

PEG EW System Overview



Now available
in South Africa.



Jurchen Technology: Introduction

- Established in 2008
- Supply of substructure / accessories and cabling harnesses:



PEG® EW PV system in Dareton, Australia

- Extensive global presence:

35

Countries

6

Continents

2

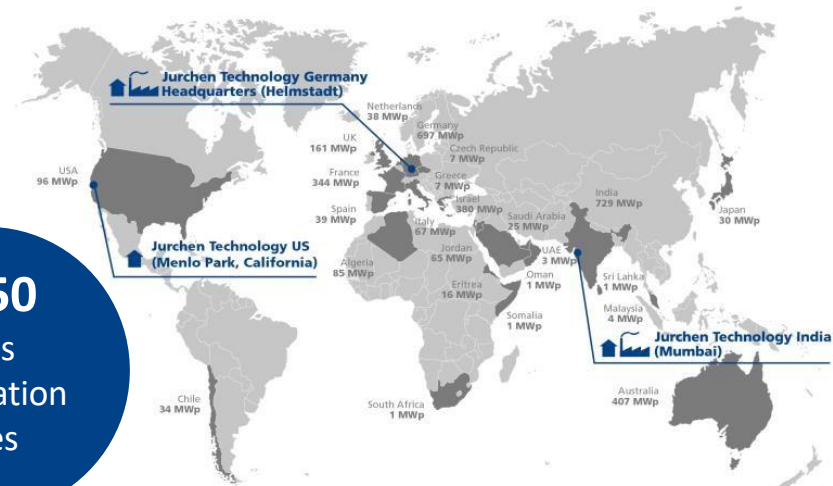
Mw

Per

Hectare

> 5 GW
of Ground
Installations

>150
Plus
installation
sites



PEG: Reduce total capex by up to 50%

Lower CAPEX

With PEG's simplified system design, there are no reasons for months of planning, a time consuming consulting and expensive construction tasks.

PEG works nearly without ground soiling foundations. No heavy construction machines are needed. Components are partly shipped pre-configured in container-based units.

2 Mw
Per Hectare
Bankable
Ground Mount

Lower OPEX

Due to new working ergonomics and an above ground installed DC cabling, maintenance costs can be reduced by a quarter.

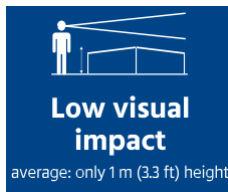
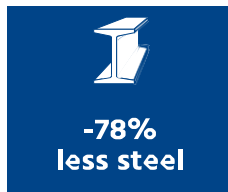
The PEG Effect: Save CAPEX and OPEX

PEG system was formed with a simple goal in mind: create a power unit to deliver electricity at lowest possible levelized costs of energy (LCOE), with best in class technologies, long-term reliability and large volume scalability. The PEG unit significantly reduces both substructure supply and delivery, as well as installation costs.

For many years solar production has been defined by its typical **Engineering-Procurement-Construction (EPC)** process. Today, Jurchen Technology is challenging this old-fashioned principle with **Engineering-Procurement-Installation (EPI)** - process focused on quick and resource-saving installation.



Learn more about, why PEG is the best ground mount solution:
<https://www.jurchen-technology.com/products/solar-mounting/peg/peg-design/>



Solar racking system
conforms to
UL Std. 2703



Institut für
Industrieaerodynamik
Aerodynamically
approved



Bankability report
available

PEG CAPEX savings:

-90%

machine
costs



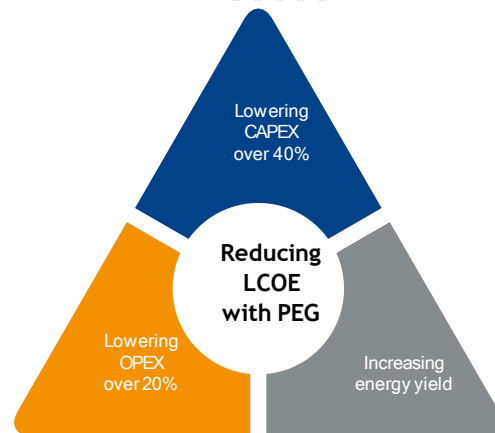
-50%

logistic
costs



-70%

labor
costs



PEG: A rod which changes everything



The DC with PEG is > 2 times higher vs tracker per Sqm

A rod, which changes everything.

The new system design is based on a PV module mesh, which is borne by many rods. The whole logistic and realization process changes.

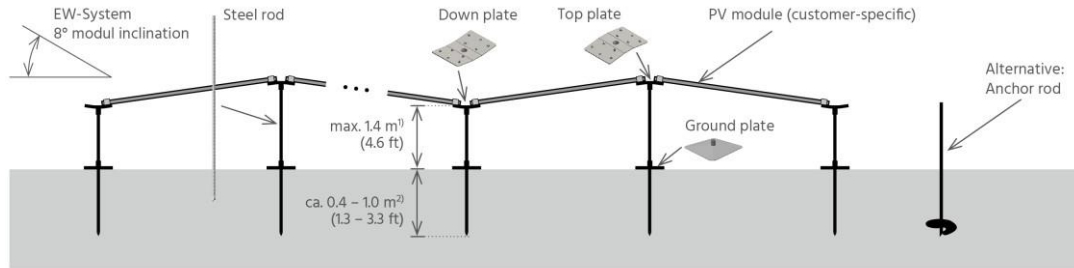
- **Extremely high land use.** Comparison per acre:
 - ~3 times higher DC vs trackers, ~ twice higher vs fixed-tilt
 - ~225% higher yield vs trackers & other fixed-tilt systems
- **Extremely cost-effective CAPEX** (supply and installations)
- **Low profile & shallow foundations, <1m (3.3ft)** above & below ground
- **Very fast installation** (400 man hours / hectare)
- Proven globally, **over 500+ MWp installed**



**Custom Cable Tray, No
Additional Trenching Required**



- **Only 3 items: Steel rod, Ground plate and Top plate**
- **Modules at 8 deg E-W tilt**, laid on the Top plates under the module's corners
- Optional **anchor rods** for soft soil or need for shallow foundations



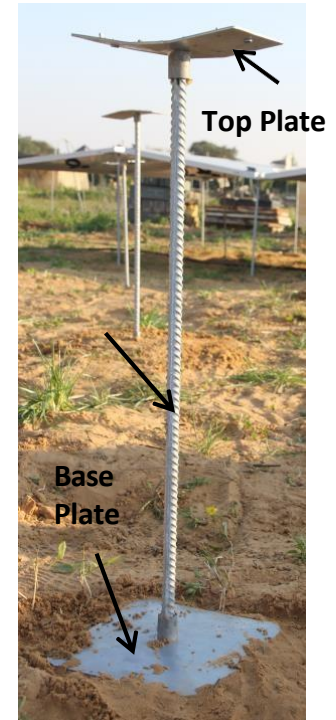
1) subject to the site conditions and system design
2) For exceptional permafrost conditions, the ramming depth could be up to 2m, done by the use of two rods crimped together onsite through a sleeve, subject to project-specific approval.



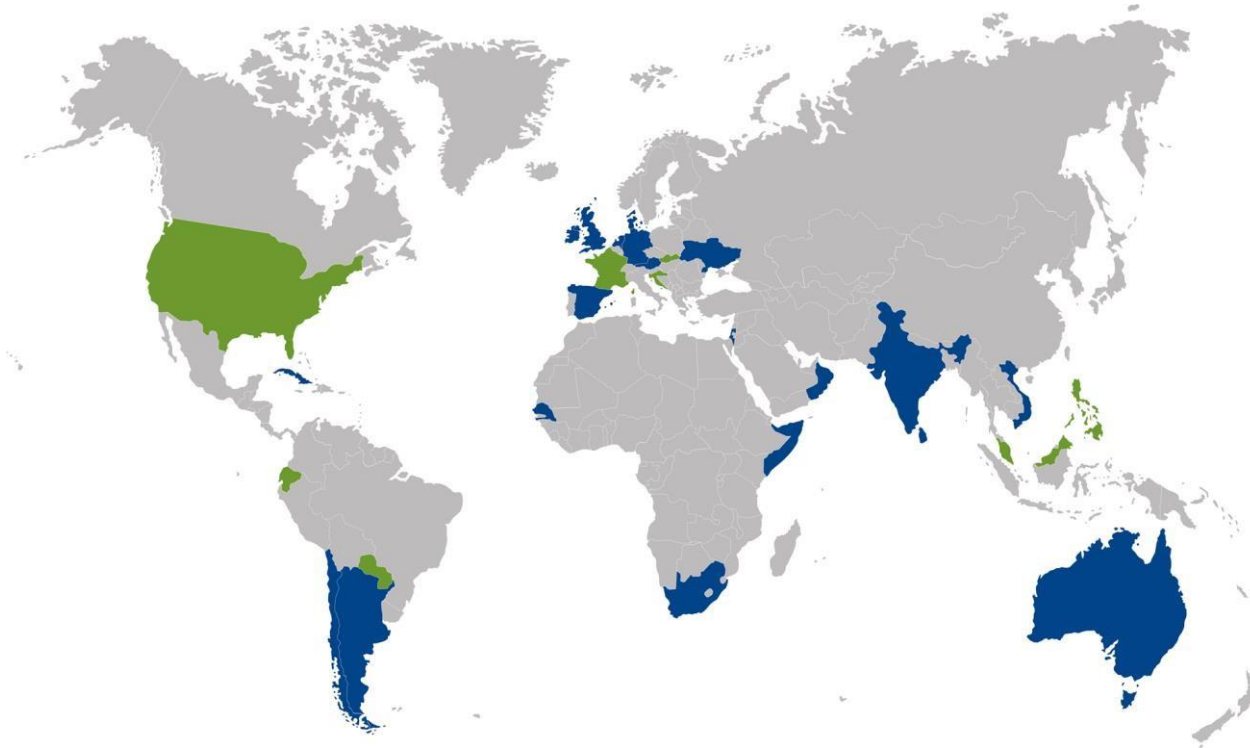
Auger diameter either
80, 150 or 250 mm

**Optional
helical screw
anchor rod**

**Rebar
Rod**



PEG systems worldwide: >500MWp, in 30 countries in all 6 continents



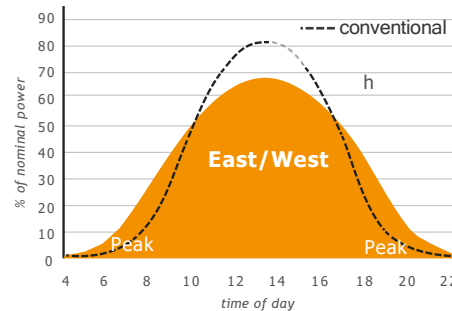
In green, new countries during 2022: Croatia, Ecuador, France, Malaysia, Paraguay, Philippines, Slovakia, USA, Vietnam

PEG® Engineering

The whole engineering process has been simplified by a clear standardization with PEG system blocks. Related to PV panel type and the selected level of DC system voltage (1000 to 1,500 V_{DC}) The flat - typical east-west oriented - PV generator creates a smoother daily averaged electricity yield.



Consistent energy generation across the day:



PEG engineering benefits:

- Fully scalable system design
- High location variety: Like a millipede, numerous mounting poles will be adapted to the ground and establish a new freedom of site selection
- Suitable for many PV module types
- Freely adaptable for 1,000-1,500 V_{DC}
- Most effective land utilization for utility-scale photovoltaics
- Low visual and ecological impact
 - ▶ simplified approval procedures



Self stabilizing



Low visual impact



Wind-proofed *

* Designed for 2,400 Pa module pressure load;
Max. wind speed is 135 mph (60.3 m/s)

PEG: Agrivoltaics ready

Reduced raw materials.
No concrete foundations.
Unit-based packaging.
No construction vehicles.

French Ouessant sheep under the PEG



-50%
logistic
costs



PEG: CAPEX Costs Saving vs other systems

Cost Factor	Saving
Material	Substructure: 50-65% less, DC cables: ~20-30% less
Logistics	~50% less due to far lower substructure quantities and weight
Labor	~50% less due to less labour time (hr/MW) & skilled labour (avg. hr cost)
Construction material	No concrete & sand is required for foundations or DC trenching
Machinery & tools	No heavy machinery is required (e.g. ramming, trenching, concreting). Only small forklift for site logistics and hand tools required.
Site operation	~30-50% less installation time , leading to saving of site operation costs, e.g. management, safety & security labor & equipment, consumables, Etc.
Safety	Far simpler installation process , e.g. without working on heights and without heavy substructure items, leading to significant less OHS effort and injury risks
Land	DC area ~50-65% smaller → Lower land acquisition / rent costs, lower installation costs, shorter perimeter fence

Fast & simple installation, means a lower cost to build



PEG[®] Procurement

Never again dealing with heavy loads and on-site problems with impassable terrain; never again dealing with complex customs clearance. Besides its simplified engineering and installation work-flow PEG system has one more ace up in sleeve: The consumption of raw materials and production resources is enormously lower compared to traditional solar PV projects.

All that even goes so far that you can install the whole DC-related PEG power plant with a small team equipped with some hand tools.

PEG material procurement and project logistics. In short, four maritime containers are sufficient to transport a PEG power plant with one megawatt DC capacity.

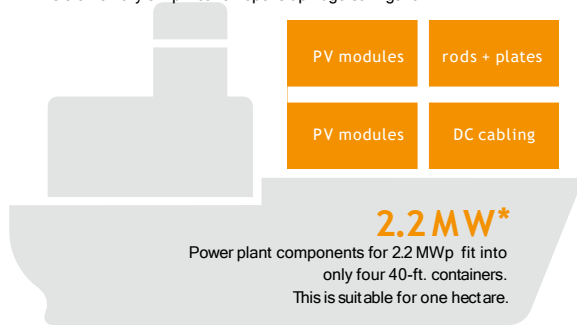
PEG's revolutionary system design enables transportation to far reaches all over the world. Thus not only on-grid capacities but also off-grid systems can produce eco-friendly, decentralized electricity.



PEG procurement benefits:

- Minimal material and transport cost
- Significantly reduced steel consumption
- Eliminates need for concrete foundations

This elementary simplification opens up huge savings for



* Figures refer to 550W modules and may differ regionally.



PEG systems worldwide:

Maastricht Landfill, Netherlands, 12MWp (2020) Ecuador KFC Phase 1, 1.5 MWp (2023)



Konowa, AUS, 9.18 MWp (2019)



Cuba, 8MWp (2022)



Florida, USA 248 kWp (2022)



Dareton, Australia, 3.8 MWp (2019)



PEG: Under Array Design and Cable Management



View under array



View under array



Cable Management



Combiner Box



Cable routing (No DC trenching)



Inverter station

PEG: Installation of Rods and Modules

Extremely **simple, safe and fast** installation:



Hammer drill for rod installation



Crimping of top plate



Crimping of bottom plate*



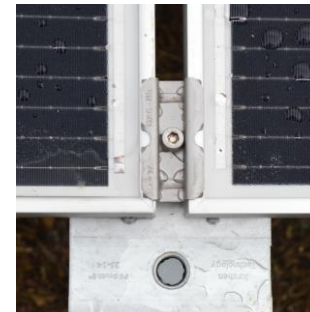
Installation of modules



Installation of module clips



Edge clip and center clip for bonding path



- **Simple, safe and fast installation** process
- Labor: **~450-520 man-hours / MWp** (subject to project size ~1-5 MW) for all DC plant (assuming 550W modules and including surveying, substructure, modules, cabling & logistics until inverters)
Crews of 8-10 people per MW per week
- Tools: **Drill hammer** (with chisel function, 1200W min power, Impact Energy: 8-11 Joules) or **Auger Drilling tool**, Hydraulic **Crimping tool** (Milwaukee or Burndy) * Optional Rotary Laser for leveling top plates in undulating terrain



* Pre-qualified crimping tools for PEG

PEG installation manual is available upon request, where labor man-hour breakdown is included

PEG: Ease of maintenance

For module replacement TÜV certified **MULTIBOARD** is the perfect solution to walk over the module rows.



Easy module replacement



Mowing robot



PEG automated cleaning system

The **GAL-IN SOLUTION** is specifically designed for the PEG design (V-shape) and works very efficient.



**RAYMO TORPEDO ROBOT
+ R42 FLEX CUTTING DECK**

The mower includes an all-wheel drive and is available in both a hybrid version and a purely electric version.
Mowing performance on a PEG plant: 2ha (5 acres) per day



Fast + effective cleaning



PEG manual cleaning system

PEG: >200 + mph high wind design

The racking is low to the ground, about waist height, providing an aerodynamic design **suitable for extreme wind hurricanes.**

Hurricane Ian passed through PEG EW site in Cuba on 27-Sep-2022 with intense winds, Category 3, ~120mph (~190kmh) speed, without causing any damage to the PEG. Three severe storms (Zeynep, Ylenia, and Antonia) on the Waalwijk Landfill site in the Netherlands during early 2022, with extreme winds up to 100 mph (160 km/hr), without any damage to the PEG substructure.



Bert van Woudenberg
Director, ProfiNRG



» At first glance the PEG might look a vulnerable and weak substructure, however the engineering work done by Jurchen Technology and the 3 extreme storm events only few months after the completion of the PEG installations had proven completely otherwise, clearly showing the PEG unique design is very robust and can withstand for extreme weather events. This is even more impressive due to the system's shallow foundation which was required for this old landfill site where the substructure could not be deeper than 0.5m below ground. «

Soil type:

- Can be **either non-cohesive** (e.g. sand or sand-gravel) **or cohesive** (e.g. sandy-clay, clayey silt)
- **Ramming through soft soil is possible** by using anchor rods
- **Ramming through limestone rock might be possible** (experience in AUS)
- **Predrill and concrete** required for **harder rock** (e.g. basalt, asphalt, coral limestone)



Mixed coral with boulders and sand and shallow water table



Shallow basalt example

Mixed limestone, 8 MW Cuba site



Further information is available in the [Jurchen Technology PEG slopes guidance](#)

- Extremely high land use: **~0.8MWp/Acre (1.9MWp/Hectare)** with ~550W modules
- **Flexible system design** allowing very high land use, also on sites with irregular shape (e.g. narrow and long or not-rectangle)
- The system's **orientation can be aligned to the site boundaries (NOT to the East-West direction) to maximize the land use**, with **NO impact on the system's yield**, due to the low modules' tilt

PEG aligned to the site boundaries



Non-rectangle PEG block



PEG on a very narrow land, ~10m wide

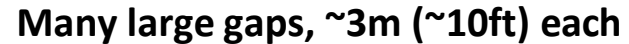


The DC with PEG EW is ~3 times higher vs with Tracker

~20.5MWp



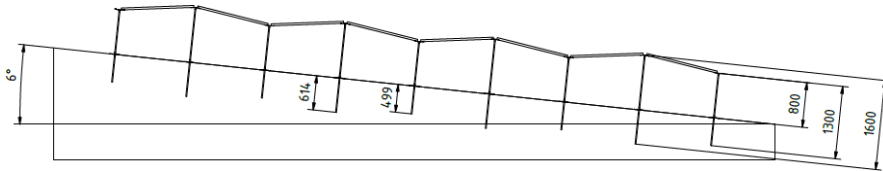
~7.0MWp



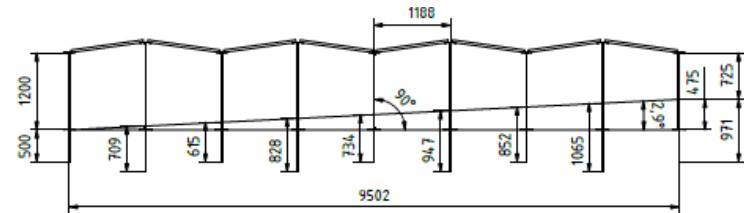
Site slopes:

The PEG can be installed on the following slopes (in any direction):

- **For sites without snow: Up to ~10 degree (~16.5%).** slopes at 11% or higher may require additional module washing
- **For sites with snow: Up to 2 degree (3.5%). Higher slope of up to ~3.5 degree (~6%) possible—evaluated per project**



Example installation for 11% slope
(no snow)



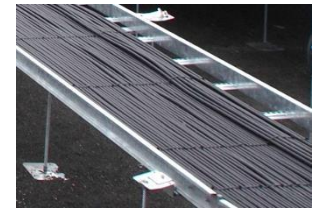
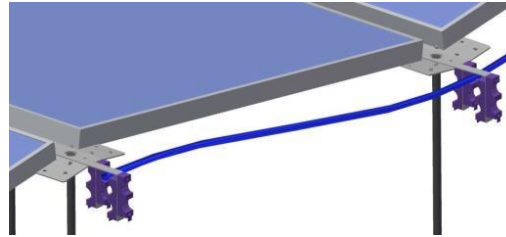
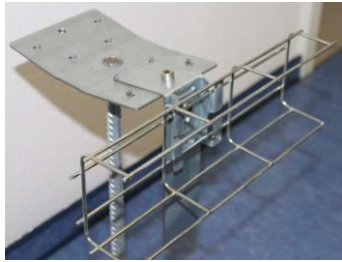
Example installation for 5% slope
(snow present)

Further information available in the [Jurchen Technology PEG slopes guidance](#)

PEG: Less Trenching-Cable Management System

- All DC cables are above ground without trenches
- Jurchen Technology offers cables management solutions for the PEG *

Cabling management products (East-West and North-South)



* Jurchen Technology cables management document is available upon request

Agrivoltaics & Specifications

Maximum Land Use



Requirements

Land soil condition	Cohesive (e.g. sandy-clay, clayey silt) and non-cohesive soil (e.g. sand or sand-gravel).
Upper soil layer	No rocks or underground infrastructure up to 1m(3'4") below ground; ram-med depth up to 0.8m (2'7")
Site slopes	<p>The PEG system can be installed on slopes of up to 4.5 deg.</p> <p>In case the slope is up to 2 deg, the rods should be vertical to the horizontal plane.</p> <p>In case the slope is higher than 2 deg., the rods should be vertical to ground slope.</p>



Mowing solutions:

- **Fabric sheet** placed on the ground, prevents vegetation growth. Commercially available product, not flammable, allows water to penetrate
- **Raymo robotic mower** under the structure, operated by a remote control
- **Clover grass**, ~150mm (~0.5ft) tall, drought-resistant, prevents other plants growth
- **French Ouessant sheep**, less than 50cm high, successful trial in Europe during H2 '22

Fabric sheet under the PEG



[Additional information is available online](#)

Raymo robotic mower
under the PEG



French Ouessant sheep
under the PEG



PEG vegetation control spec is available upon request



THANK YOU

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