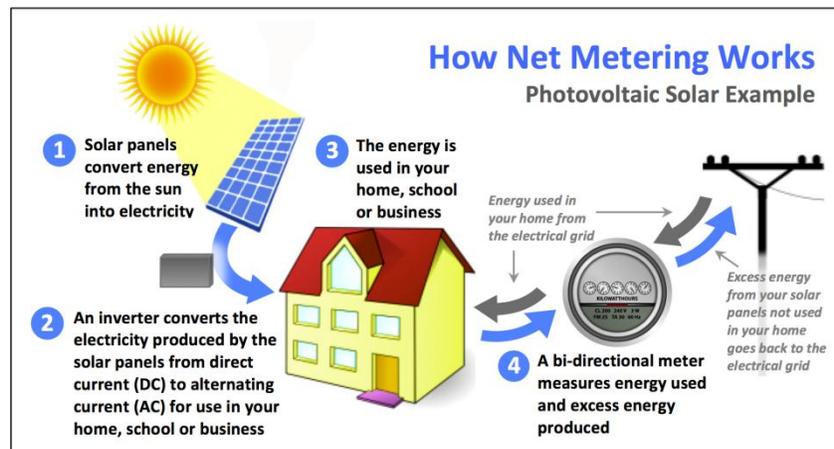


Solar Power and Net Metering: Good for Ratepayers

Solar power is creating jobs, diversifying New England's energy mix, cleaning our air and helping the region fight climate change. Yet many questions have been raised regarding the impact of solar on the electric grid and its fairness to non-solar utility customers and to all ratepayers. We should have a nuanced conversation about equity when discussing *any* source of energy, but at the end of the day, are **solar** and **net metering**—the way we buy and sell distributed energy in almost all of the United States—good for ratepayers? The answer is yes.



Source: [Our Power Campaign](#)

Solar benefits ratepayers. A growing body of research shows solar power and net metering (a.k.a. net energy meeting or NEM) are net positive for solar and non-solar users:

- A 2015 [analysis](#) by the Acadia Center puts the value of solar in Connecticut at 20-25 cents/kilowatt-hour (kWh). This valuation does not include 9.6 cents/kWh of benefits resulting from avoided pollution, such as carbon, sulfur oxides and nitrogen oxides emissions. A subsequent Acadia Center [analysis for Massachusetts](#) puts the value of solar electricity at 22-28 cents/kWh, with additional societal values of 6.7 cents/kWh.
- A 2015 Maine [study](#) valued solar at 33 cents per kWh, more than twice the cost of utility power.¹ A 2014 [evaluation](#) of net metering in Vermont found “net cost over 20 years to non-participating ratepayers... is close to zero, and there may be a net benefit.”
- A 2015 cost-benefit [study](#) of net metering in Missouri concluded that the practice is beneficial for all customers, regardless of whether they have rooftop solar or not.² The benefits of net metering in Mississippi outweighed the costs in all but one scenario according to a 2014 [study](#).³ A 2014 [study](#) by the Nevada Public Utilities Commission shows that benefits of rooftop solar outweigh the costs. A 2013 [study](#) commissioned by the California Public Utilities Commission found that solar customers cover their full costs to the electric grid.

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¹<http://www.utilitydive.com/news/maine-puc-study-values-solar-at-33-centskwh-more-than-double-the-price-of/374717/#.VQbBCvHG3P4>

² <http://www.utilitydive.com/news/study-net-metering-is-a-net-positive-for-missouri/369606/>

³ <http://www.utilitydive.com/news/study-mississippi-would-benefit-from-net-metering/316973/>

TABLE: **Solar's Benefits and Costs**⁴

<u>Benefits</u>	<u>Costs</u>
Avoided Energy Costs	Interconnection, Voltage Conversion
Avoided Line Losses	Administration of Credits/Connections
Deferred Transmission Infrastructure	Rebate/Incentive
Avoided Generation Capacity	Lost Utility Revenue
Avoided Emissions	Decrease in Utility Share Value
Fuel Hedge/Buffer Against Price Volatility ⁵	
Societal, Environmental, Economic/Jobs	

What exactly are the benefits and costs of solar? Sunlight is free, abundant and requires no extraction. Producing power closer to where it is used eliminates losses along power lines and a distributed network of small-scale power generation can reduce the need for new generation or transmission. Solar prices are stable, eliminating a risk baked into volatile⁶ fossil fuel prices.⁷ When clean energy reduces demand for oil and gas, it lowers their price, and powering our communities with solar reduces the need to run expensive, dirty generators on hot days. Renewable energy lowers wholesale energy costs⁸ and in New England, the future is even brighter: renewable energy can now bid *negatively* into energy markets, giving solar and wind the ability to further reduce costs and displace fossil fuel use in regions with transmission constraints.⁹

Solar's costs to the grid may include infrastructure upgrades related to interconnection,¹⁰ new administrative responsibilities and the incentives and credits applied to help finance and encourage uptake of renewable energy projects. For larger (i.e. non-residential) projects, developers typically have to pay the entire cost of interconnection, meaning that there is no cost to ratepayers. Some upgrades related to voltage control, metering, etc. may be paid for by the utility (and thus, passed along to ratepayers). Other infrastructure investments—such as replacing old transformers—need to happen whether or not solar is installed and should not be attributed as a cost specific to solar. Overall, distributed generation is critical for modernizing our electric grid, promoting consumer choice, stabilizing costs and keeping energy dollars local.¹¹

⁴ See http://www.rmi.org/elab_empower for solar benefits and costs, and how and to whom each accrue.

⁵ <http://www.nrel.gov/docs/fy13osti/59065.pdf>

⁶ <http://www3.cec.org/islandora/en/item/2360-renewable-energy-hedge-against-fuel-price-fluctuation-en.pdf>

⁷ http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html#bf-toc-4

⁸ <http://www.clf.org/blog/clean-energy-climate-change/renewable-energy-saves-money/>

⁹ <http://www.clf.org/wp-content/uploads/2014/09/Price-Takers-Locational-Nodes.pdf>

¹⁰ To learn about interconnection in Massachusetts, see <https://sites.google.com/site/massdgc/home>

¹¹ See <http://acadiacenter.org/document/utilityvision/> & <http://acadiacenter.org/document/energyvision/>

Caps on Net Metering Harm Low-income Consumers, Renters and the Commonwealth

Net metering is capped at a percentage of electric distribution utilities' peak load, or highest-ever power usage. In Massachusetts, the cap has been hit in the National Grid territory, meaning that in over 170 municipalities, community shared solar (CSS), low-income housing (LIH) solar and all but the smallest commercial projects cannot proceed. Renters, low-income residents and many others rely on these projects to access clean energy. In April 2015, a [report](#) by the Massachusetts' [Net Metering and Solar Task Force](#) found that:

“The net metering policy clearly drives the cumulative installations of [virtual net metering, or VNM] LIH and CSS. In capped scenarios neither of these project types will be built, but when net metering is uncapped all 130 scenarios show a hefty fraction of VNM LIH and CSS installs.” (pp. 129-130)

“Availability of net metering incentives is crucial to non-owner participants... This can be explained by the dependence of non-host-owned projects (such as Community Shared Solar and low-income housing with virtual net metering) on the availability of virtual net metering.” (page 132)

In May 2015, Massachusetts has more than 45 MW of solar on the waiting list, which is more solar than was installed during the entire year of 2011. This amount of solar equals \$45 million of held up Investment Tax Credit (ITC) funds and \$150 million in forgone solar development for solar installers. The Federal ITC expires at the end of 2016.

State Task Force Analysis Confirms Massachusetts Benefits from Solar

Even with added incentives, the Net Metering and Solar Task Force showed that benefits of solar exceed costs, with significant benefits to both solar users and the Commonwealth at large under the existing Solar Renewable Energy Certificate (SREC) program as well as two other simulated incentive models.¹² Looking at the existing incentive structure, the report stated:

“While the SREC programs are expected to come at a net cost to non-participating ratepayers of \$2.7-\$2.9 billion over 25 years, these programs are also expected to provide \$7.0-\$8.8 billion in net benefits to the citizens of Massachusetts over the same period, depending on the scenario analyzed. Customer-generators and non-owner participants are likely to enjoy a net benefit ranging from \$2.2-\$3.8 billion and \$734-\$809 million, respectively.” (Page 128)

The positive and significant benefit:cost ratio is particularly important to understand as utilities have made claims that solar will cost Massachusetts ratepayers \$2-4 billion over the next decade, without factoring in any of the benefits to the Commonwealth at large. If they exist, direct bill impacts to ratepayers are negligible¹³ and can be addressed through rate design changes which more accurately link energy supply and demand.

¹² <http://www.mass.gov/eea/docs/doer/renewables/final-net-metering-and-solar-task-force-report.pdf>

¹³ http://emp.lbl.gov/sites/all/files/LBNL%20PV%20Business%20Models%20Report_Briefing.pdf

Solar Works for All Communities. The cost of solar and solar panels is falling rapidly¹⁴ with rooftop solar experiencing an 80% price drop since 2008.¹⁵ Virtual net metering and community shared solar projects enable renters and low-income communities to access solar energy, even if they cannot put solar on their roofs. A 2013 [analysis](#) conducted by the Center for American Progress revealed that rooftop solar is not just being adopted by the wealthy; it is, in fact, mostly being deployed in neighborhoods where median income ranges from \$30,000 to \$90,000.¹⁶ An initial analysis of Massachusetts data shows that 60% of solar systems are deployed in communities with median incomes at or below \$80,000. This does not include shared solar or virtually net-metered projects.

So Why are Utilities Waging War on Solar?¹⁷ Despite solar's clear benefits to communities, investor-owned utility companies continue to assert that solar and net metering raise electricity rates and benefit only the lucky few. These claims are misguided and, worse, often targeted to manipulate communities who have borne the brunt of the fossil fuel economy.¹⁸ An [analysis](#) from the Lawrence Berkeley National Laboratory (LBNL) found that even the most aggressive net-metering solar programs would have minimal (0.1-2.7%) impact on electricity rates, but their impact on utility shareholders "may be significantly pronounced."¹⁹

Solar has profound effects on the utility business model. Distribution utilities currently anticipate certain revenue through distribution charges, and profit primarily through investments in distribution infrastructure or new transmission. Compensation to solar by distribution companies pays for the benefits provided to the grid. However, such compensation represents a loss of revenue to distribution companies that is ultimately recovered from ratepayers. As such, distribution companies tend to unfairly characterize solar compensation as a transfer of revenue from non-solar ratepayers to solar ratepayers.

How Can Solar Move Forward? Solar is working for Massachusetts, with \$2.37 billion invested in the state between 2010 and 2014 and each dollar invested yielding \$1.2 in benefits. Limits on solar such as caps on net metering caps inhibit industry growth and reduce equity in access to clean power. The state should lift net metering caps immediately to prevent further harm. As the industry matures, it may be reasonable to reduce incentives while targeting subsidies to meet specific policy goals, e.g. ensuring grid reliability and providing low-income rate relief. Conducting a comprehensive Value of Solar study, as recommended by the state's task force, is critical to build consensus among stakeholders. A Value of Solar study should precede any long-term solar policy, which will include substantial regulatory and rate design proceedings.

¹⁴<http://www.nytimes.com/2014/11/24/business/energy-environment/solar-and-wind-energy-start-to-win-on-price-vs-conventional-fuels.html>

¹⁵<http://blogs.edf.org/energyexchange/2013/07/24/net-metering-and-rooftop-solar-for-the-utility-of-the-future/>

¹⁶<https://www.americanprogress.org/issues/green/report/2013/10/21/76013/solar-power-to-the-people-the-rise-of-rooftop-solar-among-the-middle-class/>

¹⁷http://www.washingtonpost.com/national/health-science/utilities-sensing-threat-put-squeeze-on-booming-solar-roof-industry/2015/03/07/2d916f88-c1c9-11e4-ad5c-3b8ce89f1b89_story.html

¹⁸ http://www.huffingtonpost.com/jorge-madrid/lets-talk-about-solar-power_b_6724808.html

¹⁹ http://emp.lbl.gov/sites/all/files/LBNL%20PV%20Business%20Models%20Report_Briefing.pdf