

# Toxicity (Equipment and Operations)

Toxicity is probably the most common health and safety concern with PV systems that members of the public have, although as detailed below, the systems do not pose a material toxicity risk to the public or the environment. This report examines all possible sources of toxicity, from site construction to decommissioning at the end of the project life. The potential sources of toxicity are organized into two categories: (1) equipment and (2) operations and maintenance (“O&M”).

## Toxicity: Equipment

The main equipment at a solar facility is PV modules (a.k.a. solar panels or PV panels), metal structures for mounting the solar panels, and wiring to collect the electricity they produce. The other major components are inverters and transformers. Inverters are enclosed power electronic equipment that do not contain liquids and are treated like other electronic waste at the end of their life. Transformers contain non-toxic mineral oil or vegetable oil and are no different than the typical transformers outside of most residences, schools, and shopping centers. Solar panels have raised the most public concerns related to toxicity, so they are covered in depth below, but since transformers contain liquid they are also addressed.

### Contents of PV Panels

The Morven Solar project will install silicon-based PV panels sourced from reputable manufacturer meeting established criteria including third-party rankings for performance, reliability, and bankability. Specifically, the project plans to use a bi-facial monocrystalline silicon module manufactured by Canadian Solar. The PV panels are the most expensive and most important component in a solar facility, so the owner performs due diligence to ensure that the panels selected and delivered to the project are properly manufactured, certified, and tested.

The diagram below shows the components of a typical silicon PV panel, including a closeup of the solar cells and the electrical connections. Over 80% of the weight of a PV panel is the tempered front glass cover (or, front and back heat-strengthened glass) and the structural aluminum frame, which work together to create a strong, durable panel that outlasts its typical 30 to 35-year performance warranty. The encapsulation films are clear plastic lamination layers that protect the cells and electrical contacts from moisture for the life of the panel. These layers also maintain the panel as a single unit in the event of breakage of the glass cover(s), similar to the film in auto windshields that keeps them from fragmenting if the windshield shatters.

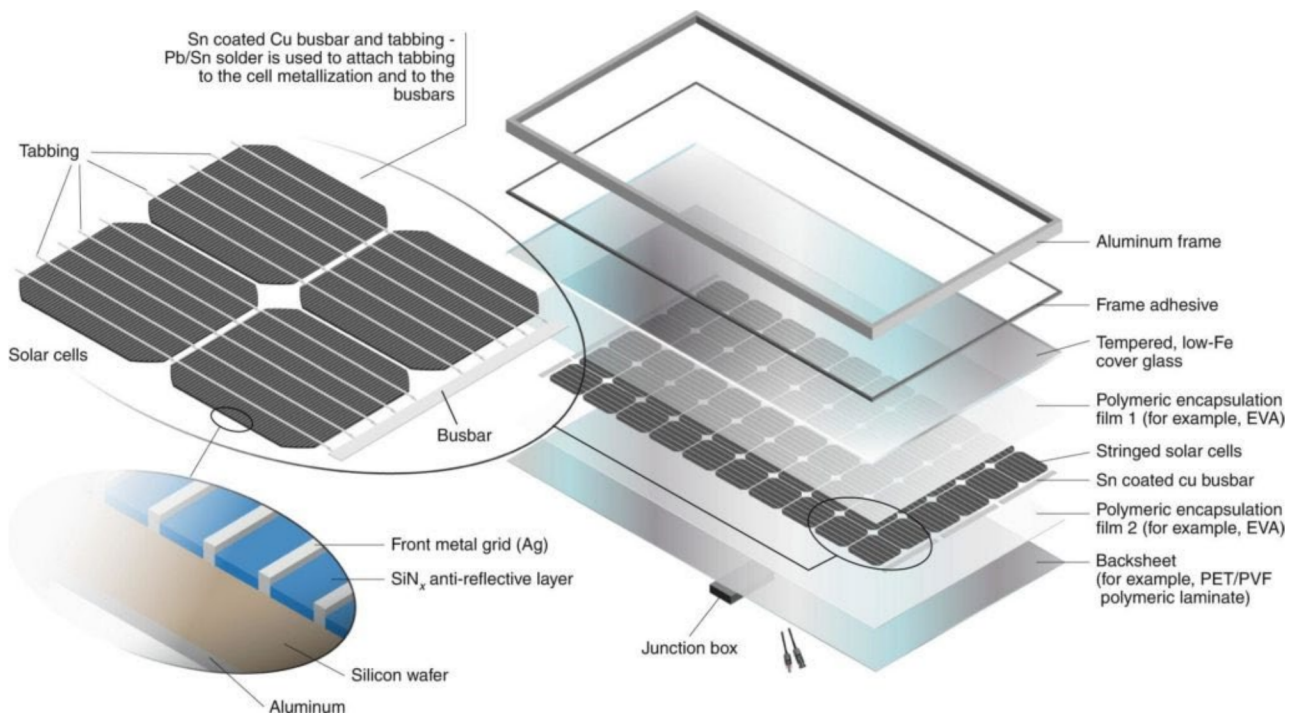


Figure 2. Contents of Framed Crystalline Silicon Panels (Source: NREL)