

Watt's Happening?

by Don Pettit

for Peace Energy Renewable Energy Cooperative

www.peaceenergy.ca ph 250-782-3882



Solar in the Winter: *how well does it work?*



The author's grid-tied solar array, seen here, produces more electricity each year than the building uses. A

surprising amount of this power is produced in the winter.

When someone is thinking about putting a solar array on their roof, one of the first questions is often “How well does it work in the winter?” In this issue of *Watt's Happening* we'll have a close look at that question, but the short answer is “Better than you might think.”

First let's establish the fact that I am speaking from experience, not theory. I lived off-grid on solar for many years in the north, and now own a building in Dawson Creek with a 5 kilowatt grid-tied roof-top solar array that has been successfully powering that building for two full years.

Dawson Creek is in northeast British Columbia, Canada, latitude 56 degrees north. We have long summer hours when the sun hardly sets, and long winters with significant snow and short days. In spite of its northern location this region is considered to be a good to very good place for solar power. How can that be?

FEEDING THE GRID

Today, most home solar power systems are “grid-tied” – they feed power into the grid when the sun is shining, then take it back out of the grid when it isn't. It's like the electrical grid is your own personal,

immense battery bank. Most electrical utilities, like BC Hydro, now welcome grid-tie systems.

I've been grid-tied for two full years now, and I can report that the system works well. For each of those two years I have 1) produced more electricity from my roof than the building used 2) and therefore received payment (or credit) from BC Hydro for that excess power two years in a row 3) powered everything in my building (lights, computers, kitchen appliances, furnace fan etc.) with clean solar electricity 4) had essentially zero electrical bills through both years (just the basic charge, a few dollars a month) 5) and had the very excellent feeling that I had finally entered the 21st century by powering a big piece of my lifestyle and business with the sunlight falling on my roof. Cool.

Now here's the winter part: because of our very long summer hours of daylight, I produced way more power during the summer than I could use, which of course was stashed in my "grid-battery" as a credit. I'm talking in June and July, TEN TIMES more power than I was using!

So come fall, I had built up a huge credit, more than enough to get me through the winter even if my solar array produced no power at all! But in fact it DID produce power surprisingly well. Here's why:

SOLAR PANELS SHED SNOW

Most roofs are tilted, so most solar panels are tilted (mine are close to a 45 degree angle). Sure, when solar panels are covered with snow, their power output goes

way down. But although they may stay covered for a few days, eventually the sun comes out, the dark-coloured panels heat up under the snow, and the snow slides off. This happens a lot with tilted panels.

If your roof is flat or low-slope, panels can be mounted on titled racks to help with snow shedding and to catch the sun better. Some folks put their array on a ground mount in the yard near their house, and that makes them easily adjustable: a low angle for summer, a high angle for winter. Simple.

LOW TEMP HELPS

Solar panels like the cold. The colder they get, the more power they produce. For every 20 degrees C temperature drop, power output increases about 10 percent. This makes a noticeable difference during our cold northern winters.

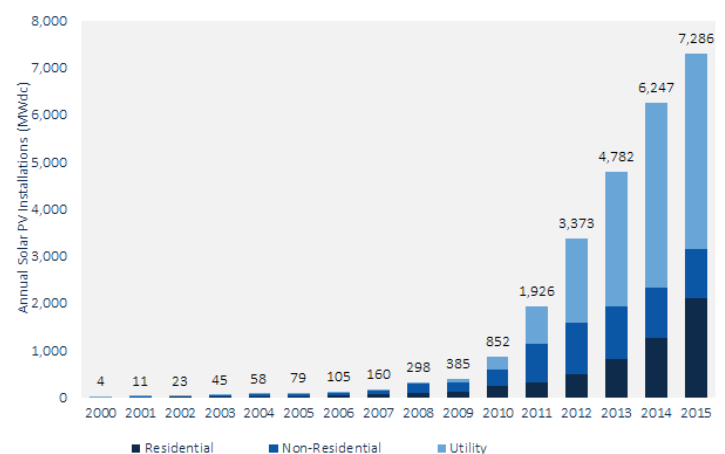
REFLECTION HELPS

Snow, a powder of fine ice crystals, reflects light like crazy. Solar panels convert this reflected light into electricity just as happily as they do direct sunlight. This can increase output by 20 to 40 percent.

There are more than a million solar roofs going up every year around the world, in cold northern climates, in hot southern climates, in sunny deserts and in smoggy overcast cities. There are many good reasons why solar is now the fastest growing energy source in the world, but there's one big one: solar works just about anywhere.

Quick Fact: solar growing faster than predicted.

Few could have foretold that new solar installations around the world would explode from a predicted 20 gigawatts to over 180 gigawatts in just a few years. Almost half of all new electricity installed in the US in 2013 and 2014 came from solar. Last year, US utilities and developers installed more solar energy systems than new natural gas plants. 7.29 gigawatts of panels were turned on in the US last year, a 17 percent increase over the previous year. As seen in the graph at right, the growth in solar is exponential, with no end in sight.



Actual solar installed in the US (above) has outstripped predictions of just a decade ago by a factor of ten.