

What are the major advantages of the Osprey PowerPlatform®?

The Osprey PowerPlatform offers several advantages over conventional foundations and racking systems, including:

- The simplicity of installing the earth anchor foundation system on any type of soil, and on sloped and uneven terrain, using only handheld power tools;
- Minimizing the chances that unknown conditions underground might deplete a reserve or contingency fund, and erode bottom line profits;
- The elimination of any need for heavy equipment or pouring of concrete for piers or pads;
- No need for any cutting, welding, bending or drilling of any of the prefabricated steel components;
- The elimination of the need for a geotechnical report and related inspections based on real-time testing of actual (vs. calculated) uplift loads;
- The assurance that geotechnical report issues or equipment availability (e.g. pile drivers) will not prevent completing projects within the contract period or fiscal year;
- The ability to use low-cost workers to install the entire Osprey PowerPlatform (excluding the electrical work, which may require a licensed contractor in some locations); and
- A savings of \$130,000 in field costs alone for a 2MW project compared to systems using concrete piers, ground screws or piles as foundations.

What are its disadvantages?

There really are none, but there can appear to be a cost disadvantage in an “apples and oranges” comparison, and some competitors may attempt just such a ruse. The material cost of the Osprey PowerPlatform is slightly higher than conventional racking systems of comparable size. But the Osprey also includes the foundation, which the others do not. The Osprey also requires no geotechnical report or engineering, and is much easier to install than all others. So when performing a legitimate “apples to apples” comparison of total costs (including the racking system, foundation, engineering and installation), the Osprey PowerPlatform is certain to have the lowest of any alternative.

How does the Osprey PowerPlatform eliminate the need for a geotechnical report and/or field inspections?

The ability to measure the actual holding strength of every earth anchor in all soil conditions with a simple, real-time field load test eliminates some of the site assessments and inspections needed for other systems, and is preferred by engineers. This ability to perform tests in the field in real time during the installation is, of course, made known to the engineer of record during the design phase of the project, as well as to the authority having jurisdiction during the permitting phase. Normally the engineer will specify the load tests be performed to 1.5 times the worst-case

scenario contained in the local building code, but higher safety factors may also be required. After the installation, a report showing the results of all the load tests is usually able to eliminate the need for an on-site inspection of the foundation. This patent-pending method of installing and testing the earth anchor foundation system is what usually eliminates the need for a geotechnical report during the design or permitting phases.

How is the real-time field load test conducted?

One person on the crew places a portable “tripod” test rig over the anchor leg after its earth anchor has been set. A scale is attached to the earth anchor’s rod or cable and uplift force is applied. The uplift force causes the earth anchor to rotate into a horizontal and locked position—a position that provides its maximum holding strength. If the scale reaches the required force, the operator slides the grip lock down to the base of the shoe plate securing the leg against uplift forces. The extra cable is then secured to the adjustable leg. If the anchor begins to pull out, the earth anchor can simply be removed and installed again at a different angle and/or depth. A second anchor can then be set, with the load test performed again on the pair.

How does the installation process compare with that for ground screws or piles?

The biggest difference with the Osprey PowerPlatform is the lack of need for any heavy equipment, such as augers or pile drivers. For some sites, the use of heavy equipment may be prohibited, either for the damage it might be caused or owing to a lack of adequate access. Another difference is the ability to use semi- or un-skilled labor because there is no heavy equipment to operate and no need for any specialized construction techniques. These differences enable the Osprey PowerPlatform to be installed quickly using only handheld power tools operated by workers receiving only a few hours of training. For example, a 4-person crew can assemble, install and load-test a 6kW system in about an hour.

What are the tools needed to install earth anchors and what, if any, training is required?

In addition to the usual wrenches, levels and other tools installers always use, it’s a short list that fits easily in a pickup truck:

- For electric tools, a hammer drill, a portable generator and the load test rig.
- For pneumatic tools, a hammer drill, a portable compressor and the load test rig.
- For training, the self-study videos and manual provided are usually sufficient, but Nuance Energy also offers onsite training classes if desired.

Do changes in soil moisture content from precipitation change the holding strength?

Moisture adds weight to the 25-30 cubic feet of soil (in the shape of an inverted cone) holding each earth anchor. In most locations, soil moisture content changes only to a relatively shallow depth—far above the 3-4’ depth of the earth anchor. So in most locations, seasonal changes in moisture content have little effect on holding strength. For sites with poor drainage where the soil might become saturated at times, special engineering may be required, including the need to install and test the earth anchors during a period of peak saturation. It is also common in these situations to use more than one earth anchor for each leg.

Does corrosion eventually degrade the holding power of the earth anchor?

Nuance Energy uses galvanized earth anchors and stainless steel rods and cables to eliminate the potential for problems caused by corrosion. This design is backed by a 25-year warranty, which covers the life of the system for most solar energy projects.

How many earth anchors does it take to secure a typical solar array?

In most soil conditions, only a single earth anchor is needed for each of the six legs in a standard 16-module (2 x 8) Osprey PowerPlatform. Some soils might require more than one anchor per leg, especially for the rear legs that must resist the highest uplift forces caused by wind. The typical installation, therefore, requires 6-9 earth anchors.

Are there different types or models of earth anchors available to accommodate different needs or conditions?

One of the advantages of the earth anchor foundation system is that a single model of earth anchor can be used in most situations. Some site and/or soil conditions may require pre-drilling the holes and/or setting the anchors at an angle (e.g. to avoid a rock), and it may be necessary to set more than one anchor per leg. Installations over solid rock or pavement require the use of a rock anchor or conventional expanding bolt, which are just as easy to set. For sites or soil conditions that are unusually challenging, it may be necessary to engineer the use of a different model of earth anchor or some other anchoring solution, but these situations are quite rare.

Does Nuance make its own earth anchor?

No, because there is no need to do so. Earth anchors have long been used in a variety of applications, and their designs have been enhanced over time to deliver continual improvements in performance. How the anchor is installed and tested in real-time for a solar array is, however, a patent-pending aspect of the Osprey's design.

Can an earth anchor be “uninstalled” or removed if desired?

The normal “uninstallation” involves simply cutting off the earth anchor rods or cables at grade level. What's left in the ground at each leg is approximately 40” of thin rod or cable, and the 5” x 1.5” earth anchor, which is substantially less steel than in a ground screw or the “I” beam used in pile-driven foundations. If the decommissioning requires removing the entire earth anchor, the earth anchor itself, and the attached rod or cable, are all sufficiently strong to withstand any uplift force (well in excess of 2,000 pounds) needed to remove them using a suitable jack or other means. This minimal impact post-decommissioning makes the Osprey PowerPlatform one of the most environmentally-friendly racking systems available.

Are there ground mount applications where earth anchors are not suitable?

One of the advantages of the earth anchor foundation system is its suitability for those sites and soil conditions where the use of other types of foundations is problematic. Examples include brownfields, leach fields, hillsides, high wind areas, desert hard pan, and sandy or rocky soils. One site that might be problematic for the Osprey PowerPlatform is a landfill capped at a depth of 4’ or less. Earth anchors are normally set to a depth of 40”, and that can leave too little of a safety margin above the membrane. It is important to note, however, that ground screws and piles would most definitely not work at such a site. Another problematic site is one with a steep slope, but these are problematic for any foundation system.

Does the earth anchor need to comply with any industry standard or regulatory requirements, and if so, has it?

The Osprey PowerPlatform has been certified compliant with the UL (Underwriters Laboratories) 2703 *Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels*, and meets

the applicable standards in the *2013 International Building Code*. Most nations and local jurisdictions may also have their own code requirements that pertain to ground mount photovoltaic systems, and Nuance Energy is prepared to certify compliance for these where warranted by market potential.

Who are the main competitors—direct and indirect—for the Osprey PowerPlatform?

There are currently no direct competitors for the Osprey PowerPlatform because its use of an earth anchor foundation system is unique in the industry. There are plenty of indirect competitors, however, and these include any company with a ground mount foundation and/or racking system. The speed, ease and low cost of installing the Osprey PowerPlatform compares quite favorably to all of these other solutions, so Nuance Energy expects its ability to compete effectively will be limited only by the company's sales and support resources.

If the advantages really are so compelling, why aren't any other vendors using earth anchors for ground mount solar arrays?

Nuance Energy is the first, but others are certain to follow. Being first-to-market with patent-pending protection for key aspects of the earth anchor foundation system and other elements of the platform create at least some barriers to entry. Over time, however, Nuance Energy expects its competitive advantages will need to derive from continual improvements in the Osprey PowerPlatform and increased, worldwide marketshare.

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