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What is Solar Power Really Worth to Maine?

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A look inside the state PUC's value-of-solar study

A recently released study commissioned by the Maine Public Utility Commission dropped a bombshell on the electricity world earlier this year, valuing distributed solar at $0.33 per kWh, far above the state's prevailing price. Maine's traditional, centrally generated grid electricity is sold to residential customers at the average retail price of $0.13 per kWh. Under retail net metering, distributed solar is compensated at that same rate. The high value the study places on distributed solar added another data point to the ongoing, vigorous debate about the answer to a fundamental question: Just what, exactly, is distributed solar power worth?

Electricity from solar panels on American homes is flooding onto the grid and providing great benefits to utilities and to society, yet it has been devilishly hard to assign a monetary value to it. Distributed solar photovoltaic (DPV) power (e.g., residential rooftop solar) has been growingat more than 50 percent per year. Yet while installed solar PV capacity in the US is climbing, valuing the electricity is generates is too often proving contentious, confusing, inconsistent, or opaque. Because of this uncertainty, "there is a heated debate about where, how, and how much distributed solar photovoltaics create benefits or impose costs," says Mathias Bell, a manager with RMI's electricity practice.

Valuing Distributed Solar

Recognizing that pricing structures and business models depend on getting these values right,RMI reviewed existing valuation studies and identified certain standards they should meet. The latest valuation study, released in March by the State of Maine, values distributed solar photovoltaics across many of the dimensions that RMI outlined in its framework. The study—and the way it's been received—tells us a lot about the value of distributed resources like solar, the debate about their value, and how that value can be unlocked.

The Maine Public Utilities Commission commissioned the study last year at the request of the state legislature. The evaluation included avoided energy costs, avoided generation capacity costs, avoided transmission costs, and avoided natural gas pipeline costs. It also included the

added costs of integrating distributed solar power to the grid. According to the analysis, two categories of potential value were not appropriate for Maine at present: avoided distribution costs (Maine's population has grown by less than one percent over the past four decades and the state doesn't expect to add any distribution infrastructure in the next 25 years) and the value of voltage regulation. All of these costs are factors that can affect the economics of an electric grid, the bottom line of a utility, and the cost to customers.

The study also considered benefits like the avoided pollution that DPV displaces, market price response, and avoided fuel price uncertainty. These benefits are more difficult to quantify and do not strictly, or even mainly, accrue to the electric grid or utilities, but rather accrue to society. They are also contentious. There is not consensus about "whether these values are most optimally included in utility costs and benefits," says Karl Rábago, an author of the Maine study, executive director of the Pace Energy and Climate Center, and former RMI employee. "This is the debate people engage around what they sometimes call externalities."

A Long Time Coming

The Maine study doesn't end the debate about externalities, but it does benefit from years of progress on other debatable elements of the value of DPV. "What's most difficult with these studies," says Bell, is that "there is a spectrum here of what's currently being monetized—what's quantifiable—and then what some may recognize, like the monetary benefit of reducing carbon, but not easily calculate a value for." "We constantly work to improve these values and use accumulated knowledge to gain a more precise understanding of value," says Rábago. "Values that we only hypothesized when the first value of solar studies were done, not ten years ago, are now being characterized and quantified reliably."

And not a moment too soon. As DPV supplies more and more of the US electric grid's power supply, more-accurately priced DPV and other distributed energy resources can enable more efficient investment. Coupled with other technologies and strategies, the right amount of DPV in the right places could make adding or updating certain generation plants, transmission lines, and distribution infrastructure unnecessary, keeping utilities' balance sheets healthy and rates low.

Further, transparently studying the value for DPV enables stakeholders and policy makers to use the analysis to "make informed policy decisions," says Rábago. Bell agrees: "In the end, it is a matter of policymaking to decide the extent to which prices will reflect value." The value of each kWh of DPV power "doesn't necessarily speak to what ultimately you decide to put in a rate design or a planning value," he says. Rábago understands that "there's a Yogi Berra thing; 'where you stand depends on where you sit.'"

Furthermore, Bell says, the right question to ask "is not just 'what's the value of this one resource' but 'what's the value of these resources in concert with another?' As they work together, what's the overall, net value?" Getting valuation right is ultimately about making the right investments in grid resources, of all kinds. And the optimal investment mix is unlikely to be in just one type of resource. For example, "avoided capacity has a lot to do with the timing of the solar generation," to coincide with peak demand, says Bell. "But if you're adding some flexibility pieces to it, like with batteries, then all of a sudden you can move that electricity to the time when it's more valuable, so the solar becomes more valuable." Stored solar electricity retains its environmental character as solar energy, but can gain time-based value when distributed to the grid at more optimal times.

Getting Down to Business

The Maine legislature is now debating what to do with the study it requested. The study included implementation options and all these, and more, are still on the table.
One possibility is that Maine will use its new DPV valuation to join Austin Energy in enacting a value-of-solar tariff. This approach is a new one, and is still contentious. For example, though the State of Minnesota set a methodology to create a value-of-solar tariff last year, no utilities have so far opted into the system.

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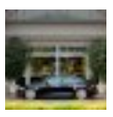
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Another possibility is embodied in a resolution recently considered by the Maine legislature that calls for establishing a market mechanism called a "standard buyer" to buy solar energy from all sources—at different rates for residential DPV, commercial DPV, and utility-scale solar—and sell it to the established electricity markets. This approach would be calibrated to both value solar power more accurately and to incentivize solar producers in a way that varies with the amount of solar that comes onto the market.

Finding they could not agree, the Maine legislature instead passed a bill directing the PUC to consider the "standard buyer" model together with other, new ways to reimburse owners of distributed generation. The bill is so popular that, though the governor of Maine vetoed it, a bipartisan, two-thirds majority of both houses of the Maine legislature overrode the veto on June 30. Importantly, the bill calls for all interested stakeholders to be involved in the PUC's deliberations, including the utilities, solar PV companies, the Maine public advocate, and environmental groups.

Creating a transparent process is an important first step with value-of-solar studies. "Having a public, transparent process boosts the integrity of the results," says Rábago. "We now have something that we can all have an objective debate about. That's worth a lot." Whatever happens, says Rábago, "you've got to give huge credit to the Maine legislature and the Maine Public Utilities Commission for seeing this project through."

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About the Author

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