

Study: Angle key to solar panel snow problems

Written by Christof Demont-Heinrich, SCD.Com Editor
Sunday, 09 December 2012 00:00



editor's
blog
entry

So far, it's been an extremely warm mostly snow-less late fall/early winter here in Aurora, Colo. Indeed, our high temperature on December 5, 2012, was 69 degrees.

But climate change aside (notice how the deniers have been evaporating as fast as the water in drought stricken areas of the U.S. this year?), we're likely to get some snow this winter here on Colorado's Front Range, though seemingly not nearly as much as we should, or actually need.

That means our [5.59 kW solar system](#) will once again experience some frustrating snow days

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on which yours truly will climb a ladder (but not up onto the roof) and use a [Mr. Longarm](#) to shove snow off of the 13 solar panels I can safely reach.

Poll: Snow & solar

What do you do when snow covers your solar system?

Wait until it melts naturally

Sweep some of the snow away to speed up melting

It depends: Sweep under some conditions, not others

Other

19° roof pitch a snow bumper

Why?

Because, thanks to our 19° roof pitch, snow sits for days on our panels, even in sunny post-snowstorm conditions here on our Aurora, Colo. rooftop.

This is something our solar installer, REC Solar – whose system, to be fair, has been working great for 2 ½ years – never talked about.

And, as I've repeatedly [noted elsewhere](#), snow on solar panels doesn't seem to be something in which the American solar industry is interested -- even though it's clear snow has the potential to significantly negatively impact rooftop solar production.

Amount of snowfall, temperature and how much sun follows after a snowstorm all affect how long snow sits on your system and blocks its production capacity.

However, rooftop/PV system pitch is perhaps the single most important factor in transforming your once powerful PV system into a zero-electricity production machine. At least that's been my thinking for awhile in terms of our own snow-on-solar panels situation.

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Study in snowy Truckee, Calif.

Now I have confirmation I'm right: A [study](#) of the effects of snow on solar panel production in Truckee, Calif., which, by the way, receives about 200 inches of snow per year.

Those interested in the details of the study – and they are both important and interesting, can find a summary [here](#) . Here's the condensed version: Perhaps unsurprisingly, the greater the tilt angle of a solar array, the lower the annual loss of solar production to snow cover.

The study found that snow losses over 18 months averaged 13 percent for a 39° module, 17 percent for a 24° module, and 26 percent for a flat 0° module.



Yes, the study was conducted via modules on the ground, not on a rooftop, but it seems reasonable to assume that the significant differences in snow-induced PV production loss based on tilt would at least roughly translate to similarly tilted PV systems on rooftops.

The study was also conducted in a very snowy climate. So, the authors projected their findings to various cities across the U.S. – including Denver, where we live :-)

In fact, we found out about the study when one of its authors, Tim Townsend of [BEW Engineering](#) , a California-based solar engineering firm, e-mailed us about a month ago – thank you Tim :-).

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Snow on solar PV in Denver, Detroit & Philadelphia

Of course, they didn't project different findings based on different rooftop pitches/tilt angles. Instead, they simply took an angle of 15° and projected this to four different American cities: Truckee, Philadelphia, Detroit and Denver (see table).

As Townsend wrote in an e-mail to me, "We predicted a 3 percent annual loss for Denver in a typical year for a similarly oriented array as the one you have."

Don't you think it would make sense for the solar industry and solar installers to start taking snow seriously and actually invest themselves into systematically researching snow as a real 'shading' issue -- as BEW Engineering has -- rather than simply brushing the snow issue off with what, in my view, are frankly asinine -- and clearly totally ill-informed -- comments such as, 'It'll just melt or slide off'?

Indeed, this tracks amazingly closely to the very unscientific, rough, and methodologically flawed tracking I did of snow loss on our system – which is actually at 19°, not 15° -- two winters ago. Based on systematic monitoring, I estimated that if our system had been entirely cleared of snow immediately following snowfalls during the winter of 2010-11, we would have produced [300 kWh more solar electricity](#), or the equivalent of about 3.5 percent of our total annual production.

While that might not seem like a lot, as I noted in previous entries (e.g. ["Let's stop brushing off the snow on solar panels problem"](#))

) in which I've written about snow blocking solar panels, 300 kWh is more electricity than we used in

[the entire month of May 2011](#)

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Multiplied snow on panels effect significant

It's also significant when you multiply it by, say, 1,000 similarly positioned, angled and sized solar systems. That puts you at 300,000 kWh or enough electricity to power nearly 30 average U.S. households for a year.

A 300 kWh annual loss to snow cover gets a lot more significant when you push that number to 10,000 similarly positioned, angled and sized solar systems, which now puts you at 3 million kWh, or enough electricity to power nearly 300 average American households per year, or if you push that number to 100,000, or to 1 million, etc.

No, we're not even close to a million home solar PV systems in the U.S. yet. But we'll get there.

In the meantime, don't you think it would make sense for the solar industry and solar installers to start taking snow seriously and actually invest themselves into systematically researching snow as a real "shading" issue -- as BEW Engineering has -- rather than simply brushing the snow issue off with what, in my view, are frankly asinine -- and clearly totally ill-informed -- comments such as, "It'll just melt or slide off"?

Related articles-->

- [Let's stop brushing off snow on panels problem](#)
- [A dozen tips for getting snow off solar panels](#)
- [Two snow on solar panels solutions from Europe](#)
- [Snow wastes millions of solar kWh every year](#)