

Watt's Happening? #194

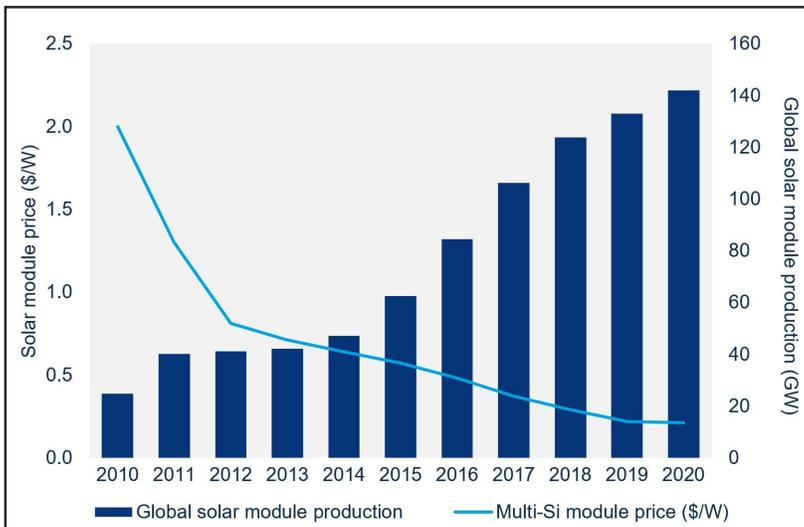
by Don Pettit

for Peace Energy Renewable Energy Cooperative

www.peaceenergy.ca ph 250-782-3882



Reader's question answered: "Can solar panels be recycled?"



This graph shows the rapidly rising production of solar panels worldwide and the resulting decline in the cost of solar per watt. Silicon-based solar panels, shown at right, are the most common in use today.

With some half a million solar panels manufactured and installed world-wide EVERY DAY, and that number doubling EVERY THREE YEARS, solar is poised to become the world's leading source of energy in just 20 years.

Great news, since solar energy is a big part of the move to beat climate change: they produce no carbon pollution during operation and use an inexhaustible, non-polluting energy source, sunlight.

But what about all those billions of solar panels? Can they be recycled or are we just creating another huge new problem in our attempt to solve an old one?

Fair question. Let's have a look.

PANEL COMPONENTS

Most solar panels manufactured today use crystalline silicon as their active ingredient. Crystalline silicon has the remarkable ability to turn photons of sunlight

directly into electrons of electricity. Shine sunlight on a solar panel and electricity comes out: no moving parts, no fuel, no pollution, and zero emissions.

Solar panels do have a life span, however, as the silicon breaks down very slowly, usually considered to be less than 0.5% per year. That gives a lifetime of 50 years or more, and even then, they'll still be producing electricity, just less per square meter.

Even so, that could be an awful lot of landfill if those materials can't be extracted and re-used to make new solar panels. The good news is that yes they can, and they are.

Three quarters of the weight of a solar panel is the tough tempered glass that covers and protects it. This glass is 95% reusable.

The aluminum frame, like all aluminum, is 100% reusable.

The active ingredient, silicon, and other trace metals are 85% recoverable and reusable with present

technology. Close to 100% is possible.

RECYCLING

Of course because our world is so fossil fuel intensive at the moment, a solar panel has a carbon footprint to both create it and recycle it. However, as we install more and more renewable energy infrastructure this carbon footprint will quickly decline and then disappear.

There are no processes needed to build or recycle a solar panel that strictly require fossil fuels: it can all be done with electricity generated by solar, wind, geothermal and other clean energy sources. (The small amount of plastic in a solar panel can easily be made from plant-based polymers.)

Europe has been serious about solar for some 30 years, so their solar recycling market is ahead of ours and steadily maturing. The Waste Electrical and Electronic Equipment Directive of the European Union helped found a member-based organization called PV Cycle to build out a robust recycling infrastructure.

In North America, recycling solar panels is a moot point, since we only got serious about solar less than ten years ago. There won't be much to recycle for decades. However, Washington became the first state to pass a solar product stewardship law last year. Under the Biden administration, we'll see more movement on this soon.

RAW MATERIALS

But what about all this silicon? Is it a nasty material extracted with slave labour in a third world country?

No. Silicon is one of the most abundant elements on the planet. Think quartz (silicon dioxide), the major component of sand and most rocks and minerals. Yes, pure quartz is an ideal source, and this requires mining on a large scale, but quartz is available around the world in many rich deposits. It's simply a matter of digging it out and sending it to a plant for processing: melting the quartz (ideally using renewable electricity) and extracting pure silicon crystals.

Let's be clear about one important point. No energy source is perfect. There is an environmental price to pay for all sources of energy and everything else we consume.

The question that we are faced with right now, with climate catastrophe showing up all around us, is: can we devise a BETTER ways of doing things? Can we create abundant, inexpensive energy with a very, very low carbon pollution footprint?

The answer, thanks to great advances in the development of wind, solar and other renewable, ultra-low pollution energy sources, is yes, we can.

And the more solar we manufacture, install and recycle, the better things will get. It's that simple.

There are no processes needed to build or recycle a solar panel that strictly require fossil fuels.

