

Threatt, Linnetta

From: Kristina Van Staalduinen <kjv20@hotmail.com>
Sent: Thursday, October 25, 2018 10:18 PM
To: Statements; ChiefClerks Office - External Use
Subject: EMP-93, Sub 0

Chief Clerk of the Utilities Commission,

First, I would like to thank the NCUC for taking the time to hear the concerns of citizens and thoughtful considering decisions that will affect many people. I simply ask you to **Do No Harm**.

The proposed solar facility is a threat to Eastern North Carolina. Since the last hearing in June evidence continues to prove the dangers of toxic chemical in solar panels are real. The EPA has yet to even develop ways to measure PFAS compounds, this is serious!

Thank you,

Kristina Beasley

MAY 23, 2018 @ 12:28 PM 27,052

If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste?

Michael Shellenberger, CONTRIBUTOR *I write about energy and the environment* Opinions expressed by Forbes Contributors are their own.

Bell Labs, 1954. Solar Panel Waste, 2014

The last few years have seen growing concern over what happens to solar panels at the end of their life. Consider the following statements:

- The problem of solar panel disposal “will explode with full force in two or three decades and wreck the environment” because it “is a huge amount of waste and they are not easy to recycle.”
- “The reality is that there is a problem now, and it’s only going to get larger, expanding as rapidly as the PV industry expanded 10 years ago.”
- “Contrary to previous assumptions, pollutants such as lead or carcinogenic cadmium can be almost completely washed out of the fragments of solar modules over a period of several months, for example by rainwater.”

Were these statements made by the right-wing Heritage Foundation? Koch-funded global warming deniers? The editorial board of the *Wall Street Journal*?

None of the above. Rather, the quotes come from a senior Chinese solar official, a 40-year

veteran of the U.S. solar industry, and research scientists with the German Stuttgart Institute for Photovoltaics.

With few environmental journalists willing to report on much of anything other than the good news about renewables, it's been left to environmental scientists and solar industry leaders to raise the alarm.

"I've been working in solar since 1976 and that's part of my guilt," the veteran solar developer told *Solar Power World* last year. "I've been involved with millions of solar panels going into the field, and now they're getting old."

The Trouble With Solar Waste

The International Renewable Energy Agency (IRENA) in 2016 estimated there was about 250,000 metric tonnes of solar panel waste in the world at the end of that year. IRENA projected that this amount could reach 78 *million* metric tonnes by 2050.

Solar panels often contain lead, cadmium, and other toxic chemicals that cannot be removed without breaking apart the entire panel. For this reason, the whole solar panel is considered hazardous by many experts and governments, including the state of California, which is trying to prevent the flow of old solar panels to landfills.

"Approximately 90% of most PV modules are made up of glass," notes San Jose State environmental studies professor Dustin Mulvaney. "However, this glass often cannot be recycled as float glass due to impurities. Common problematic impurities in glass include plastics, lead, cadmium and antimony."

Researchers with the Electric Power Research Institute (EPRI) undertook a study for U.S. solar-owning utilities to plan for end-of-life and concluded that solar panel "disposal in "regular landfills [is] not recommended in case modules break and toxic materials leach into the soil" and so "disposal is potentially a major issue."

The fact that cadmium can be washed out of solar modules by rainwater is increasingly a concern for local environmentalists like the Concerned Citizens of Fawn Lake in Virginia, where a 6,350 acre solar farm to partly power Microsoft data centers is being proposed.

"We estimate there are 100,000 pounds of cadmium contained in the 1.8 million panels," Sean Fogarty of the group told me. "Leaching from broken panels damaged during natural events — hail storms, tornadoes, hurricanes, earthquakes, etc. — and at decommissioning is a big concern."

There is real-world precedent for this concern. A tornado in 2015 broke 200,000 solar modules at southern California solar farm Desert Sunlight.

"Any modules that were broken into small bits of glass had to be swept from the ground," Mulvaney explained, "so lots of rocks and dirt got mixed in that would not work in recycling plants that are designed to take modules. These were the cadmium-based modules that failed [hazardous] waste tests, so were treated at a [hazardous] waste facility. But about 70 percent of the modules were actually sent to recycling, and the recycled metals are in new panels today."

And when Hurricane Maria hit Puerto Rico last September, the nation's second largest solar farm, responsible for 40 percent of the island's solar energy, lost a majority of its panels.

Bob Meinetz

Destroys Solar Farm in Puerto Rico

Many experts urge mandatory recycling. The main finding promoted by IRENA's in its 2016 report was that, "If fully injected back into the economy, the value of the recovered material [from used solar panels] could exceed USD 15 billion by 2050."