Solar Savings in Massachusetts

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Electricity from solar reduces the need to run other power plants, which cuts the amount of electricity utilities need to buy and saves customers money. By avoiding the need to run the most expensive power plants (which are often powered by fossil fuels), when solar lowers the amount of electricity purchased, it also reduces the wholesale price of electricity.

Analyzing hourly data from ISO New England, we estimated what demand and prices for electricity would have been if not for local solar. These include benefits shared by all New Englanders, not just those with solar. **Massachusetts ratepayers saved more than $513 million due to local solar.**

On average, over the six years analyzed, local solar provided 11.9 cents per kWh of energy market benefits. This calculation only includes weeks where there is a strong relationship between loads and prices; other likely energy savings are not estimated here.

New England Solar Energy Savings

Year	MA	New England
2014	$49 million	$96 million
2015	$59 million	$118 million
2016	$83 million	$171 million
2017	$99 million	$206 million
2018	$123 million	$258 million
2019	$99 million	$211 million
Total	**$513 million**	**$1,060 million**

Numerous heat waves and especially high summertime energy prices in 2018 contributed to higher savings that year. Benefits in this figure only include impacts related to the wholesale energy market. Other benefits (e.g., public health, climate, capacity, transmission and distribution, reliability, or retail margins) are not included.

From 2014 to 2019...

- Solar created **$1.1 billion** in energy savings in New England, including **$513 million** in MA
- New England solar cut **4.6 million metric tons** of CO_2 pollution, equal to taking **one million cars** off the road
- Solar created **$87 million** in public health benefits in New England and **$47 million** in MA

In Massachusetts in 2019...

- Local solar produced **1.1 billion kWh** of electricity, equal to **2 percent** of the state's needs
- Local solar powered the equivalent of **166,000** homes
- Local solar created **$65 million** in CO_2 benefits, and removed the equivalent of **125,000** cars from the road

Synapse Energy Economics, Inc.

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Pollution Reduction Benefits

Energy market savings are just one benefit solar provides. Using peer-reviewed tools from U.S. EPA, we find that local solar avoided 4.6 million metric tons of climate-damaging carbon dioxide emissions in 2014 to 2019. Local solar also avoided the release of hundreds of thousands of pounds of criteria pollutants proven to have negative impacts on human health. **Public health and avoided CO_2 benefits of local solar exceed $600 million dollars from 2014 to 2019 in New England, and $324 million dollars in Massachusetts.**

Benefits of More Solar

If solar produced in Massachusetts in 2019 were doubled to 2.2 billion kWh, it would have provided $179 million in energy benefits to Massachusetts, an increase of 1.8X. If Massachusetts' local solar were tripled, energy benefits would be increased by 2.7X to $272 million. While the incremental energy benefit of each solar MWh does decrease, some of this difference could be mitigated by pairing solar with energy storage and smart load management.

Other Solar Benefits Exist

"Local solar" only includes solar characterized as behind-the-meter or "BTM" by ISO New England. It only includes solar less than 5 MW that is not enrolled in New England's electricity markets. This analysis only includes "local solar." In Massachusetts, this is only about half of the total solar installed. Including this solar would increase the benefits estimated in this analysis.

See Synapse Energy Economics' 2020 report "Solar Savings in New England" for additional information on our methodology, findings, and sources: www.synapse-energy.com/new-england-solar-savings

Historical Local Solar Benefits

Benefit category	*2019 c /kWh*
Energy	11.9 ¢
Capacity	1.6 ¢
Criteria pollutants	1.0 ¢
CO_2 @ $112/MT	6.0 ¢
Energy, capacity, and pollution reduction benefits of solar	**20.5 ¢**

Additional benefits not calculated:

- Capacity price impacts
- Local economic benefits
- Transmission and distribution capacity
- Reliability benefits
- Participant savings
- Local tax support
- Retail margin

As a point of comparison, the typical MA household pays 17 cents per kWh for electricity.

Synapse Energy Economics, Inc. is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients. Contact: Pat Knight pknight@synapse-energy.com

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