

## Is Your Solar System Protected?

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Since PV systems are typically installed at outdoor, remote locations, engineers must consider many design issues involving the protection of your investment. Some issues are naturally occurring while others are not.

### **Protection from the Elements**

There are many natural occurrences that may affect the performance of your system. The most common events are:

#### UV rays and Rain

The sun, while providing power to your system, is also attacking the materials holding the system together. Rain can also have detrimental effects on equipment if not handled correctly.

Typically a system enclosures should be of aluminium and coated with light-coloured UV polyester based powder-coat paint and mounts are either aluminium or galvanised steel, painted with light-coloured UV polyester based powder-coat paint. Both finishes are durable providing corrosion resistance. The highly reflective colour, in conjunction with the designed-in ventilation system, keeps inside temperatures as low as possible while minimizing water ingress.

#### Wind

Geography plays a role in how the wind affects your system. Open terrain is the most severe, as there is little to shed or block the wind. System mounts and enclosures are designed to allow multiple means of attachment to your pole. This includes steel banding as well as u-bolts. Mounts are sized for a specific range of pole sizes, optimizing the fit to the pole. The combination of these components allows the array to shed the wind safely.

#### Lightning and Transients

Transients can come from many sources, but lightning is the primary source of concern. Indirect and direct lightning strikes can damage or destroy one or many components of a solar system. Generally, a PV system is assembled with ease of earth bonding in mind. Modules are attached to rails using split washers to insure good electrical contact. Enclosures are equipped with grounding lugs, simplifying the bonding to ground. Lightning arrestors provide surge protection, limiting the levels of voltage transient, to protect load equipment. In conjunction with circuit breakers and fuses, surge arrestors protect and isolate the equipment from the source of the problem.

#### Animal Droppings

Animal droppings can damage the solar equipment. Droppings block the sun from the face of solar modules and the acidity can attack the system finish, making maintenance difficult for service technicians. If the system is not regularly maintained, system performance degradation can be expected.

### **Protection from Vandalism and Theft**

Security of equipment installed in a remote location is always a concern. System design has to be flexible to allow owners to meet the level of protection they require. Some of the most common areas of concern are:

#### Solar Module Damage

Solar modules are typically mounted out of reach, but are still prone to vandalism from ground level. Thrown rocks can damage modules and snag wiring. Modules closer to ground level are prone to theft. To deter vandalism, systems should include wire encased in conduit, minimizing wire exposure. Optional metal shields can be added to the

rear of modules to protect from rock throwing. Modules have a glass face that is impact resistant to hail sized objects up to 1" in diameter, minimizing the likelihood of damage.

For systems requiring theft deterrence, optional special hardware is available. This special hardware uses an uncommon tool for attachment, deterring theft by increasing the difficulty of removal. While the examples above are typical issues which engineers deal with, other extreme conditions which requires further considerations include hurricanes, tropical rainforests, snow, corrosive salt air and temperatures ranging from Antarctic cold to desert heat.

#### Enclosure Tampering

The equipment enclosure is typically mounted for ease of service and installation. The battery, control equipment and sometimes the customer's equipment can be located inside. To deter theft, all enclosures should come with either a key lock or pad lock clasp. The enclosures should be mounted to the pole or wall using a bracket that can only be removed from the inside of the enclosure.

For more critical applications, where wireless communication is available, a remote monitoring system can be incorporated. This package includes system state of health monitoring, as well as the ability to add external sensors for door ajar, proximity or motion detection alarms. The sensors can be tied to a central dispatch to allow response to vandalism or attempted theft.

#### **Benefits of using Solar Power System**

Having mentioned the various considerations that affect a Solar PV System, it must be said that these conditions can be overcome and the benefits of using a Solar PV System still outweighs the minor inconveniences.

Solar power is harnessed from the sun, an infinite resource. This means energy independence (as compared finite fossil fuel resource).

Solar power is also environmentally friendly. It does not emit greenhouse gases. It does not damage our ecosystem.

Solar power is quiet during use. It is also safe to use. Many users install their Solar Power System in their own home and still sleep soundly at night!

Solar power requires only minimal maintenance. Advances in technology have made the components of a solar power system become more reliable, durable, user-friendly and safe.

#### **A GREEN MESSAGE**

Using renewable solar energy enables us to reduce the use of fossil fuels to generate energy. Fossil fuel energy generation pollutes our environment. You are empowered to help. Do your part. Be a responsible global citizen.

#### **SAVE GAIA.**

