$_{AC}$ on Appalachian brownfields.

2.2.1 Hypothetical roll-out scenarios for the 1000MW$_{AC}$ community solar program on various types of sites

All projects in this program have a project cap of 10MW$_{AC}$. For this program, we hypothesize three different roll-out scenarios as follows:

- **Scenario 1**: In this scenario, we assume all the projects are 5MW$_{AC}$ projects and will be allocated over four years. Therefore, fifty 5MW$_{AC}$ projects will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 3)

- **Scenario 2**: In this scenario, we assume all the projects are 10MW$_{AC}$ projects and will be allocated over four years. Therefore, twenty-five 10MW$_{AC}$ projects will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 4)

- **Scenario 3**: In this scenario, we assume that the 1000MW$_{AC}$ community solar program on various types of sites is a combination of 5MW$_{AC}$ and 10MW$_{AC}$ projects and will be allocated over four years. In this scenario, we assume thirty projects of 5MW$_{AC}$ and

ten projects of 10MW$_{AC}$ will be built a year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 5)

Table 3: 1000MW$_{AC}$ Community Solar Program on various types of sites rollout scenario 1

Scenario 1																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	50	50	50	50												
10MW	-	-	-	-												
Number of projects operated																
5MW	0	50	100	150	200	200	200	200	200	200	200	200	150	100	50	0
10MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4: 1000MW$_{AC}$ Community Solar Program on various types of sites rollout scenario 2

Scenario 2																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10MW	25	25	25	25												
Number of projects operated																
5MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10MW	0	25	50	75	100	100	100	100	100	100	100	100	75	50	25	0

Table 5: 1000MW$_{AC}$ Community Solar Program on various types of sites rollout scenario 3

Scenario 3																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	30	30	30	30												
10MW	10	10	10	10												
Number of projects operated																
5MW	0	30	60	90	120	120	120	120	120	120	120	120	90	60	30	0
10MW	0	10	20	30	40	40	40	40	40	40	40	40	30	20	10	0

2.2.2 Hypothetical roll-out scenarios for the 500MW$_{AC}$ community solar program on brownfields

All projects in this program have a project cap of 20MW$_{AC}$. For this program, we hypothesize three different roll-out scenarios as follows:

- **Scenario 1**: In this scenario, we assume that the 500MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over four years. In this scenario, we assume eleven projects of 5MW$_{AC}$, five projects of 10MW$_{AC}$, and one project of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 6)

- **Scenario 2**: In this scenario, we assume that the 500MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over four years. In this scenario, we assume nine projects of 5MW$_{AC}$, four projects of 10MW$_{AC}$, and two projects of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 7)

- **Scenario 3**: In this scenario, we assume that the 500MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over four years. In this scenario, we assume seven projects of 5MW$_{AC}$, five projects of 10MW$_{AC}$, and two projects of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 4, all projects' construction will be completed. (Table 8)

Table 6: 500MW$_{AC}$ Community Solar Program on brownfields rollout scenario 1

Scenario 1																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	11	11	11	11												
10MW	5	5	5	5												
20MW	1	1	1	1												
Number of projects operated																
5MW	0	11	22	33	44	44	44	44	44	44	44	44	33	22	11	0
10MW	0	5	10	15	20	20	20	20	20	20	20	20	15	10	5	0
20MW	0	1	2	3	4	4	4	4	4	4	4	4	3	2	1	0

Table 7: 500MW$_{AC}$ Community Solar Program on brownfields rollout scenario 2

Scenario 2																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	9	9	9	9												
10MW	4	4	4	4												
20MW	2	2	2	2												
Number of projects operated																
5MW	0	9	18	27	36	36	36	36	36	36	36	36	27	18	9	0
10MW	0	4	8	12	16	16	16	16	16	16	16	16	12	8	4	0
20MW	0	2	4	6	8	8	8	8	8	8	8	8	6	4	2	0

Table 8: 500MW$_{AC}$ Community Solar Program on brownfields rollout scenario 3

Scenario 3																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	7	7	7	7												
10MW	5	5	5	5												
20MW	2	2	2	2												
Number of projects operated																
5MW	0	7	14	21	28	28	28	28	28	28	28	28	21	14	7	0
10MW	0	5	10	15	20	20	20	20	20	20	20	20	15	10	5	0
20MW	0	2	4	6	8	8	8	8	8	8	8	8	6	4	2	0

2.2.3 Hypothetical roll-out scenarios for the 250MW$_{AC}$ community solar program in the Appalachian Region

All projects in this program have a project cap of 20MW. For this program, we hypothesize three different roll-out scenarios as follows:

- **Scenario 1**: In this scenario, we assume that the 250MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over two years. In this scenario, we assume eleven projects of 5MW$_{AC}$, five projects of 10MW$_{AC}$, and one project of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 2, all projects' construction will be completed. (Table 9)

- **Scenario 2**: In this scenario, we assume that the 250MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over two years. In this scenario, we assume nine projects of 5MW$_{AC}$, four projects of 10MW$_{AC}$, and two projects of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 2, all projects' construction will be completed. (Table 10)

- **Scenario 3**: In this scenario, we assume that the 250MW$_{AC}$ is the combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects and will be allocated over two years. In this scenario, we assume seven projects of 5MW$_{AC}$, five projects of 10MW$_{AC}$, and two projects of 20MW$_{AC}$ will be built each year. The projects will be operated the year after construction and have a lifespan of 25 years. By the end of year 2, all projects' construction will be completed. (Table 11)

Table 9: 250MW$_{AC}$ Community Solar Program on the Appalachian region's distressed sites rollout scenario 1

Scenario 1																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	11	11														
10MW	5	5														
20MW	1	1														
Number of projects operated																
5MW	0	11	22	22	22	22	22	22	22	22	22	22	11	0		
10MW	0	5	10	10	10	10	10	10	10	10	10	10	5	0		
20MW	0	1	2	2	2	2	2	2	2	2	2	2	1	0		

Table 10: 250MW$_{AC}$ Community Solar Program on the Appalachian region's distressed sites rollout scenario 2

Scenario 2																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	9	9														
10MW	4	4														
20MW	2	2														
Number of projects operated																
5MW	0	9	18	18	18	18	18	18	18	18	18	18	9	0		
10MW	0	4	8	8	8	8	8	8	8	8	8	8	4	0		
20MW	0	2	4	4	4	4	4	4	4	4	4	4	2	0		

Table 11: 250MW$_{AC}$ Community Solar Program on the Appalachian region's distressed sites rollout scenario 3

Scenario 3																
Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10 to Y24	Y25	Y26	Y27	Y28	Y29	Y30
Number of projects constructed																
5MW	7	7														
10MW	5	5														
20MW	2	2														
Number of projects operated																
5MW	0	7	14	14	14	14	14	14	14	14	14	14	7	0		
10MW	0	5	10	10	10	10	10	10	10	10	10	10	5	0		
20MW	0	2	4	4	4	4	4	4	4	4	4	4	2	0		

3 Findings

3.1 The economic impacts of a single project

This section presents the economic impacts of a single project of different sizes. Since it takes less than a year to build smaller projects, the jobs created in the construction phase are converted to full-time job years. For example, if two full-time construction workers are employed to construct a 5MW$_{AC}$ project for six months, we consider it one full-time job year. The construction and operation of solar projects contribute to the economy through 4 channels:

- **Direct effect**: This effect measures the changes in manufacturing, construction, and O&M jobs directly associated with constructing and operating solar projects.
- **Indirect effect**: This effect measures the changes in employment, incomes, and sales in Ohio among vendors who supply intermediate goods and services to the construction and operation of solar projects.
- **Induced effect**: This effect measures the added local economic activities, such as purchasing entertainment, healthcare, retail, etc., led by the incomes generated through direct and indirect impacts.
- **Induced effect from land leasing**: The extra income from leasing land goes directly to households. Although this income does not generate direct employment, it will induce more local spending, thus, help support more jobs and generate more income and sales in Ohio.

Table 12: Construction phase's local spending

	A single 5MW project ($)	A single 10MW project ($)	A single 20MW project ($)
Total direct construction cost ($)	13,325,000	24,830,000	46,540,000
Local spending ($)	5,668,000	10,192,000	18,564,0000
Local spending as % of total construction	42.5%	41%	39.88%

3.1.1 Economic impacts of a single 5MW$_{AC}$ project

It costs $13.25 million in Ohio to build a 5MW$_{AC}$ photovoltaics solar project. 42.5% of the total construction cost ($5.67 million) is expected to be captured in the state (Table 12). The construction of each 5MW$_{AC}$ project is expected to generate 23 direct job years and support another 19.95 full-time job years through indirect and induced effects. In addition, the income from land leasing helps to support another 0.15 job years through its induced effect. In total, the construction of a 5MW$_{AC}$ project supports about 43.1 Ohio full-time job years with total earnings of over 4.98 million dollars (Table 13). The construction of a 5MW$_{AC}$ photovoltaics solar project is expected to contribute over $7 million to the state GSP and $10.76 million to the total state gross output. (Table 13)

Table 14 summarizes the economic impacts of operating a 5MW$_{AC}$ project for a single year in Ohio. Collectively, the operation of a 5MW project supports the equivalence of 0.97 full-time jobs through direct, indirect, and induced effects with an annual labor income of $94,252. The annual operation and maintenance expenses of a 5MW project are expected to contribute $132,851 to the state GSP and $232,996 to the total state gross output.

A 5MW$_{AC}$ project is expected to support 67.47 full-time job years in Ohio with a total labor income of $7.34 million during its construction phase and 25 years of operation (Table 15). Throughout its lifetime, a 5MW$_{AC}$ project is estimated to contribute $10.38 million to the Ohio GSP and $16.58 million to the state's gross output. (Table 15)

Table 13: The economic impacts of the construction of a 5MW$_{AC}$ project

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	23	2,985,400	3,470,000	4,212,200
Indirect	11.65	1,222,100	2,068,700	3,760,600
Induced	8.30	769,500	1,504,400	2,759,100
Induced impact from land leasing	0.15	8,607	15,553	27,129
Total	43.10	4,985,607	7,058,653	10,759,029

Table 14: The economic impacts of the operating a 5MW$_{AC}$ project for a single year

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	0.26	51,090	51,090	85,150
Indirect	0.10	8,874	19,675	39,563
Induced	0.31	17,073	30,981	54,025
Induced impact from land leasing	0.30	17,215	31,105	54,258
Total	0.97	94,252	132,851	232,996

Table 15: The lifetime economic impacts of a 5MW$_{AC}$ project

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Construction	43.10	4,985,607	7,058,653	10,759,029
O&M	24.37	2,356,293	3,321,285	5,824,891
Total lifetime impact of a 5MW project	67.47	7,341,900	10,379,938	16,583,921

3.1.2 Economic impacts of a single 10MW$_{AC}$ project

It costs $24.83 million to build a 10MW$_{AC}$ solar project in Ohio. 41% of the total construction cost ($10.19 million) is expected to be captured in the state (Table 12). The construction of each 10MW$_{AC}$ project is expected to generate 65.63 direct job years and support another 52.80 full-time job years through indirect and induced effects. In addition, the income from land leasing helps to support another 0.46 job years through its induced effect. In total, the construction of a 10MW$_{AC}$ project supports about 118.88 Ohio full-time job years with total earnings of $9.2 million (Table 16). The construction of a 10MW$_{AC}$ photovoltaics solar project is expected to contribute $12.84 million to the state GSP and $19.37 million to the total state gross output. (Table 16)

Table 17 summarizes the economic impacts of operating a 10MW$_{AC}$ project for a single year in Ohio. Collectively, the operation of a 10MW$_{AC}$ project supports the equivalence of 1.94 full-time jobs through direct, indirect, and induced effects with an annual labor income of $188,503. The annual operation and maintenance expenses of a 10MW$_{AC}$ project are expected to contribute $265,703 to the state GSP and $465,991 to the total state gross output.

A 10MW$_{AC}$ project is expected to support 167.36 full-time job years in Ohio with a total labor income of $13.91 million during its construction phase and 25 years of operation (Table 18). Throughout its lifetime, a 10MW$_{AC}$ solar project is estimated to contribute $19.48 million to the Ohio GSP and over $31 million to the state's gross output. (Table 18)

Table 16: The economic impacts of the construction of a 10MW$_{AC}$ project

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	65.63	5,673,600	6,484,000	7,696,300
Indirect	30.75	2,137,200	3,647,800	6,712,600
Induced	22.05	1,361,800	2,662,400	4,882,800
Induced impact from land leasing	0.46	25,822	46,658	81,387
Total	118.88	9,198,422	12,840,858	19,373,087

Table 17: The economic impacts of the operating a 10MW$_{AC}$ project for a single year

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	0.51	$102,180	$102,180	$170,300
Indirect	0.20	$17,748	$39,350	$79,126
Induced	0.62	$34,146	$61,962	$108,050
Induced impact from land leasing	0.61	34,429	62,211	108,515
Total	1.94	188,503	265,703	465,991

Table 18: The lifetime economic impacts of a 10MW$_{AC}$ project

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Construction	118.88	9,198,422	12,840,858	19,373,087
O&M	48.48	4,712,585	6,642,570	11,649,782
Total lifetime impact of a 10MW project	167.36	13,911,007	19,483,428	31,022,869

3.1.3 Economic impacts of a single 20MW$_{AC}$ project

It costs $46.54 million to build a 20MW$_{AC}$ solar project in Ohio. 39.88% of the total construction cost ($18.56 million) is expected to be captured in the state (Table 12). The construction of each 20MW$_{AC}$ project is expected to generate 168 direct job years and support another 125.8 full-time job years through indirect and induced effects. In addition, the income from land leasing helps to support another 1.22 job years through its induced effect. In total, the construction of a 20MW$_{AC}$ project supports about 295.02 Ohio full-time job years with total earnings of over $17.18 million (Table 19). The construction of a 20MW$_{AC}$ photovoltaics solar project is expected to contribute $23.66 million to the state GSP and $35.35 million to the total state gross output. (Table 19)

Table 20 summarizes the economic impacts of operating a 20MW$_{AC}$ project for a single year in Ohio. Collectively, the operation of a 20MW$_{AC}$ project supports the equivalence of 3.87 full-time jobs through direct, indirect, and induced effects with an annual labor income of $377,007. The annual operation and maintenance expenses of a 10MW$_{AC}$ project are expected to contribute $531,406 to the state GSP and $931,983 to the total state gross output.

A 20MW$_{AC}$ project is expected to support 391.73 full-time job years in Ohio with a total labor income of over $26.6 million during its construction phase and 25 years of operation (Table 21). Throughout its lifetime, a 20MW$_{AC}$ solar project is estimated to contribute $36.94 million to the Ohio GSP and $58.65 million to the state's gross output. (Table 21)

Table 19: The economic impacts of the construction of a 20MW$_{AC}$ project

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	168.00	10,879,800	12,248,300	14,248,600
Indirect	73.10	3,784,300	6,510,900	12,123,300
Induced	52.70	2,442,700	4,775,500	8,758,000
Induced impact from land leasing	1.22	68,858	124,422	217,030
Total	295.02	17,175,658	23,659,122	35,346,930

Table 20: The economic impacts of operating a 20MW$_{AC}$ project for a single year

	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Direct	1.02	204,360	204,360	340,600
Indirect	0.40	35,496	78,700	158,253
Induced	1.23	68,293	123,924	216,099
Induced impact from land leasing	1.22	68,858	124,422	217,030
Total	3.87	377,007	531,406	931,983

Table 21: The lifetime economic impacts of a 20MW$_{AC}$ project

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Construction	295.02	17,175,658	23,659,122	35,346,930
O&M	96.72	9,425,170	13,285,139	23,299,565
Total lifetime impact of a 20MW project	391.73	26,600,828	36,944,261	58,646,495

3.2 Lifetime impacts of the hypothetical community solar rollout scenarios

3.2.1 Lifetime impacts of 1000MW$_{AC}$ community solar program on various types of sites with a project cap of 10MW$_{AC}$

Table 22 presents the total lifetime economic impact of the rollout scenario 1. The scenario assumes 200 projects of 5MW$_{AC}$ will be constructed to meet 1000MW$_{AC}$. This rollout scenario will support 13,494 job years in Ohio with total earnings of $1.47 billion through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, the 200 solar projects of 5MW$_{AC}$ will contribute $2.07 billion to the state's GSP.

Table 22: Lifetime economic impacts of the 1000MW$_{AC}$ community solar program on various types of sites - Rollout scenario 1

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	8,620	997,121,491	1,411,730,616	2,151,805,885
Total Operation Phase Impacts	4,873	471,258,512	664,256,963	1,164,978,244
Total Lifetime Impacts	13,494	1,468,380,004	2,075,987,578	3,316,784,129

Table 23 presents the total lifetime economic impact of the rollout scenario 2. The scenario assumes 100 projects of 10MW$_{AC}$ will be constructed to meet 1000MW$_{AC}$. This rollout scenario will support 16,736 job years in Ohio with total earnings of $1.39 billion through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, 100 solar projects of 10MW$_{AC}$ will contribute $1.95 billion to the state's GSP.

Table 23: Lifetime economic impacts of the 1000MW$_{AC}$ community solar program on various types of sites - Rollout scenario 2

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	11,888	919,842,196	1,284,085,850	1,937,308,699
Total Operation Phase Impacts	4,848	471,258,530	664,256,967	1,164,978,230
Total Lifetime Impacts	16,736	1,391,100,727	1,948,342,817	3,102,286,929

Table 24 presents the total lifetime economic impact of the rollout scenario 3. The scenario assumes 120 projects of 5MW$_{AC}$ and 40 projects of 10MW$_{AC}$ will be constructed to meet 1000MW. This rollout scenario will support 14,791 job years in Ohio with total earnings of $1.44 billion through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, the combination of 120 solar projects of 5MW$_{AC}$ and 40 projects of 10MW$_{AC}$ will contribute $2.02 billion to the state's GSP.

Table 24: Lifetime economic impacts of the 1000MW$_{AC}$ community solar program on various types of sites - Rollout scenario 3

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	9,927	966,209,773	1,360,672,709	2,066,007,010
Total Operation Phase Impacts	4,863	471,258,520	664,256,965	1,164,978,238
Total Lifetime Impacts	14,791	1,437,468,293	2,024,929,674	3,230,985,249

3.2.2 Lifetime impacts of 500MW$_{AC}$ community solar program on brownfields with a project cap of 20MW$_{AC}$

Table 25 presents the total lifetime economic impact of the rollout scenario 1. The scenario assumes 44 projects of 5MW$_{AC}$, 20 projects of 10MW$_{AC}$, and 4 projects of 20MW$_{AC}$ will be

constructed to meet 500MW$_{AC}$. This rollout scenario will support 7,883 job years in Ohio with total earnings of $707.67 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $994.16 million to the state's GSP.

Table 25: Lifetime economic impacts of the 500MW$_{AC}$ community solar program on brownfields - Rollout scenario 1

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	5,454	472,037,799	662,034,392	1,002,246,755
Total Operation Phase Impacts	2,429	235,629,259	332,128,483	582,489,120
Total Lifetime Impacts	7,883	707,667,059	994,162,875	1,584,735,875

Table 26 presents the total lifetime economic impact of the rollout scenario 2. The scenario assumes 36 projects of 5MW$_{AC}$, 16 projects of 10MW$_{AC}$, and 8 projects of 20MW$_{AC}$ will be constructed to meet 500MW$_{AC}$. This rollout scenario will support 8,241 job years in Ohio with total earnings of $699.69 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $980.97 million to the state's GSP.

Table 26: Lifetime economic impacts of the 500MW$_{AC}$ community solar program on brownfields - Rollout Scenario 2

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	5,814	464,061,884	648,838,220	980,069,893
Total Operation Phase Impacts	2,427	235,629,258	332,128,483	582,489,122
Total Lifetime Impacts	8,241	699,691,142	980,966,703	1,562,559,015

Table 27 presents the total lifetime economic impact of the rollout scenario 3. The scenario assumes 28 projects of 5MW$_{AC}$, 20 projects of 10MW$_{AC}$, and 8 projects of 20MW$_{AC}$ will be constructed to meet 500MW$_{AC}$. This rollout scenario will support 8,370 job years in Ohio with total earnings of $696.60 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $975.86 million to the state's GSP.

Table 27: Lifetime economic impacts of the 500MW$_{AC}$ community solar program on brownfields - Rollout scenario 3

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	5,945	460,970,712	643,732,430	971,490,006
Total Operation Phase Impacts	2,426	235,629,259	332,128,483	582,489,121
Total Lifetime Impacts	8,370	696,599,971	975,860,913	1,553,979,127

3.2.3 Lifetime impacts of 250MW$_{AC}$ community solar program on Appalachian region's distressed sites with a project cap of 20MW$_{AC}$

Table 28 presents the total lifetime economic impact of the rollout scenario 1. The scenario assumes 22 projects of 5MW$_{AC}$, 10 projects of 10MW$_{AC}$, and 2 projects of 20MW$_{AC}$ will be constructed to meet 250MW$_{AC}$. This rollout scenario will support 3,941 job years in Ohio with total earnings of $353.83 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $497.08 million to the state's GSP.

Table 28: Lifetime economic impacts of 250MW$_{AC}$ community solar program on Appalachian region - Rollout scenario 1

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	2,727	236,018,900	331,017,196	501,123,378
Total Operation Phase Impacts	1,214	117,814,630	166,064,241	291,244,560
Total Lifetime Impacts	3,941	353,833,529	497,081,437	792,367,938

Table 29 presents the total lifetime economic impact of the rollout scenario 2. The scenario assumes 18 projects of 5MW$_{AC}$, 8 projects of 10MW$_{AC}$, and 4 projects of 20MW$_{AC}$ will be constructed to meet 250MW$_{AC}$. This rollout scenario will support 4,120 job years in Ohio with total earnings of $349.85 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $490.48 million to the state's GSP.

Table 30 presents the total lifetime economic impact of rollout scenario 3. The scenario assumes 14 projects of 5MW$_{AC}$, 10 projects of 10MW$_{AC}$, and 4 projects of 20MW$_{AC}$ will be

Table 29: Lifetime economic impacts of 250MW$_{AC}$ community solar program on Appalachian region - Rollout scenario 2

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	2,907	232,030,942	324,419,110	490,034,946
Total Operation Phase Impacts	1,213	117,814,629	166,064,241	291,244,561
Total Lifetime Impacts	4,120	349,845,571	490,483,351	781,279,507

constructed to meet 250MW$_{AC}$. This rollout scenario will support 4,185 job years in Ohio with total earnings of $348.30 million through direct, indirect, and induced effects. Throughout their construction phase and 25 years of operation, this combination of 5MW$_{AC}$, 10MW$_{AC}$, and 20MW$_{AC}$ projects will contribute $487.93 million to the state's GSP.

Table 30: Lifetime economic impacts of 250MW$_{AC}$ community solar program on Appalachian region - Rollout scenario 3

Phase	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
Total Construction Phase Impacts	2,972	230,485,356	321,866,215	485,745,003
Total Operation Phase Impacts	1,213	117,814,629	166,064,242	291,244,560
Total Lifetime Impacts	4,185	348,299,985	487,930,456	776,989,563

3.3 Tax impacts

Ohio Revised Code (R.C.) § 5727.75 exempts "qualified energy projects", including renewable energy generation, from tangible personal property tax. If a solar project in Ohio meets certain criteria as certified by the director of the Ohio Department of Development, it utilizes the real and personal property tax abatement and payment in lieu of taxes (PILOT) framework[11].

To qualify for the exemption, the owner or lessee pursuant must submit an application to the power sitting board for a certificate before December 31, 2024. Construction must begin on or later than January 1, 2009, and before January 1, 2025. For projects greater than 20MW, the local county commissioners must approve the exemption by resolution within 30 days or else have declared itself an "alternative energy zone". The PILOT is distributed in the same

[11] Ohio Revised Code (R.C.) § 5727.75 *Exemption on tangible personal property and real property of certain qualified energy projects.* Retrieved from https://codes.ohio.gov/ohio-revised-code/section-5727.75.

manner as the tangible personal property tax (to localities and school districts).

The owner or a lessee pursuant of a qualified solar project shall make annual service payments of $7,000 per megawatt of nameplate capacity in lieu of taxes to the county treasurer. However, 5727.75(E)(1)(b) permits the county to impose an annual service payment to be made in addition to the PILOT. The sum of the additional service payment and the PILOT payment shall not exceed $9,000 per megawatt of nameplate capacity located in the county.

Given the above, we calculated the potential tax revenues paid to counties using the lower bound of $7,000 per megawatt and the upper bound of $9,000 per megawatt. The entire Ohio Community Solar Pilot Program (1,750MW$_{AC}$ of new capacity) is expected to bring $12.25 million to $15.75 million in annual tax revenue to the counties (Table 31). Throughout its lifetime, The Ohio Community Solar Pilot Program is expected to bring between $318.5 million to $409.5 million in tax revenue to counties in Ohio (Table 32). A significant portion of this tax revenue will go to fund Ohio's schools and the remainder will be distributed among all other local governments in the state.

Table 31: Potential annual tax revenues from the Ohio Community Solar Pilot Programs

Program	Minimum tax revenue ($)	Maximum tax revenue ($)
1000MW$_{AC}$ on various types of site	7,000,000	9,000,000
500MW$_{AC}$ on brownfields	3,500,000	4,500,000
250MW$_{AC}$ in Appalachian Ohio	1,750,000	2,250,000
Total	12,250,000	15,750,000

Table 32: Potential lifetime tax revenues from the Ohio Community Solar Pilot Programs

Program	Minimum tax revenue ($)	Maximum tax revenue ($)
1000MW$_{AC}$ on various types of site	182,000,000	234,000,000
500MW$_{AC}$ on brownfields	91,000,000	117,000,000
250MW$_{AC}$ in Appalachian Ohio	45,500,000	58,500,000
Total	318,500,000	409,500,000

4 Discussion

Throughout their lifetime, a single 5MW$_{AC}$ project is expected to support 67.47 job years and contribute $10.38 million to GSP (Table 15), a single 10MW$_{AC}$ project is expected to support 167.36 job years and contribute $19.48 million to GSP (Table 18), and a single 20MW$_{AC}$ project is expected to support 391.73 job years and contribute $36.94 million to GSP (Table 21).

The results suggest that rollout scenarios with more of the smaller projects contribute more to labor income, gross state product (GSP), and total state's gross outputs but support smaller numbers of job years compared to scenarios with more of the larger projects. This is because smaller projects capture higher local spending during their construction phase (Table 12) but have shorter construction durations. In general, having more of the smaller projects will benefit the state in terms of labor income and value-added.

Since the true distribution of the size of facilities for each section of this program is still being determined, we only presented the impacts of some hypothetical rollout scenarios in the previous section with the assumption that there will be more smaller projects of 5MW$_{AC}$ than bigger projects of 10MW$_{AC}$ and 20MW$_{AC}$. If the program ends up with a different combination of large and small projects, the total lifetime impact of the program can be calculated using the lifetime impacts of single projects; tables 15, 18, and 21.

Table 33: Expected economic impacts of the Ohio Community Solar Pilot Programs

Program	Employment (Job years)	Earning ($)	GSP ($)	Gross Output ($)
1000MW$_{AC}$ on various types of site	15,007	1,432,316,341	2,016,420,023	3,216,685,435
500MW$_{AC}$ on brownfields	8,165	701,319,391	983,663,497	1,567,091,339
250MW$_{AC}$ in Appalachian Ohio	4,082	350,659,695	491,831,748	783,545,669
Total	27,254	2,484,295,427	3,491,915,268	5,567,322,444

Table 33 summarizes the average impacts of our hypothetical rollout scenarios for each project and the average total impact of the entire Ohio Community Solar Pilot Program. The 1000MW$_{AC}$ project on various types of sites with a project cap of 10MW$_{AC}$ is expected to support an average of 15,007 Ohio job years and contribute roughly $2.02 billion to GSP. The 500MW$_{AC}$ project on brownfields with a project cap of 20MW$_{AC}$ is expected to support an average of 8,165 Ohio job years and contribute about $983.66 million to GSP. The 250MW$_{AC}$

project in Appalachian Ohio is expected to support an average of 4,082 Ohio job years and contribute $491.83 million to GSP. The entire Ohio Community Solar Pilot Program, which combines the three projects, is expected to support 27,254 Ohio job years with total earnings of $2.48 billion and contribute $3.49 billion to GSP and $5.56 billion to gross output.

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