



Solar on Superstores

How the Roofs of Big Box Stores Can Help America Shift to Clean Energy



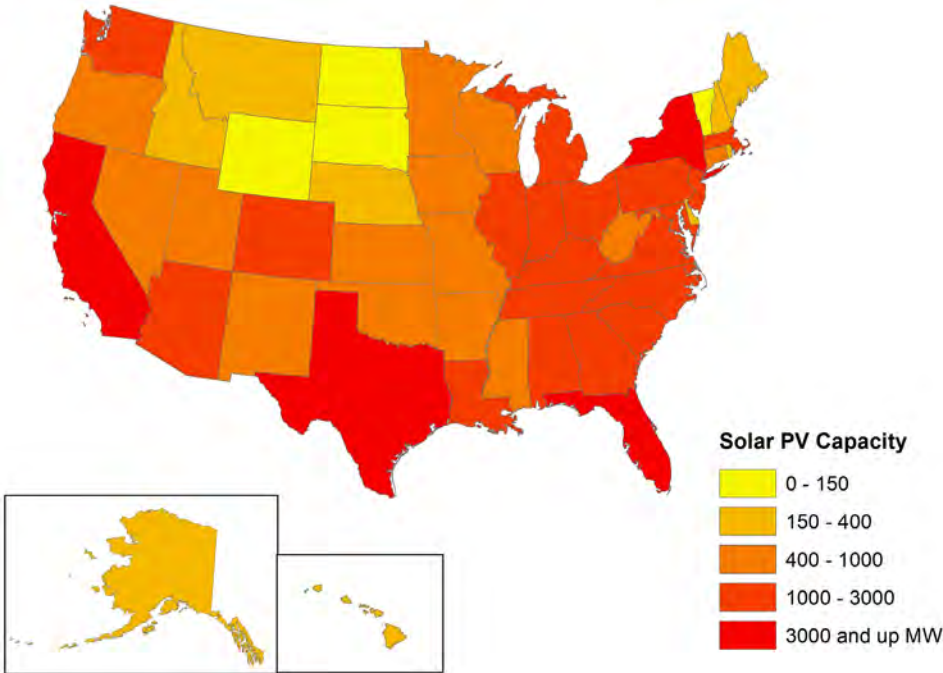
FRONTIER GROUP

Executive Summary

Solar energy is expanding rapidly across the United States – increasing more than 100-fold over the past decade. But, there are still many untapped opportunities to harness the nation’s nearly limitless solar potential. The United States has the technical potential to produce more than 100 times as much electricity from solar photovoltaic (PV) and concentrating solar power (CSP) installations as the nation consumes each year. Given our abundant solar resources, America must take advantage of untapped opportunities to install solar technologies – like using rooftops of large superstores and “big box” retail stores as hosts for clean electricity generation.

The roofs of these large stores are perfect locations for solar panels – they are largely flat and vacant and almost always fully exposed to the sun. The big box stores, large grocery stores and malls considered in this report account for 5 percent of electricity use in the United States. Solar panels produce energy that can offset this large electricity demand while contributing to a cleaner grid. Rooftop solar power also brings benefits to the communities in which it is situated. By producing electricity close to its final point of use, distributed rooftop power reduces costs and energy losses associated with electricity transmission and distribution.

Figure ES-1: Potential Solar PV Capacity on Big Box Stores and Shopping Centers, by State (Megawatts)



According to the National Renewable Energy Laboratory (NREL), the United States has the technical potential to generate enough electricity from rooftop solar installations alone to meet nearly a quarter of the nation's electricity demand. The United States has more than 102,000 big box retail stores, supercenters, large grocery stores and malls with more than 4.5 billion cumulative square feet of available rooftop space on which solar panels could be installed.

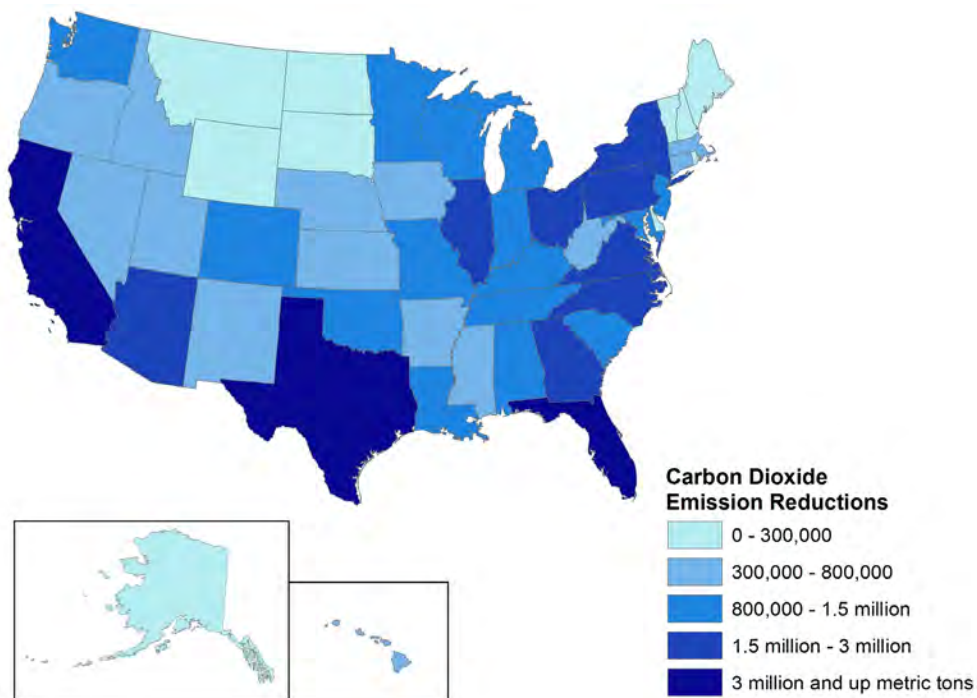
The rooftops of America's big box stores and shopping centers could host 62.3 gigawatts (GW) of solar photovoltaic capacity, equivalent to the amount of electricity used by more than 7 million average U.S. homes or more than 7,500 average Walmart stores, and more than double the solar photovoltaic capacity that has been installed in the U.S. to date. (See Appendix B for state breakdowns.)

Putting solar panels on the nation's big box grocery and retail stores creates unique benefits for the envi-

ronment, electricity customers and the large commercial businesses themselves.

- Generating clean electricity from rooftop solar panels on existing commercial buildings is good for the environment. **Installing 62.3 GW of clean solar power on America's big box stores and shopping centers would reduce global warming pollution by nearly 57 million metric tons annually – equivalent to taking nearly 12 million passenger vehicles off the road.**
- Rooftop solar power is good for the grid and electricity consumers. **Producing electricity on rooftops, close to where the electricity will be used, reduces losses that happen during electricity transmission – losses that totaled an estimated 203 million megawatt-hours (MWh), or 5 percent of electricity sales in 2012.** Solar power also reduces costs by producing the most electricity during the sunniest parts of the

Figure ES-2: Annual Reductions in Global Warming Pollution with Solar Panels on Available Big Box Stores and Shopping Centers by State (Metric Tons CO₂)



day, which are often when demand for electricity peaks. This helps utilities avoid firing up expensive, peaking power plants to meet the temporary rise in demand.

- Putting solar panels on the roofs of big box stores is good for business. **Electricity produced by rooftop panels on big box stores and shopping centers could offset the annual electricity use of these buildings by 42 percent, saving these businesses \$8.2 billion annually on their electricity bills.**

Many big box retail stores are already reaping the benefits of installing solar power on their rooftops.

- Of the businesses evaluated by the Solar Energy Industries Association (SEIA), Walmart, Costco, Kohl's, IKEA, and Macy's were the retail giants with the most solar capacity installed as of the end of 2015. Walmart has at least 142 MW of total on-site installed solar capacity.
- From the same survey, the top 25 companies have installed a total of 1,462 solar energy systems at business locations across the United States.
- The 10 big box companies with the largest amount of retail space in the U.S. – Walmart,

Target, Home Depot, Lowe's, Sears Holdings (including Sears and KMart), Macy's, J.C. Penney, Kohl's, Costco, and TJX (including Marshall's and TJMaxx) – have enough rooftop space to host approximately 17 GW of solar capacity on their retail stores, or nearly three quarters of the United States' current solar PV capacity.

- Solar-powered businesses are saving money on their electricity bills and contributing to a cleaner and more resilient electricity grid. By installing solar panels on two California stores, Costco reported savings of \$300 per day on average over three months.

Implementing local, state and federal policies that promote the growth of rooftop solar power – like net metering, third-party financing, community solar power programs, streamlined solar permitting and interconnection and tax credits and incentive programs for new solar energy markets – can spur the development of rooftop solar power on America's big box stores and help America reach its solar potential. **Officials at all levels of government should implement solar-friendly policies that help to accelerate adoption of solar energy by America's businesses.**



CITY OF HUNTINGTON BEACH

2000 MAIN STREET, HUNTINGTON BEACH, CALIFORNIA 92648-2702

Mr. Doug McMillon
President and CEO, Walmart Inc.

July 2022

Dear Mr. McMillon,

On behalf of our constituents in the City of Huntington Beach, we are writing to urge you to commit Walmart to installing solar on all viable rooftops and parking lots by 2035.

As local elected officials, we know that businesses like Walmart play big roles in our communities' economies and livelihoods. The public and private sector must come together to reduce global warming pollution and transition to 100 percent renewable energy. One of the best ways to do this is to install solar panels on available commercial rooftop and parking lot space.

Big box retailers like Walmart are ideal candidates to ramp up solar energy production. With wide, flat, sunny roofs and parking lots, your stores can generate significant amounts of carbon-free solar electricity. Putting solar panels on the nation's big box grocery and retail stores creates unique benefits for the environment, electricity customers and the large commercial businesses themselves. The benefits are:

-Generating clean electricity from rooftop solar panels on existing commercial buildings is good for the environment. For example, based on a 2022 report, Walmart alone could generate approximately 8,974.4 gigawatt-hours of rooftop solar electricity each year, enough to cleanly power 842,700 average American homes annually.

-Rooftop solar power is good for the energy grid and for electricity consumers. Producing electricity on rooftops, close to where the electricity will be used, reduces losses that happen during transmission – losses that totaled 6 percent of electricity sales in 2020.

-Putting solar panels on the roofs of all big box stores is good for business. Electricity produced by rooftop panels on the nation's big box stores and shopping centers could offset the annual electricity use of these buildings by over 50 percent, saving these businesses approximately \$8.95 billion each year on their electricity bills.

We're excited by your company's current commitments of 100 percent renewable energy by 2035 and zero emissions without carbon offsets by 2040. Walmart's over 400 U.S. locations with on-site solar is another great start, but given the enormous potential and many benefits of big box solar installations, we are urging you to expand Walmart's commitment to rooftop and parking lot solar.

Solar can power a brighter future for our cities, our country and our world. It's high time that we embrace this renewable energy source and use our empty roofs and parking lots to generate clean electricity. We call on Walmart to continue its environmental leadership by installing solar on all viable United States locations.