

From: Dave Hammond <davehammond@gmail.com>
Sent: Wednesday, March 13, 2019 2:00 PM
To: Wanda Parrish
Cc: Paul D. Trampe; Gary Skinner; David Ross; Thomas G. Benton; Timothy J. McLaughlin; Chris Yakabouski; Kevin Marshall; Aimee Mann; Concerned Citizens
Subject: Article on Water Leaching Cadmium from Solar Panels

Wanda - Please forward this article to Dewberry (Evan Hill), since I don't have his email address.

[Study warns of environmental risks from solar modules](#), Daniel Wetzel, De Welt, 13May2018 - contrary to earlier studies, water can wash contaminants out of solar panels in months.

This article is a summary of a study conducted by the European Union. It states:

"The researchers had investigated whether the pollutants used in the four main photovoltaic technologies are water-soluble. Contrary to previous assumptions, the result shows that 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. "

As I stated last night, I am not concerned about whole Cadmium-Telluride solar panels sitting in a field - "in normal use". However, I am very concerned when the panels are damaged and exposed to water for weeks or months.

Please let me know if you have any questions.

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ECONOMY HAZARD FROM HEAVY METALS

Study warns of environmental risks from solar modules

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By **Daniel Wetzel**
business editor



View of two water tanks with solar panels in the Ardennes. The pollutants contained in the modules can become an environmental risk

Source: W. Pattyn / picture alliance / viewpoint / W

Other than assumed, the pollutants contained in solar modules are water-soluble. This shows a study commissioned by the Ministry of Economic Affairs. The EU is in a position to solve the problem.

The derogation of the European Pollution Ordinance Restriction of Hazardous Substances (RoHS) for solar modules (</themen/solarenergie-solarfoerderung/>) has serious environmental risks. This emerges from a study commissioned by the Federal Ministry of Economics on the "release of pollutants from photovoltaic modules".

The final report of the Stuttgart Institute for Photovoltaics (ipv) and the Institute for Urban Water Management, Water Quality and Waste Management (Iswa) is exclusively available to WELT AM SONNTAG.

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Toxic pollutants can be washed out

In view of the widespread use of solar modules, the researchers emphasize the importance of retrieving old solar modules and recycling as completely as possible. However, it is "difficult to imagine that the collection succeeds 100 percent, not even in a technically and politically well-organized industrialized country," warn the Stuttgart researchers.

"Environmental hazards certainly arise when modules or parts of them (legally or illegally) land on normal trash cans, glass containers or other ways eg in landfills or (possibly still ground) in the substructure of roads and remain there for a long time or always. "Then the pollutants would be triggered by water.

The researchers are particularly critical of the possible environmental risks caused by the use of contaminated modules in developing countries. "Dangers and hazards of toxins in photovoltaic modules appear particularly large in countries where there are no orderly waste management systems," the study said. "Especially in less developed countries in the so-called global south, which are particularly predestined for the use of photovoltaics because of the high solar radiation, it seems highly problematic to use modules that contain pollutants."

Tons of lead and cadmium installed

According to the researchers, by the end of this year around 3700 square kilometers of the world's solar cells will be occupied. Every day, around three square kilometers of solar area "with the pollutants in them" would be added. "Based on installed power and performance weight, we can estimate that by the year 2016, photovoltaics has spread about 11,000 tonnes of lead and about 800 tonnes of Cd (cadmium)," the study said.

The European Union had banned the use of toxic heavy metals, especially leaded solder, in 2006 in the RoHS directive for the electrical industry. After intervention by solar lobbyists photovoltaic modules were exempted from this rule.

According to the Stuttgart researchers, lead-free solder can now also be replaced by lead-free compounds "with little additional effort" in the solar industry.

"The easiest way to avoid environmental hazards caused by pollutants, at least in Europe, would be to include photovoltaic modules like other electrical and electronic products in the EU RoHS directive," the Stuttgart researchers suggest. "With the sole prohibition of lead soldering in the modules, 97 percent of the photovoltaic modules (with the exception of CdTe modules) would immediately be free from pollutants and environmental hazards would be avoided."

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