

SEPTEMBER 2022

COMMUNITY SOLAR

would bring investments, jobs and savings to West Virginia

REPORT states that enabling Community Solar programs will control energy costs, spur market competition, create jobs, and save ratepayers millions

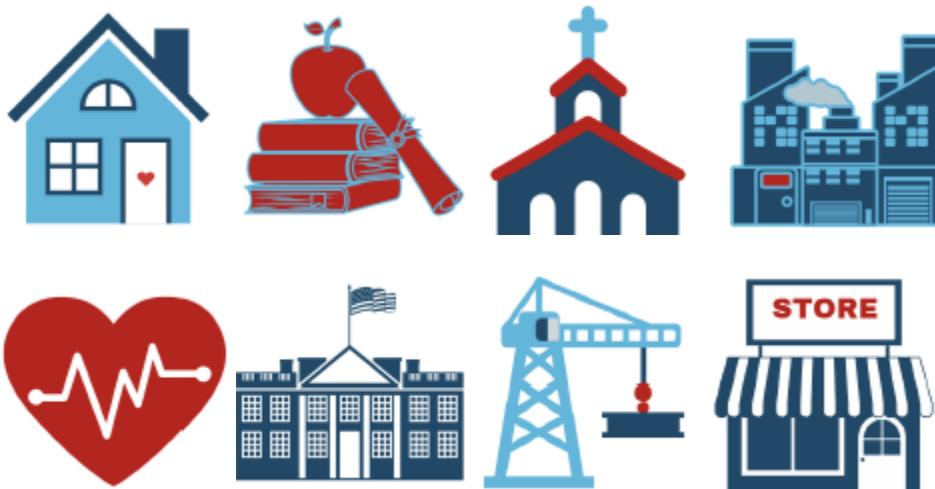
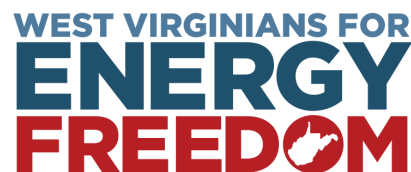




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SPECIAL REPORT BY



EXECUTIVE SUMMARY

Mountaineers are always free. However, when it comes to access to cheaper renewable electricity, their choices are limited. West Virginians can choose to purchase even-more-expensive renewable electricity from their utility or install an on-site solar array. And if people rent their home or have a shaded property, choices are even more limited. This report examines community solar as an alternative to the current “either/or” policy. Community solar enables individuals, businesses, or organizations to subscribe to a nearby solar installation and receive credits on their electric bills for the energy produced by their share of the solar project.

Solar development has rapidly expanded across the United States in the last decade. While solar in general grew, so did community solar: More community solar capacity was installed in 2020 and 2021 than in the previous 14 years combined. Community solar legislation and policies adopted by 21 states and Washington, DC were key to this growth.

One important benefit of the expansion of the solar industry has been the creation of local jobs. Fewer solar jobs have been created in West Virginia than all surrounding states. In fact, in 2021, West Virginia ranked 49th in solar jobs per capita. In 2021, community solar accounted for 9% of all solar installation and project development jobs across the United States. None of these community solar jobs, however, are in West Virginia. If West Virginia adopts legislation to allow community solar to flourish, numerous local jobs will be created.

Community solar would have significant local economic benefits in West Virginia. In the 2022 legislative session, a community solar bill was introduced that would allow the development of 200 MW of true community solar projects across West Virginia (House Bill 4561). Installing 200 MW of community solar projects across West Virginia would create \$386.3 million in new sales. West Virginian firms would hire approximately 1,630 employees for that work. The new economic activity associated with the installation of community solar projects would then ripple out into many sectors of West Virginia’s economy, generating an estimated 2,500 full- and part-time jobs.

Another benefit is that West Virginians would save money on their electricity bills. If community solar subscribers save 1-2 cents per kWh on their electric bills, their savings would total approximately \$2.6–5.3 million per year. These savings can then be spent at West Virginia businesses, providing additional local economic benefits.

The successes and obstacles encountered in other states are instructive for developing effective community solar legislation in West Virginia. Community solar policies adopted in Minnesota and New York have been very successful, leading to the rapid development of hundreds of megawatts per year of community solar projects. In contrast, community solar has hardly taken off in North Carolina.

In other states, community solar has provided clear benefits to several sectors of the economy. West Virginia’s largest employment sectors include education, health care, and retail; these sectors, along with the agriculture sector, could benefit significantly from community solar projects. By subscribing to a large percentage of a community solar project’s electricity, anchor tenants in these sectors can help developers lower risk and program costs while stabilizing their own electricity costs and often meeting corporate sustainability goals.

Community solar will bring widespread, significant benefits to the people of West Virginia.

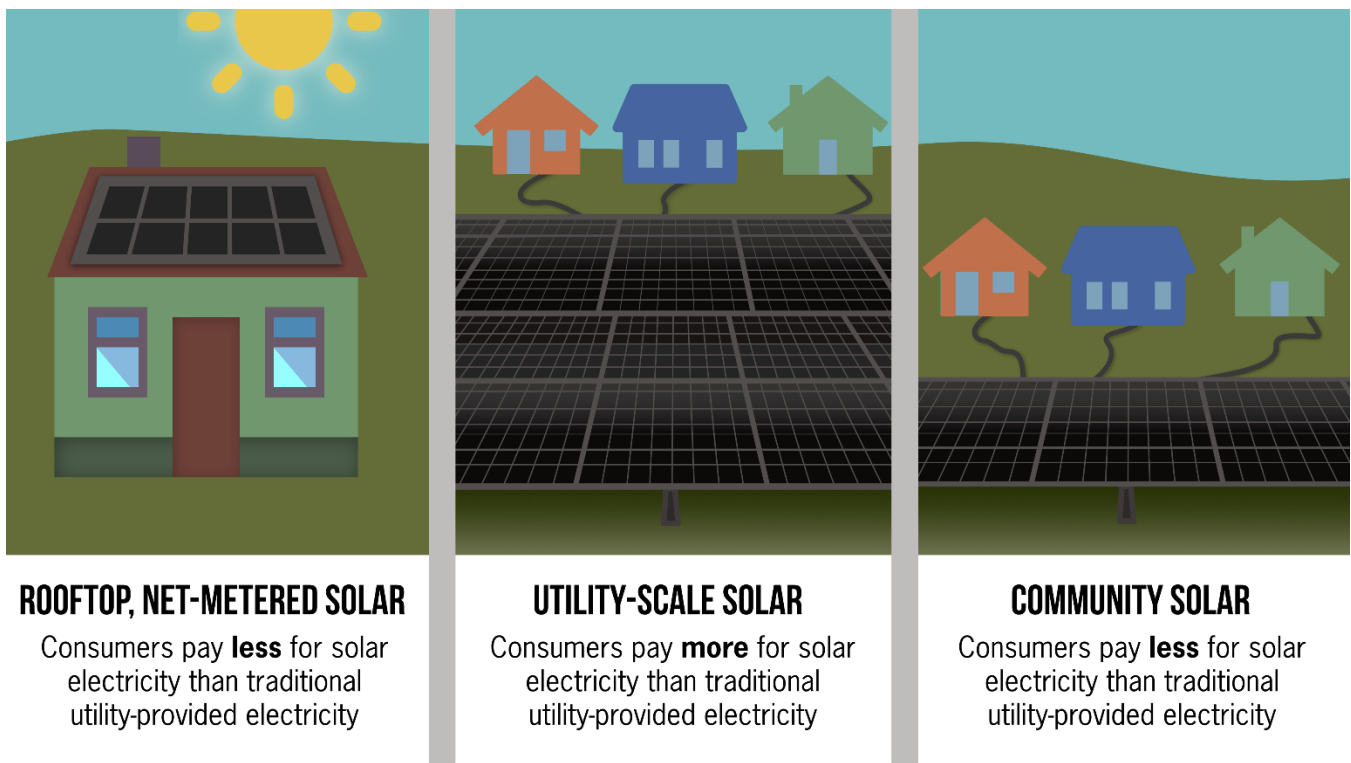
1. INTRODUCTION: What is community solar?

Mountaineers are always free. However, when it comes to access to cheaper renewable electricity, their choices are limited. West Virginians can choose to purchase even-more-expensive renewable electricity from their utility or install an on-site solar array. And if people rent their home or have a shaded property, choices are even more limited. This report examines community solar as an alternative to the current “either/or” policy. Community solar enables individuals, businesses, or organizations to subscribe to a nearby solar installation and receive credits on their electric bills for the energy produced by their share of the solar project.

While legislation enacted in recent years is helping increase access to solar electricity, true community solar is needed to broaden access to solar, reduce electricity costs, and create jobs. In 2020, the Legislature passed a utility solar bill (Senate Bill 583), and West Virginians can now sign up for solar electricity provided by their electric utility. However, this solar electricity is more expensive than non-solar electricity, and it is more expensive than solar electricity that would be provided by private developers in a true community solar program. In 2021, the Legislature passed a bill allowing people to install rooftop solar at no cost to themselves (House Bill 3310). With third-party ownership allowed, people can save money immediately on their electric bills with no up-front cost. However, this policy does not help people who rent their homes or have shaded roofs.

Community solar is growing in many states across the country. As illustrated in Figure 1, community solar in West Virginia would provide an alternative that recent legislation has failed to address. Community solar creates more competition among electricity generators, encourages investments of private capital by independent solar developers, saves subscribers money, stimulates innovation, and provides higher levels of service. In short, consumers have more choice and save money on their electricity.

Figure 1: Rooftop, utility-scale, and community solar

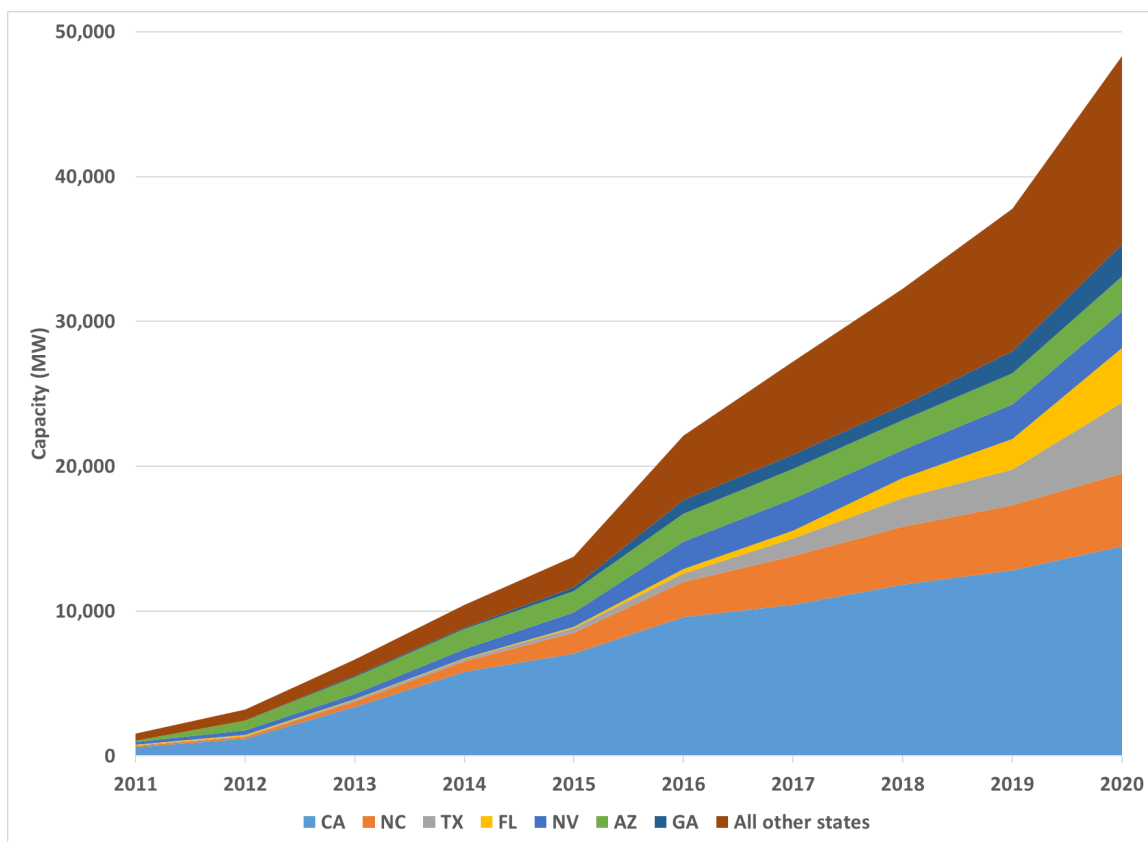


After providing an overview of solar development across the United States, this report outlines the benefits that community solar would bring to West Virginia. It then reviews three community solar case study states: Minnesota, New York, and North Carolina, which are instructive for developing the best community solar program possible in West Virginia. Finally, this report examines four economic sectors that would benefit greatly from participating in a community solar program.

As illustrated in Figure 2, solar development has rapidly expanded across the United States in the last decade. The top states include California, Arizona, and Texas; however, Florida, Georgia, and North Carolina on the East Coast have also seen a rapid expansion of solar capacity.

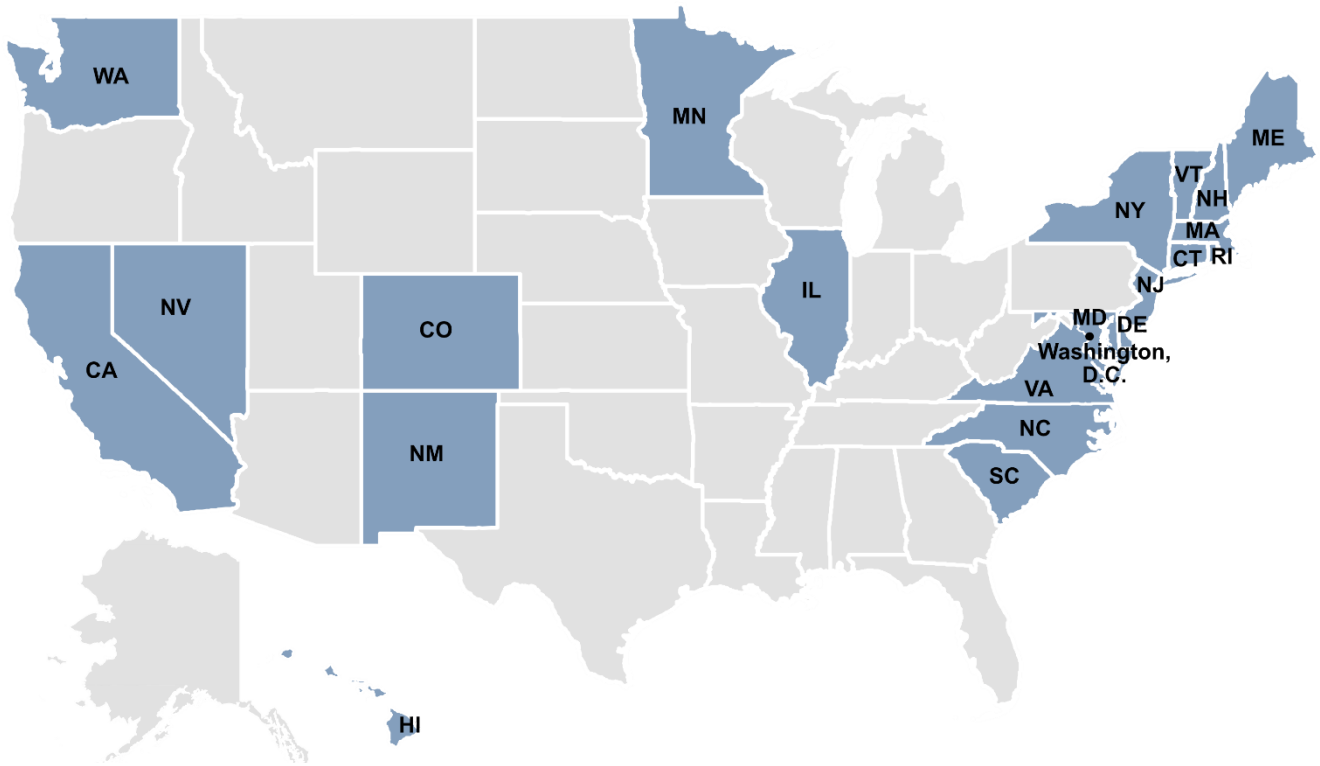
While solar in general grew, so did community solar: More community solar capacity was installed in 2020 and 2021 than in the previous 14 years combined (Chan et al., 2022). Community solar legislation and policies adopted by 21 states and Washington, DC were key to this growth (See Figure 3). The declining cost of solar installations—as well as policies that generally support solar and renewables—have also contributed to the rapid increase in community solar.

Figure 2: Solar capacity by state (2011-2020)



Source: EIA (2022).

Figure 3: States that have adopted community solar legislation

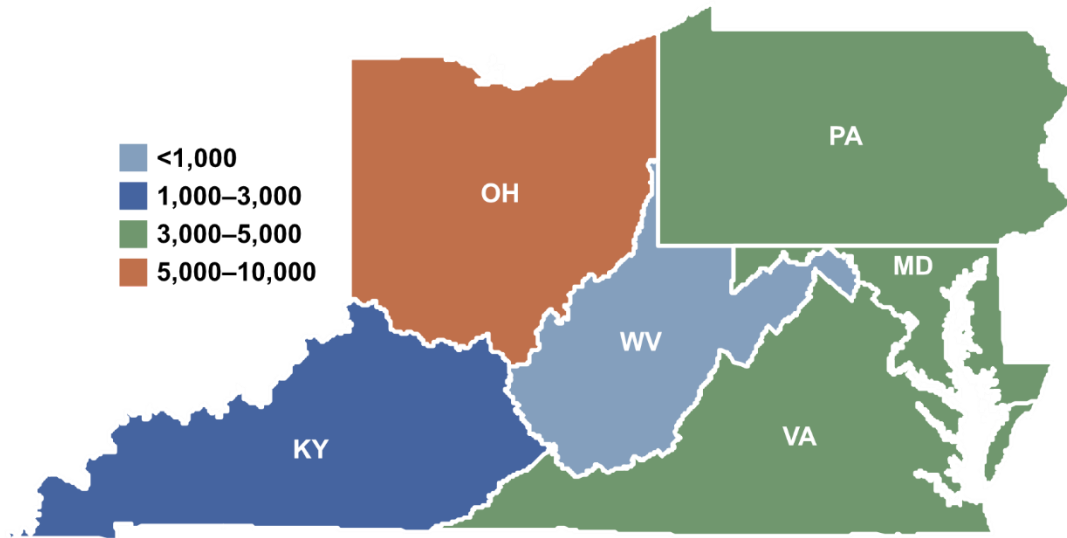


Source: Chan et al. (2022).

One important benefit of the expansion of the solar industry has been the creation of local jobs. As illustrated in Figure 4, fewer solar jobs have been created in West Virginia than all surrounding states. In fact, in 2021, only 372 solar jobs were reported in West Virginia—ranking 49th in solar jobs per capita (Interstate Renewable Energy Council, 2022).

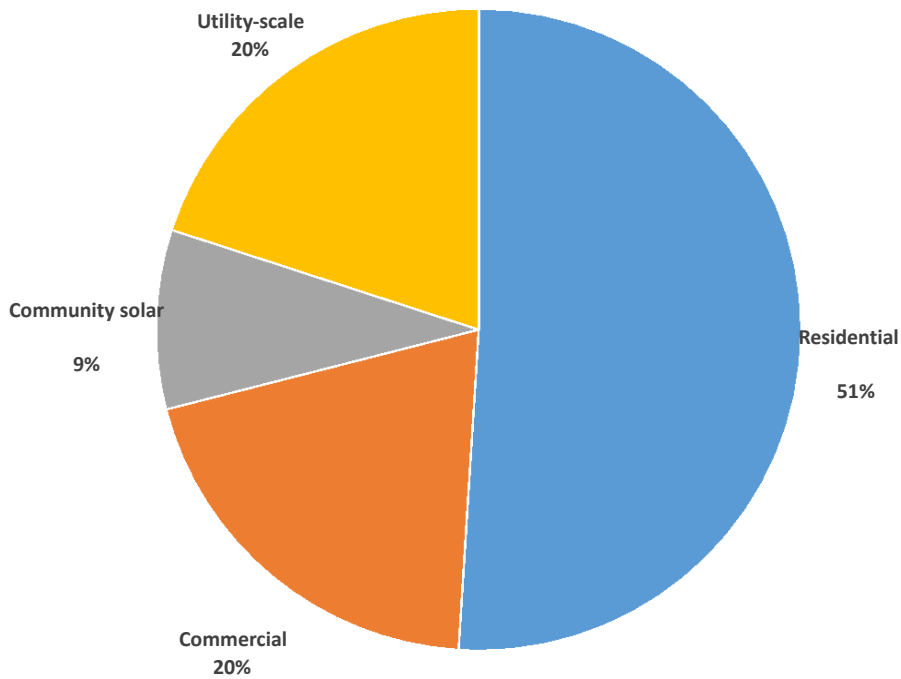
In 2021, community solar accounted for 9% of all solar installation and project development jobs across the United States (See Figure 5). None of these community solar jobs, however, are in West Virginia. If West Virginia adopts legislation to allow community solar to flourish, numerous local jobs will be created.

Figure 4: Solar jobs by state (2021)



Source: Interstate Renewable Energy Council (2022), Figure 4.

Figure 5: Solar installation and project development jobs by segment in the United States (2021)



Source: Interstate Renewable Energy Council (2022), Figure 7.

1. COMMUNITY SOLAR WOULD BENEFIT WEST VIRGINIA

Community solar installations—and the jobs generated by these investments—can increase dramatically in states with policies that allow community solar to thrive. As documented below in Chapter 3, hundreds of MW of community solar projects were installed in New York in each year from 2019 through 2021, just a few years after the state’s community solar policy was implemented in 2015. In Minnesota, community solar installations topped 100 MW per year from 2017 through 2020—again a few years after that state’s community solar program began in 2014. In contrast, North Carolina’s program, which is not a true community solar program, has resulted in just 1.1 MW of solar installed in 2019.

Table 4 summarizes some of the differences between the successful Minnesota and New York programs and the North Carolina program. One notable difference is that both the New York and Minnesota programs are uncapped. Not only does this allow community solar development to expand to meet consumer demand, but it also provides certainty for solar developers who would otherwise be unsure whether a new project will ultimately fit under the cap.

Table 4: Key characteristics of successful community solar programs

	Minnesota	New York	North Carolina
Factors			
Program Cap	Uncapped	Uncapped	40 MW
Project Cap	1 MW	2 MW	5 MW
Subscriber Location	Subscriber and project must be in same or neighboring county	Subscriber and project must be in same service territory	Subscriber and project must be in same or neighboring county
Types of entities that can offer community solar	Electric utility or other entity or organization	Electric utility or other entity or organization	Electric utility
Outcome			
Community solar capacity installed after policy change	Hundreds of MW	More than 1,000 MW	Approximately 1 MW

The individual project caps in Minnesota and New York are considerably lower than the 5 MW cap in North Carolina, suggesting that a cap as low as 1 MW does not appear to hinder the growth of community solar.

Subscriber location requirements can also be important. In New York, community solar projects can be located anywhere within the same electric service territory. In Minnesota, however, projects must be located within the same or adjacent county as the subscriber. This requirement in Minnesota is likely a cause of the reduction in the rate of increase of community solar installations in 2019 and 2020. In general, the broader the geographic area, the more successful the program is likely to be.

A final consideration is the type of entity that can offer community solar. Restricting community solar to electric utilities only, as is done in North Carolina, hinders investments of private capital and stifles competition, leading to more expensive, rather than less expensive, solar electricity.

1.1 Community solar would have significant local economic benefits

In the 2022 legislative session, a community solar bill was introduced that would allow the development of 200 MW of true community solar projects across West Virginia (House Bill 4561). Installing 200 MW of community solar projects across West Virginia would create \$386.3 million in new sales across the state (See Table 5). This full impact results from an increase in total market sales in the state of \$328 million related to the expenditures associated with installing the solar projects.

Approximately \$248 million is estimated to go immediately to West Virginian firms (direct effect on output), which would hire approximately 1,630 employees for that work. The new economic activity associated with the installation of community solar projects would then ripple out into many sectors of West Virginia’s economy, generating an estimated 2,500 full- and part-time jobs and increasing sales by \$386 million. The total increase in jobs includes 870 support jobs generated through indirect and induced activity.¹

Overall, the direct labor income to employees and proprietors is estimated to increase by slightly more than \$100 million, and the total additional labor income generated by this activity across the state is estimated to be \$143 million. The total impact on value added, a measure of the increase of wealth within the state that includes labor income, is estimated to be \$241 million.

The full impact on state and local taxes, including the purchase of products not made within the state but taxable as imports, is estimated to be nearly \$32 million.

Table 5: Estimated economic impact on West Virginia’s economy from the installation of 200 MW of community solar

Impact	Employment	Output (million \$)	Value added (million \$)	Labor income (million \$)
Direct effects	1,630	\$248	\$167	\$101
Secondary effects				
Indirect	299	\$57	\$29	\$17
Induced	571	\$82	\$46	\$26
Subtotal	870	\$139	\$74	\$43
Total	2,500	\$386	\$241	\$143

Source: IMPLAN analysis conducted by the authors using data from Solar Energy Industries Association et al. (2021). Note: Employment includes full-time and part-time employment. Dollars are 2022 dollars. This analysis is based on an estimate that each installation job can install 175 kilowatts of solar capacity and will earn \$47,445. In addition to the immediate installation activity, nearly 500 additional support jobs are estimated in the direct effects to be involved in engineering and the other aspects of managing the community solar projects.

¹ These secondary jobs are based on the indirect activity that results from the increases in production to meet the increased demand for goods and services directly, as well as the induced jobs that result from increases across the state in household spending that is associated with the earnings from the direct installation activity and the indirect production activity.

1.2 Community solar subscribers would save money on their electricity bills

True non-utility community solar projects sell subscriptions that would save customers money on each kWh of electricity used. According to House Bill 4561, subscribers would get a credit on their electricity bills for each subscribed kWh of electricity generated at the community solar farm. While subscription prices have not been set yet by solar developers because West Virginia's community solar program is not operational, it is likely that customers will save 1-2 cents per kWh on their electric bills by subscribing to community solar.

This savings, while small per kWh, are large in aggregate. If 200 MW of community solar were built across West Virginia as allowed by House Bill 4561, West Virginia electric customers would save approximately \$2.6–5.3 million per year.²

These savings can then be spent at West Virginia businesses, providing additional local economic benefits.

² Based on generation estimated as 200 MW * 8,760 hours * 15% capacity factor.

2. OTHER STATES HAVE HAD SUCCESS WITH COMMUNITY SOLAR

While community solar is growing across the nation, every state's community solar program is different. Key program elements, defined below, differ from state to state (NREL, 2017) and influence a program's attractiveness to both developers and customers.

- **Program cap:** The cumulative statewide community solar program capacity limit.
- **Project cap:** The individual project capacity limit.
- **Subscriber location:** All community solar customers must be located within the same electric service territory as the project. However, additional requirements relating to project-to-subscriber geographic proximity may exist.
- **Subscriber eligibility:** The number of subscribers a community solar project must have and the amount each subscriber may purchase.
- **Low- and moderate-income (LMI) stipulations:** Lower-income customer allocation for community solar projects.
- **Subscriber compensation:** The amount customers receive for the generation from their subscription in a project.

This chapter focuses on three states that have adopted community solar policies: Minnesota, New York, and North Carolina. The Minnesota and New York programs have been very successful, leading to the rapid development of hundreds of megawatts per year of community solar projects. In contrast, community solar has hardly taken off in North Carolina. The successes and obstacles encountered in these states are instructive for developing effective community solar legislation in West Virginia.

2.1 Minnesota

Renewable resources—including wind, solar, hydropower, and biomass—generated the largest share of Minnesota’s electricity in 2020 (EIA, 2021b). While wind still generates the largest share of renewable energy, solar has climbed the ranks and now provides 20%.

Integral to the increase in solar development has been Minnesota’s Community Solar Garden Statute, which was adopted in 2013 and requires utilities to operate community solar garden programs and “purchase all energy generated by the community solar garden” (Minnesota Legislature, 2022).

The owner of the community solar garden may be a public utility or any other entity or organization; therefore, Minnesota’s program provides true community solar to its residents.

This program is uncapped, but each project is capped at 1 MW.

As illustrated in Table 1, community solar installations have increased dramatically since the program was rolled out in 2014, especially in 2017 and 2018. Year-on-year community solar development slowed in 2019 and 2020.

This reduction in the growth rate could be related to legal geographic restrictions that require developers to only sell subscriptions in the county where the community solar project is located—or to neighboring counties. In areas with low populations and few small businesses, potential community solar sites may be financially challenging for developers. (Jossi, 2020)

Table 1: Community solar installations in Minnesota

Year	Installed capacity (MW)
2013	<0.1
2014	0.4
2015	0.3
2016	32.6
2017	234.8
2018	246.6
2019	155.4
2020	126.8

Source: Chan et al. (2022).

Minnesota Community Solar Details

Program Cap: Uncapped

Project Cap: 1 MW

Subscriber Location: Within or adjacent to project county

Subscriber Eligibility: Not fewer than five subscribers and no single subscriber has greater than 40% interest

LMI Stipulations: No

Subscriber Compensation: Value-of-solar-energy

New York

New York has surged to become a leader in community solar. In 2021, community solar made up 70% of all new solar capacity installed across the state (NYSERDA, 2022). As illustrated in Table 2, hundreds of MW of community solar have been installed in each of the past three years.

The Empire State took a different path than Minnesota and North Carolina. Instead of passing a community solar bill, New York simply opted to modify its existing net metering policy, which permits the return of unused solar power back into the grid.

New York’s community solar program was enacted via state Public Service Commission Case 15-E-0082 in 2015, and was aided by NY-Sun, a New York State Energy Research and Development Authority (NYSERDA) public-private partnership that coordinates projects with solar developers, local governments, and subscribers. NY-Sun facilitates the state’s solar energy programs by reducing costs and easing bureaucratic obstacles that can overwhelm small businesses and families. Its goal is not just to provide incentives, but also to affect market behaviors and leverage private investment to create a self-sustaining solar industry.

New York’s community solar program has no aggregate cap, but individual projects are capped at 2 MW—twice that of Minnesota.

In New York, subscribers can choose a community solar project anywhere within their service territory. This works well for the Empire State because of its urban populations that have high electricity demands but rent apartments or have limited rooftop areas to install panels.

New York Community Solar Details

Program Cap: Uncapped

Project Cap: 2 MW

Subscriber Location: No

Subscriber Eligibility: Not fewer than ten subscribers and no single subscriber has greater than 40% interest

LMI Stipulations: No

Subscriber Compensation: Value-of-solar-energy

Table 2: Community solar installations in New York

Year	MW
2016	0.6
2017	4.4
2018	12.8
2019	226.1
2020	293.2
2021	667.8

Source: Chan et al. (2022).

2.2 North Carolina

North Carolina is a major solar power provider, ranking fourth in the nation in solar power generation and third in installed capacity (EIA, 2021a). However, only a small portion of the state’s solar installations are community solar projects.

In the past, North Carolina’s favorable tax incentives, rebates, and large utility-scale projects have overshadowed the demand for community solar. However, with the sunset of several solar incentives and the passage of House Bill 589 in 2017, community solar may take on a larger share of new solar projects.

House Bill 589 established the framework for North Carolina’s electric utilities to provide community solar programs to their customers. The bill authorized 20 MW of solar installations per “offering utility” and capped each individual project at 5 MW. Offering utilities are defined as large utilities with at least 150,000 customers—specifically Duke Carolina and Progress. Solar installations for smaller utilities, such as municipally owned or electric cooperatives, are uncapped. People and businesses that subscribe to a community solar project are compensated at the avoided cost rate. (North Carolina Sustainable Energy Association, 2022) Because North Carolina’s program is run by its utilities and charges more for solar electricity, it is similar to the utility-based solar program already being implemented in West Virginia and is not a true community solar program.

Taking into account enrollment fees and monthly subscription fees, North Carolinians participating in this program will most likely pay more for their electricity (Duke Progress, 2022). This increased cost of participation may be one obstacle to program success, as Duke Energy has failed to construct a single community solar facility as of July 2020. (North Carolina Sustainable Energy Association, 2022) Elsewhere in North Carolina, a small municipal electric utility in Fayetteville offers a community solar program. The Fayetteville Public Works Commission allows subscriptions of up to five panels; customers pay one-time enrollment fees for each panel but then receive monthly bill credits. (Fayetteville Public Works Commission, 2022)

Before the adoption of House Bill 589, approximately 2 MW of community solar was installed between 2011 and 2017 (See Table 3). After its passage, only another 1.1 MW was installed, with 90% being installed by the Fayetteville Public Works Commission. (Chan et al., 2022) North Carolina’s community solar program has not led to a significant increase in capacity or a broad roll-out across the state.

North Carolina Community Solar Details

Program Cap: 40 MW (20 MW in each of two service areas)

Project Cap: 5 MW

Subscriber Location: Within or contiguous to the county where the project is located

Subscriber Eligibility: Not fewer than five subscribers and no single subscriber has greater than 40% interest

LMI Stipulations: No

Subscriber Compensation: Avoided cost of generation

Table 3: Community solar installations in North Carolina

Year	Installed capacity (MW)
2011	<0.1
2012	0.0
2013	0.0
2014	0.2
2015	0.6
2016	1.1
2017	0.1
2018	0.0
2019	1.1

Source: Chan et al. (2022).

3. COMMUNITY SOLAR CAN BENEFIT MANY SECTORS

In other states, community solar has provided clear benefits to several sectors of the economy. West Virginia's largest employment sectors include education, health care, and retail; these sectors, along with the agriculture sector, could benefit significantly from community solar projects. By subscribing to a large percentage of a community solar project's electricity, anchor tenants in these sectors can help developers lower risk and program costs while stabilizing their own electricity costs and often meeting corporate sustainability goals.

3.1 Education

On average, U.S. schools spend 67 cents per square foot on electricity (Xcel Energy, 2007). In 2016, West Virginia's public schools spent over \$67 million on energy, one of the largest expenses behind personnel salaries and benefits (WVDE, 2016). West Virginia's education sector can therefore benefit from reduced electricity costs associated with community solar.

In Minnesota, the Red Wing School District leases its property to a solar installation company and subscribes to the 5-MW community solar array built on that site. This project required no up-front capital expenditure from Red Wing, while saving the school district \$7 million over life of the system. (Todd, 2016,)

As illustrated by the Red Wing School District, public education can serve as a viable anchor tenant for a community solar project, making projects more feasible in rural areas with a limited subscriber base. School campuses offer large rooftops and other suitable spaces, creating opportunities for siting community solar projects on public school property, which would generate additional revenue via lease agreements. Additionally, boards of education can save money on one of their largest non-employment expenses. Boards can also help community solar developers find subscribers because of the large number of employees and student families tied to the school system.

3.2 Health care

West Virginia's hospitals have faced difficulties in recent years, particularly in rural areas (Lawrence, 2020). Electricity accounts for approximately 21% of the energy demand at hospitals in the United States (Sheppy, 2014). Community solar can play a key role in saving hospitals money, while saving lives.

For example, New York's Albany Medical Center recently subscribed to community solar projects at four nearby solar farms. Under the agreements, Albany Medical Center saves more than \$150,000 per year on its electricity bills. (Misbrener, 2020)

The health care industry is the largest private employment sector in West Virginia. Like public schools, hospitals can serve as long-term committed anchor tenants for community solar projects and may have roofs, parking garages, or other areas on their campuses on which to site these projects.

3.3 Retail

Walmart has 39 stores and five Sam's Clubs operating in West Virginia (Walmart, 2022). One of West Virginia's largest employers, Walmart has a strong commitment to renewable energy.

In New York, Walmart is an anchor tenant for community solar, where it has subscribed to 23 Nexamp community solar projects totaling approximately 50 MW in solar capacity (Wagman, 2021).

Walmart set a goal to reach zero carbon emissions by 2040 across its global operations and aims to power all of its facilities with renewables by 2035. Community solar is an efficient way for Walmart to reach these goals because the company can simply subscribe to projects rather than managing their construction and operation. At the same time, these projects create jobs at third-party solar developers. (Wagman, 2021)

3.4 Agriculture

As "price-takers," individual farmers lack the capacity to pass on higher production costs. Increases in energy prices are likely to reduce farm income. (Schenpf, 2004)

Traditionally not seen as high-demand energy sector, electric bills account for up to 6% of total farm production expenses. However, small poultry farms and producers had the highest share of production-related electricity expenses: 13% in 2014 (Hitaj, 2016).

West Virginia's poultry industry is the state's highest-value livestock sector at \$261 million and ranks 19th in chicken broilers and 13th in turkey production in the nation. This industry is largely comprised of small, family-owned farms in the Mountain State, as 98% of farms are classified as small (most in the nation), and 93% are family-owned (second most in the nation). (USDA and WVDA, 2021).

West Virginia farms can benefit not just from subscribing to community solar projects, but also from siting the projects on farms. Community solar panels installed on the roofs of average-sized 20,000-square foot poultry houses can help stabilize production costs for small, family-owned poultry farms.

Several studies have investigated the positive benefits of developing solar on farms. Agrivoltaic opportunities provide a dual income for farmers who co-locate solar energy with agriculture. Solar pastures or solar grazing integrates herds and flocks amongst field-mounted panel arrays. Wildflowers seeded between panels support bee populations and aid in crop pollination. (Macknick, 2017). Farmers can consider increasing soil health without sacrificing farm income by installing solar panels for multi-year lease periods on fallow plots, allowing the ground to rest to restore its fertility (Izler, 2018).

When paired together, panels and crops provide co-benefits. Panels reduce stress on plants by providing shade during the hottest part of the day. The plants below the panels produce water vapor, naturally lowering the panels' operating temperatures to maximize their summertime efficiency. (USDA, 2022)

4. COMMUNITY SOLAR CAN WORK IN WEST VIRGINIA

As documented in this report, a true community solar program in West Virginia would open the market for competition and encourage investments of private capital. These investments would result in hundreds of millions of dollars of local economic benefits.

Community solar would also provide access to solar electricity for people who rent their homes or have shaded properties and will save all subscribers money—estimated at millions of dollars per year

Anchor tenants, which help developers lower risk and program costs, would help community solar succeed and could provide even greater benefits to the education, health care, retail, and agriculture sectors.

Community solar will bring widespread, significant benefits to the people of West Virginia.

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