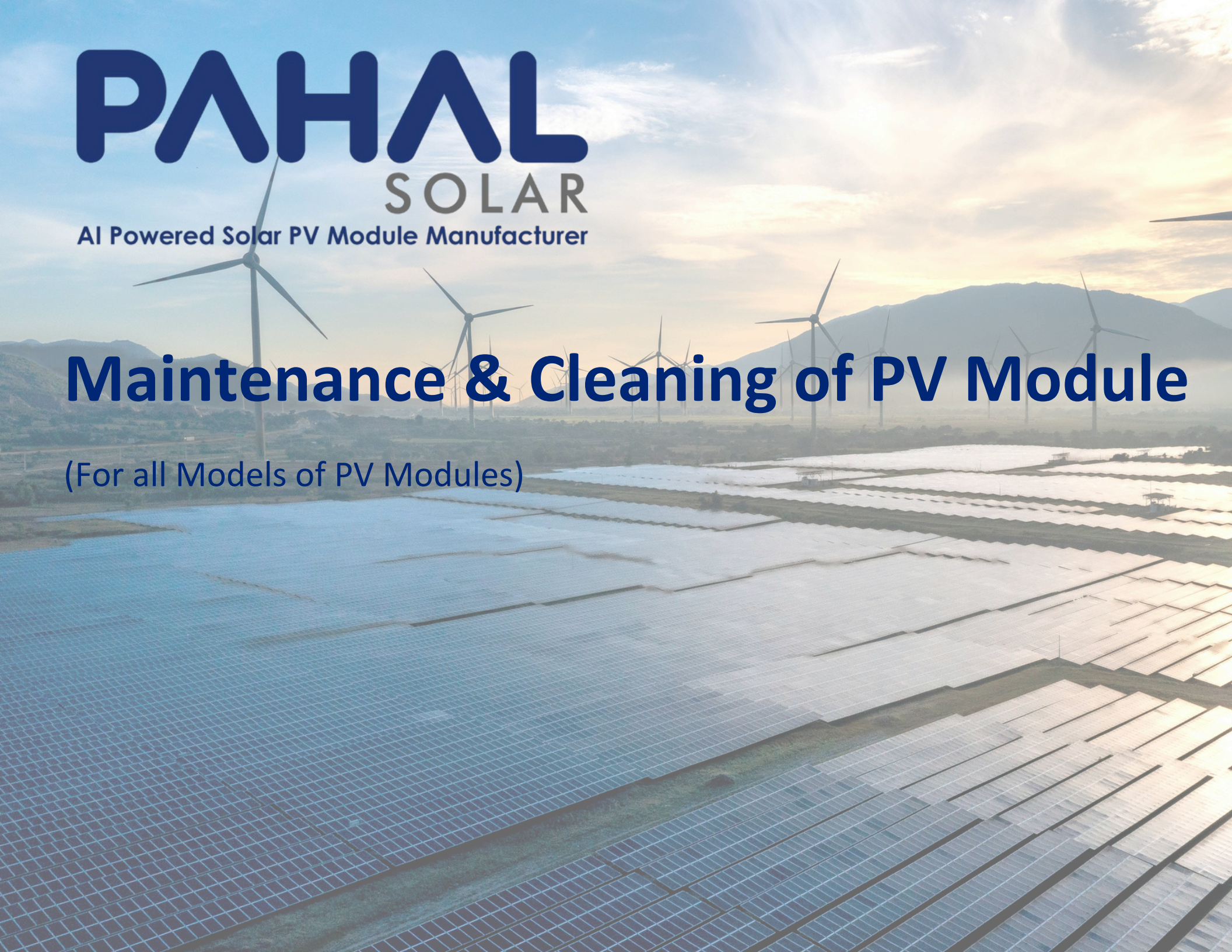

Maintenance & Cleaning of PV Module

(For all Models of PV Modules)

1. MAINTENANCE & CLEANING OF PV MODULE

It is common for dust and dirt particles to accumulate on the surface(s) (front and back in case of bifacial modulo) of the Modulo. This can reduce the optimal output performance of the solar Modules.

Normally, the accumulated dust can be washed with water, but in some instances some maintenance is recommended to clean the surface of the glass with water and a soft cloth or sponge to remove layer of dirt. A mild non-abrasive detergent may be applied to remove persistent dirt.

It is advisable to perform periodic inspection of the Modules for damage to glass, back-sheet. frame, junction box or external electrical / loose connections and corrosion by the authorized professional.

PV Modulo Cleaning should be done only by properly trained personnel who understand the risks of applying water to electrical components.

No aggressive and abrasive cleansers or chemicals should ever be used on the coated front glass. No alkali- based chemicals should be used, including ammonia based solutions.

Always wear rubber gloves for electrical insulation while maintaining, washing or cleaning Modules. Appropriate electrically insulating Personal Protective Equipment (PPE) must be worn during any cleaning or inspection operations.

Always make sure that Cleaning should not be done during Generation time, the recommended time to clean Modules is from dusk to dawn when production is not affected and risk of electrical shock hazard is minimized. During the generation time the temperature of Module is higher and washing may also cause thermal stress in Module.

Acceptable Module cleaning methods are to spray the Modules with low-pressure water closely matched in temperature to the Module or to use a dry cleaning technique. Do not apply water that is more than 20°C warmer or colder than Module surface temperature.

Maintenance should be carried out at least once a year by trained personnel, always wearing safety gloves and safety shoes.

Trim any vegetation which may shade the solar array thus impacting performance.

Check that mounting hardware is properly tightened.

Inspect all cables to verify that connections are tight; the cables are protected from direct sunlight and away from water.

It is recommended to check the torque of terminal bolts and the general condition of wiring at least twice in a year. Also, check that mounting hardware is properly torqued. Loose connections will result in damage to the array.

Replacement modules must be of same type. Do not touch live parts of cables and connectors, use appropriate safety equipment (insulated tools, insulating gloves etc.) when handling modules.

High pollution or close to large bird populations will require more regular cleaning.

The back surface of the mono-facial module normally does not need to be cleaned but if needed, avoid the use of any sharp projects that might penetrate the substrate material.

The amount of electricity generated by a solar module is proportional to the amount of light falling on it a module with shaded cells will produce less energy and therefore it is important to keep modules clean.

Frequency of Cleaning will vary depending upon any special conditions in the area where the Modules are installed.

Modules installed in high windy or dusty area should be inspected more frequently. Do not clean or spray water at the Junction Box.

- For cleaning of Modules Fresh water (TDS < 1500 mg/l) may be used. If needed, a mild, non-abrasive, non- caustic detergent with a final fresh water and detergent solution mix between 6.5 < pH< 8.5 at 25°C may be used.
- Frequency of Cleaning will vary depending upon any special conditions in the area where the Modules are installed. Modules installed in high windy or dusty areas should be inspected more frequently.