Assessing the Benefits of Distributed Solar Energy in Virginia

What is distributed solar energy?

- "Distributed solar" refers to solar PV energy systems that are connected to the distribution grid, providing electrical power to homes, businesses and municipal facilities. Distributed solar energy provides local benefits to the grid, ratepayers and the economy.[1]
- Distributed solar can be customer-owned, third-party owned, or community-owned "shared" solar, which expands access to solar energy by subscribing multiple customers into a single system.
- Virginia currently has less than 100 megawatts (MW) of distributed solar, far below neighboring states. Installing 2,500 MW of distributed solar in Virginia would produce 3.75 million megawatt-hours (MWh) of electricity a year, equal to 3% of statewide electricity use and enough to power 125,000 homes.

What are the existing economic impacts of distributed solar energy in Virginia?

- Currently the distributed solar industry supports nearly 2,900 direct jobs in Virginia, plus an estimated 1,800 more jobs via indirect and induced impacts,[2] for a total of 4,700 jobs supported.
- For every $1 invested in distributed solar, an additional $0.60 is added to the state economy. This brings the total economic impact of distributed solar in Virginia to an estimated $727 million.

What are the potential economic impacts of distributed solar energy in Virginia?

- Expanding our distributed solar capacity to 2,500 MW[3] would lead to an estimated 29,500 direct jobs, plus 17,000 more indirect and induced jobs, resulting in over **$7 billion** in total economic impact.
- This new economic activity would generate over $860 million in federal, state, and local tax revenues.

Total Estimated Current and Potential Economic Impacts of the Distributed Solar Industry in Virginia

Type of Impact	Current Distributed Solar Industry (< 100 MW)		Potential Distributed Solar Industry (2500 MW)	
	Employment	Total Economic Impact	Employment	Total Economic Impact
Direct	2,900	$445,000,000	29,500	$4,341,000,000
Indirect	700	$122,000,000	6,600	$1,154,000,000
Induced	1,100	$160,000,000	11,000	$1,631,000,000
Total	*4,700*	*$727,000,000*	47,100	$7,126,000,000

1 This fact sheet summarizes the results of a 2020 study by the VCU Center for Urban and Regional Analysis (CURA) on the economic and environmental impacts of distributed solar energy in Virginia. The full report and citations are available at cura@vcu.edu. This research was made possible due to the sponsorship of MDV-SEIA. The findings and conclusions are those of the authors.

2 Direct impact refers to the initial expenditures of the immediate investment, including labor income and the purchase of materials and services. This initial spending creates "multiplier effects" as the dollars move through the economy. Indirect impact refers to "supplier" effects, or inter-industry spending through the supply chain. Induced impact looks outside the supply chain at changes in household spending, i.e., the effects of employees spending their wages on goods and services in the area.

3 Modeling assumes a mix of residential (500 MW), small commercial (750 MW), large commercial (750 MW) and community solar (500 MW) systems, with a weighted average installation price of $2.415 / watt.

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How much distributed solar can Virginia support?

- The summer retail peak load in Virginia is an estimated 20-25 GW. Virginia law currently limits "net-metered" generation capacity to 1% of that total, or 200-250 MW, most of which comes from residential and commercial-scale distributed solar. This study models expanding Virginia's net-metered distributed solar capacity to approximately 10% of summer retail peak load.
- Research by the National Renewable Energy Laboratory estimated that Virginia could support 19 GW of distributed solar, producing 22 million MWh of electricity, which equals 19% of state electricity demand.
- A report for PJM found that our region could get 30% of its electricity supply from renewable energy without any significant operating issues, leading to reduced wholesale electricity prices. This includes up to nearly 34,000 MW of distributed solar, equal to roughly 20-25% of the PJM region's summer peak load.
- A study for Dominion showed that over 200 MW of distributed solar could be supported on 14 individual distribution lines, which together represent less than 1% of the utility's total distribution network.

Does distributed solar create costs for utilities or their customers?

- There is no evidence that this increased distributed solar energy use will shift costs from solar customers to non-solar customers. This "cross-subsidization" can only occur if a utility gets State Corporation Commission approval to raise customer rates, after a full base rate case review, based on evidence that distributed solar is worth less to the utility than the existing electricity rate per kilowatt-hour.
- Research shows that distributed solar is more likely to be a net-benefit for utilities. At least six recent independent "value-of-solar" studies (i.e., ones conducted for independent agencies rather than utilities or the solar industry) have found that electricity generated by solar energy has a net-positive value to electric utilities, even without including societal benefits related to climate change or job creation.

How would increasing distributed solar use help fight climate change and reduce air pollution?

- Solar energy is particularly valuable for mitigating climate change, because it displaces carbon-intensive mid-day electricity production. The energy produced by 2,500 MW of distributed solar in Virginia would save about 2.8 million tons of CO_2, equal to 2.5% of our carbon footprint from electricity production.[4]
- These carbon savings are equal to the annual footprint of nearly 540,000 cars (over 285 million gallons of gasoline), or 14,000 rail cars full of coal. The same amount of CO_2 could be avoided by converting nearly 97 million incandescent light bulbs to LEDs, or by planting over 3.3 million acres of forest in a year.
- This solar energy production would also save roughly 3 million pounds / year of both sulfur dioxide and nitrous oxide pollution, and nearly 350,000 pounds / year of particulate matter (PM 2.5) emissions.

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[4] This research employed modeling tools from the U.S. EPA and the Pacific Northwest National Lab, which support granular analysis accounting for the complexities of regional grid operations and hourly variations in electricity generation and emissions profiles.