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The Best Idea in a Long Time: Covering Parking Lots with Solar Panels

Parking lot featuring solar power panels to shade cars and provide power.

America is a nation of pavement. According to research conducted by the Lawrence Berkeley National Laboratory, most cities' surfaces are 35 to 50 percent composed of the stuff. And 40 percent of that pavement is parking lots. That has a large effect: Asphalt and concrete absorb the sun's energy, retaining heat — and contributing to the "urban heat island effect," in which cities are hotter than the surrounding areas.

So what if there were a way to cut down on that heat, cool down the cars that park in these lots, power up those parked cars that are electric vehicles (like Teslas), and generate a lot of energy to boot? It sounds great, and there is actually a technology that does all of this — solar carports.

It's just what it sounds like — covering up a parking lot with solar panels, which are elevated above the ground so that cars park in the shade beneath a canopy of photovoltaics. Depending of course on the size of the array, you can generate a lot of power. For instance, one vast solar carport installation at Rutgers University is 28 acres in size and produces 8 megawatts of power, or about enough energy to power 1,000 homes.

Solar carports have many benefits, ranging from aesthetics (yes, the things look very cool) to subtler factors. Like this: Not having to return to a hot car after spending three hours at the mall or a sporting event in the summer. In fact, according to the Environmental Protection Agency and Department of Energy, being able to park in the shade in the summer is actually a substantial contributor to increased vehicle fuel efficiency, because it saves having to cool your car back up by cranking the air conditioner.

So what's the downside here? And why aren't solar parking lots to be found pretty much everywhere you turn?

In a word, the problem is cost.

"It's the most expensive type of system to build," says Chase Weir of TruSolar, which rates solar projects based on financial riskiness. "A lot more engineering, a whole lot more steel, more labor, and therefore, it's a relatively small percentage [of solar power]…but it is growing, and the cost to install a solar canopy today is less than the cost to install a rooftop just a few years ago."

Still, there aren't all that many right now. According to Scott Moskowitz of GTM Research, which released a study of the sector last year, by the end of 2014 there were an estimated 600 megawatts (or 2.5 billion dollars) worth of solar canopies installed in the U.S. In energy terms, though, 600 megawatts isn't a very big number. Just consider: The Hoover Dam has a capacity of more than 2,000 megawatts, the world's biggest coal plant is close to 6,000 megawatts, and even the world's largest solar plant is 550 megawatts.

So at least for now, the market remains relatively niche. The carports seem to be particularly popular with large companies, which can afford them and where they can provide an impressive display at their corporate campuses. Thus, they've been installed by Munich RE, Dow Jones & Co., and Staples, among others.

They've also been used to adorn hotels, such as one just unveiled at the Phoenician, a luxury hotel in Scotsdale, Arizona:

A solar array now sits atop a parking structure at The Phoenician in Scottsdale, Ariz., on Jan. 14, 2015. The project is the first of several planned as a result of a partnership between Starwood Hotels & Resorts Worldwide, Inc. and NRG

Energy and was unveiled on Jan. 14, 2015. The project will feature 2,000 photovoltaic solar panels totaling nearly 600 kilowatts. (Photo by Rick Scuteri/Invision for NRG Re New/AP Images)

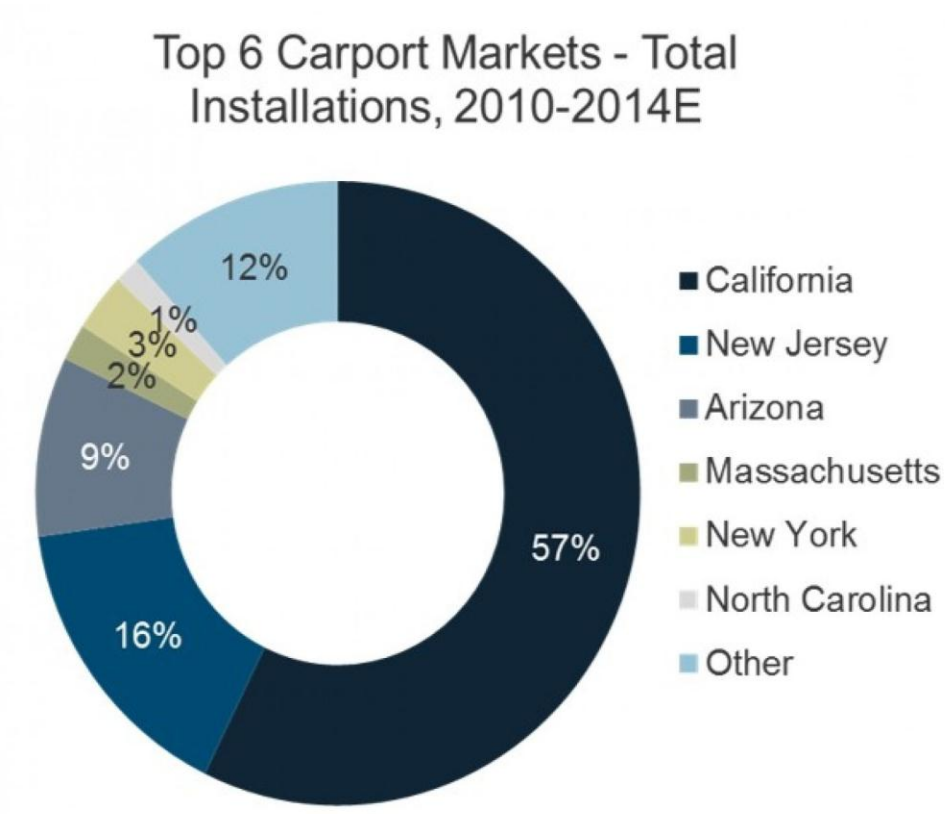
And then there are other large-scale installers: One of the best known solar carports is at the Washington Redskins' FedEx Field, where a gigantic solar array covering 841 parking spaces is able to generate enough power to cover "20 percent of the stadium's power needs on game days and all of its power on non-game days," according to Clark Construction, which installed it.

Laurence Mackler, who founded the solar carport installer Solaire Generation, says his company has now installed 50 megawatts worth of carports nationwide and has seen costs steadily decline over time. But he also emphasizes that there's still a financial problem — one that has limited the growth of solar carports significantly.

"Everyone says to me, that's a great idea, why doesn't everyone do it," says Mackler of solar carports. "And I have to say, well, because the economics work in certain states."

That conclusion was reaffirmed by a 2014 market research report on solar carports by GTM Research, which found that they are mainly springing up in Arizona, New Jersey, Maryland, Massachusetts, and New York and most of all California, which is more than half of the total market. For the most part, the report notes, that's because these states offer an array of state financial incentives to support their development.

Here's a figure demonstrating as much from GTM Research:

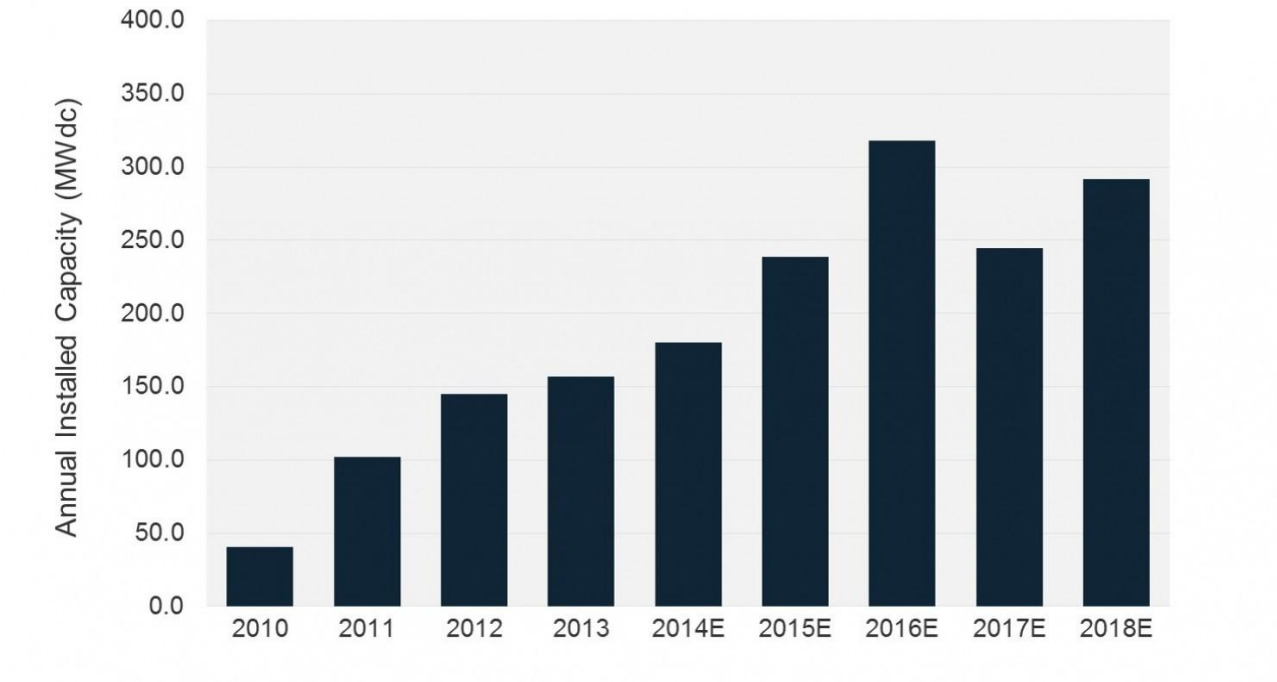


Credit: GTM Research.

“Because carport projects are more expensive, they have a generally higher reliance on state level incentives,” says report co-author Scott Moskowitz, a solar analyst with GTM Research. “So the markets in which those exist, there is going to be a higher concentration of carports.”

Clearly, the most important state is California, where according to GTM Research, solar carports have been supported both by the California Solar Initiative and also by the Division of the State Architect, which oversees construction on many public buildings. Moskowitz says that as costs of installation continue to decline, he does expect the solar carport market to expand into other states, too.

Here are his projections for growth through 2018:



Solar carport installation forecast through 2018. Source: GTM Research

So in sum: Putting solar atop pavements, with cooled down cars sandwiched in between, sounds like an energy no brainer. Maybe in the future, it’ll also be a financial one.

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