



PEG[®] EW SYSTEM OVERVIEW



PEG[®] Revolutionizing
Solar Mounting

PEG[®] Main Benefits

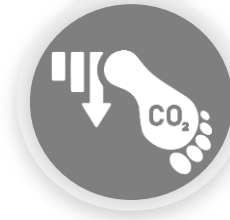
Extremely high land use of 2 MWp/ha
(approx. 225% higher yield per hectare)



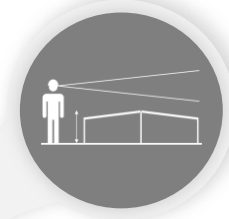
Extreme high weather resilience
(storm proof up to 300 km/h)



72% less carbon footprint
(78 % less steel, no foundations and low logistics)



Extremely cost-effective CAPEX
(supply, logistics and installation)



Low profile & shallow foundations
<1m (3,5ft) above & below ground



Very light system of 9 kg per
kWp (540W modules)



Furthermore PEG[®] Advantages

Hot dip galvanized steel offers high resistance to demanding corrosion classes (e.g. also near to the sea)



Optimized energy generation, higher during the morning and afternoon



Safe installation, working height 3,3ft (1m)



Proven globally, over 500+ MWp installed



50% fewer labor → only 430 working hours per MWp (with 580 watt modules – applied to PEG EW Standard) & in addition - just low skilled labor needed



Patented, ,innovative, minimalist, simple design

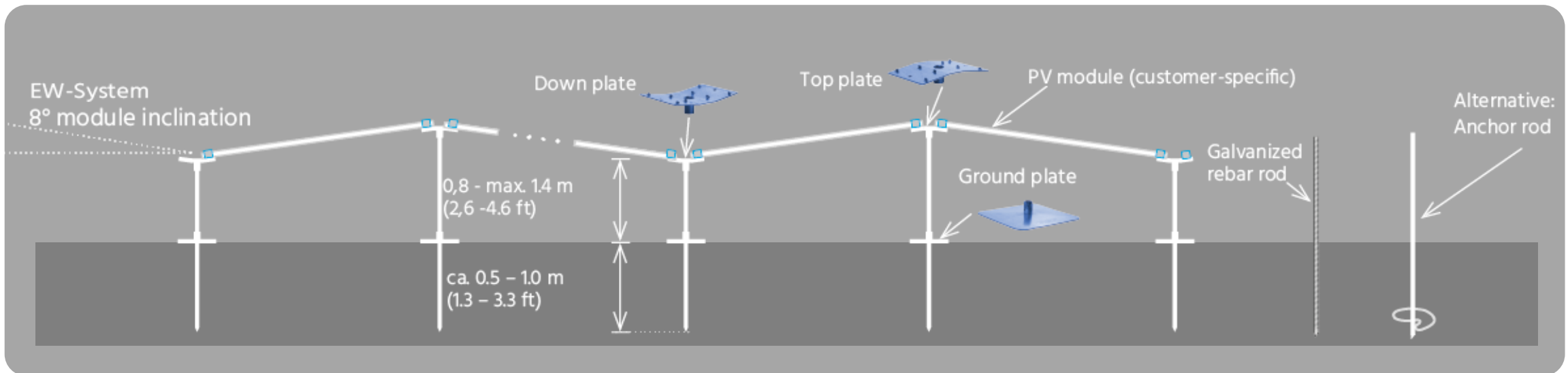
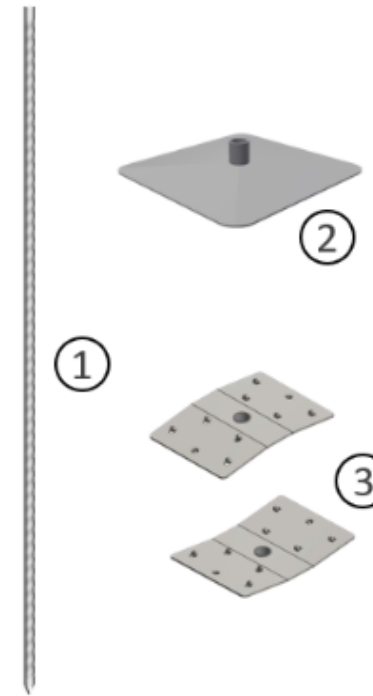


PEG[®]: Patented Design Characteristics

Only 3 items:

- Steel rod ①
- Ground plate and ②
- Top plate ③

Modules at 8 degree E-W tilt,
laid on the Top plates under the module's corners



1. subject to the site conditions and system design
2. Depends on the POT-values. 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.

PEG®: Installation of Rods and Modules

1) Surveying and marking rod positions

- ① Marking robot, e.g. CIV robotics
- ② Marking device, semi automated or manual (with GPS tracker)
- ③ Stringlines with or without GPS staking corners



PEG[®]: Installation of Rods and Modules

2) Raming the PEG[®]

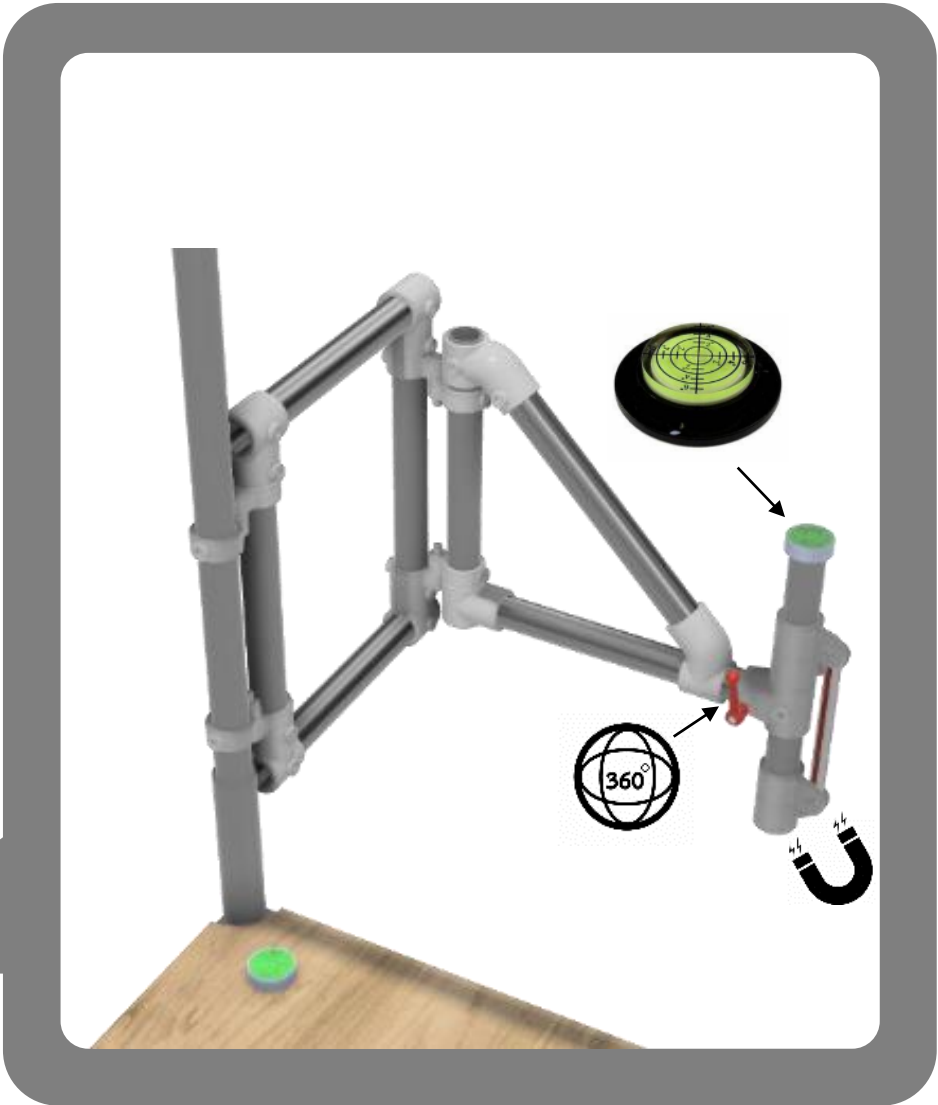
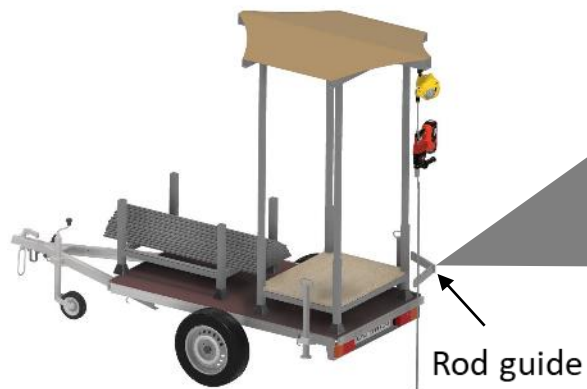
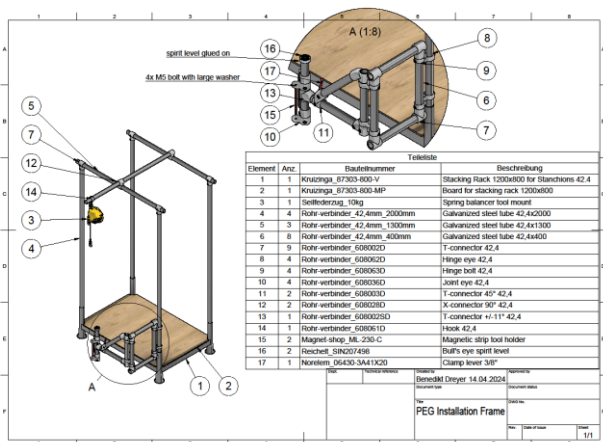
- ① Use a drill hammer, post driver or pile driving machine
- ② “PEG assist platform”
- ③ PEG DRIVE: autonomous ramn

Rotary laser, GPS surveying device or/and string line for rods to reduce the measurement effort



PEG[®]: Installation of Rods and Modules

“PEG Assist Platform”



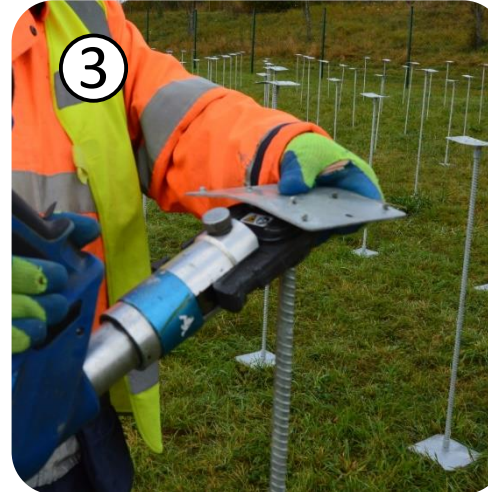
soon... Autonomous ram



PEG®: Installation of Rods and Modules

3) Installation of plates

- ① Ground plate (installed at ground level on any rammed rod)
- ② Top plate (installed at top of long rod)
- ③ Down plate (installed at top of short rod)
- ④ Crimping tool & ⑤ Tool detail



PEG®: Installation of Rods and Modules

4) Installation of modules

- ① place modules
- ② installation of module clips
- ③ detail: ready-fixed module on the PEG substructure



PEG[®]: Under Array Design and Cable Management



PEG® Excuse: Special Solutions

①



Auger diameter
Either 80, 150
or 250 mm

- ① Optional anchor rods for soft soil, swamp or need for shallow foundations (e.g. landfill)
- ② Optional self ballasted PEG if there is no ground penetration allowed (e.g. ammunition)
- ③ Optional pre drilled (15mm) and rammed or pre drilled (25mm) and grouted (e.g. rocky ground)

②



②



③

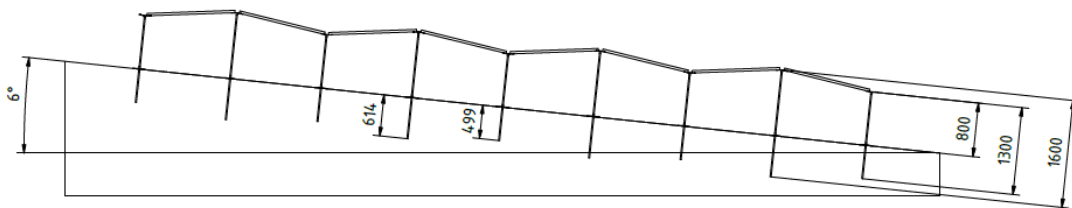


Design: Ground/Soil Requirements – Type & Slopes

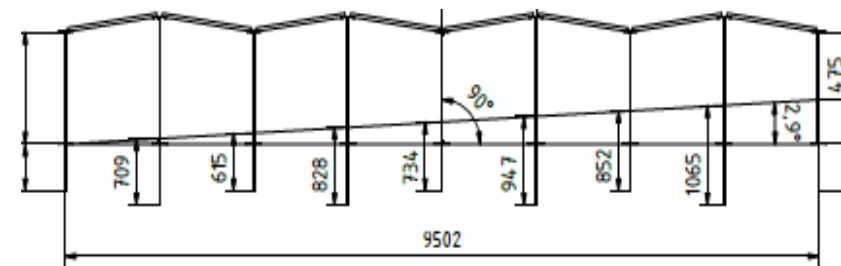
Site slopes:

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



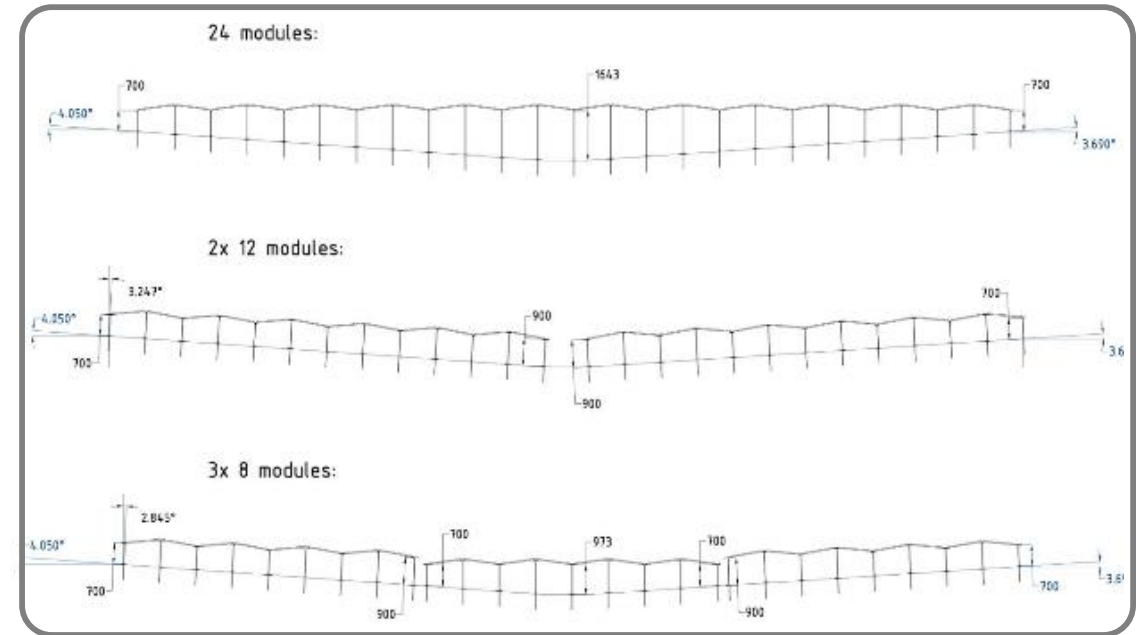
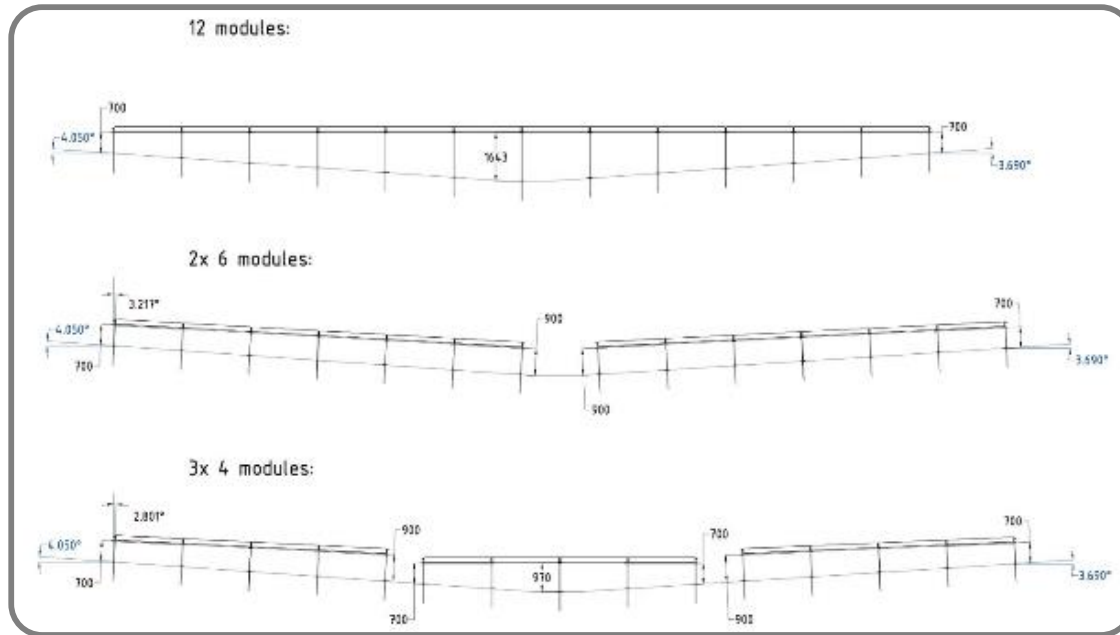
Example installation for 11% slope (no snow)



Example installation for 5% slope (snow present)

PEG®: Soil Requirements – Flatness

Handling slopes by using smaller blocks - below left shows EW orientation and right show NS

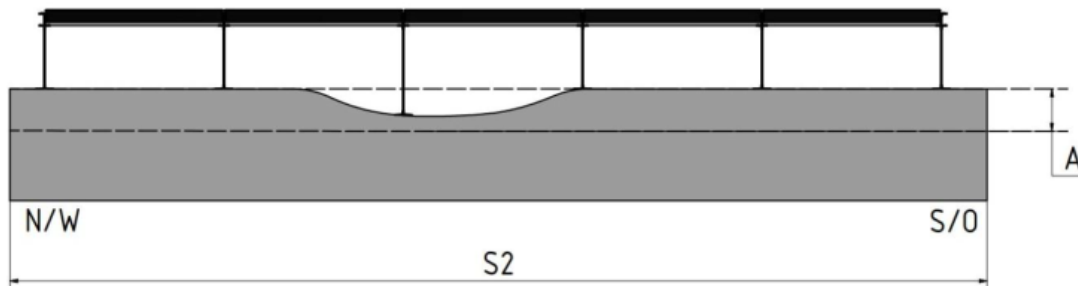


Further information available in the Jurchen Technology PEG slopes guidance.

PEG[®]: Soil Requirements – Undulations

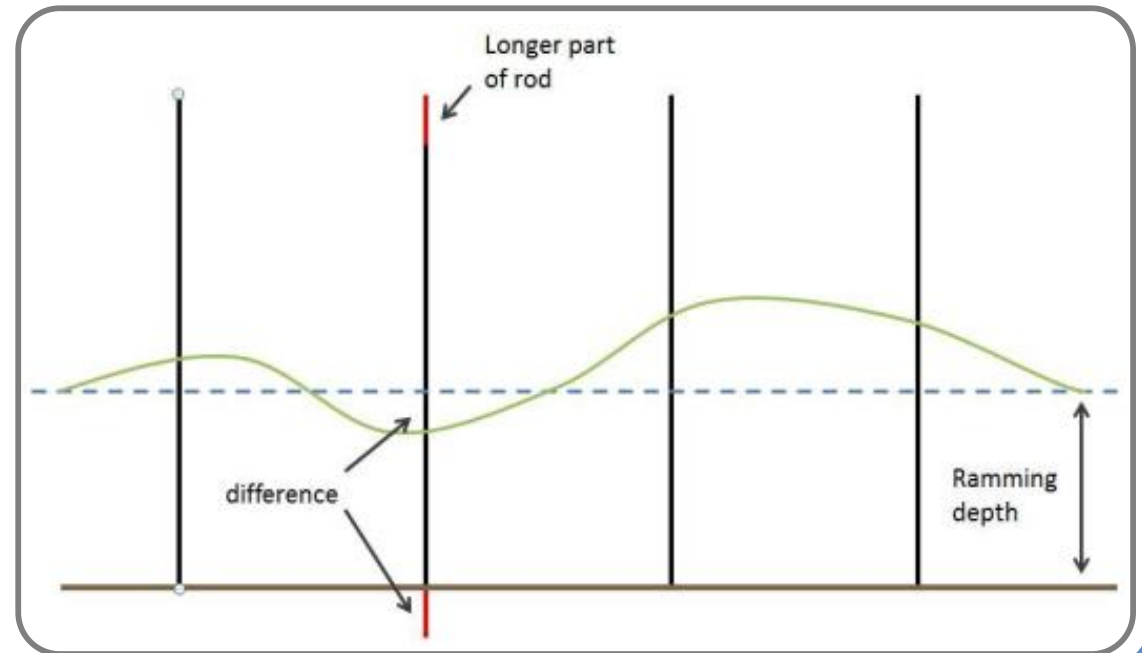
- Ground flatness: Up to 500mm (19.68 Inch) over 9-40m (29- 130ft) is recommended*
- Higher value is possible as long as the required ramming depth and the max above-ground height are achieved

→ The rods should be sufficiently long for the undulations onsite (or use extensions)



A = Up to 0.7m (~27.5 Inch), S2 = 9-40m (29- 130ft)

*The above is implemented through customized block size to address the ground flatness



Further information available in the Jurchen Technology PEG slopes guidance.

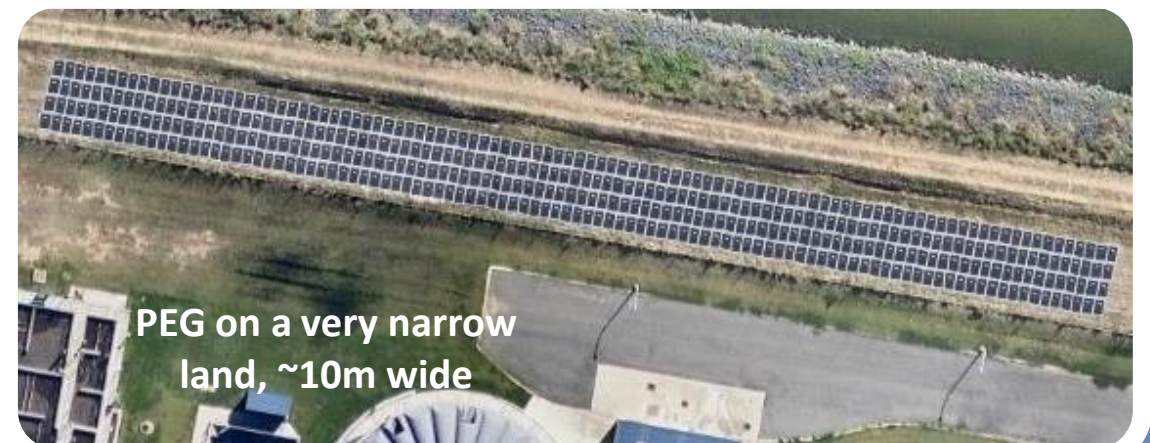


PEG[®] EW backup information



PEG[®] Revolutionizing
Solar Mounting

- Extremely high land use: 2,0MWp/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 alighted to the site boundaries (NOT to the East-West direction) to maximize the land use, with low (no) impact on the system's yield, due to the low modules' tilt



PEG[®] : Land Use

Item	Material (India / Germany supply)	Corrosion protection ** (India / Germany supply)	Weight
Rod *	Ripped Steel rebar: Fe 500D / B500B	Zinc coating ~80 µm	16mm rod: ~1.75 Kg/m (~1.18lbs/ft)
Ground plate	Steel: S275MPa / S280GD	Zinc coating ~50 µm HDG / Z275 MA Pre-galvanized	~0.8 kg (1.76lbs)
Top plate	Steel: S275MPa / S280GD	Zinc coating ~50 µm HDG / Z275 MA Pre-galvanized	~0.46 kg (1.0lbs)
Corner Bracing	Steel: E250 or E350 / DX51D	Zinc coating ~80 µm HDG / Z275 MA Pre-galvanized	~3.5-4.0kg (~7.7-8.8lb)
Middle clamp	Stainless steel: SS304 / 1.4301	(None)	~0.05 kg (0.11lbs)
Edge clamp	Aluminium Alloy: 6063-T6 / EN AW 6060	(None)	~0.04 kg (0.09lbs)
Bolts	Stainless steel: SS304 / A2-70	(None)	~0.02 kg (0.045lbs)

* The rods diameter is 14mm (non UL), 16mm or 20mm. The length of the short & long rods is determined per site based on the required ramming depth (determined by Geotech report and pullout tests) and the required above-ground height. ** Indian plates supply are HDG (Hot-Dip Galvanized). German plates supply are pre-galvanize.

PEG® : Approved Modules

- Modules suitable for PEG must have frames
- Approved modules list regularly updated at <https://www.jurchen-technology.com/products/pv-substructures/peg>
- Some approved module manufacturers:



*Approved for UL2703

→ Module's compatibility with PEG **MUST** be confirmed before ordering!

PEG®: Design Robustness – Track Record

- 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, the modules and the cables.

27-Sep-2022,
Hurricane Ian ~500
km wide with its
center only ~100
km from a PEG EW
site in Cuba.



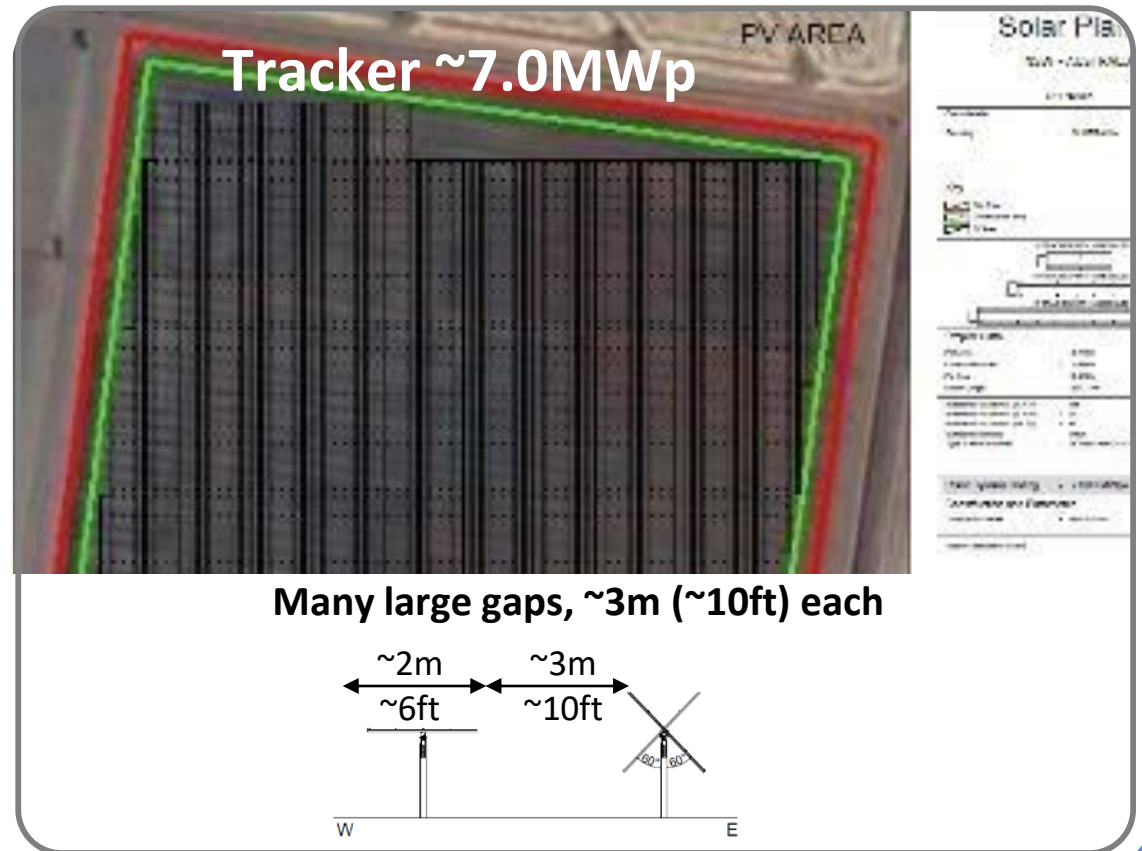
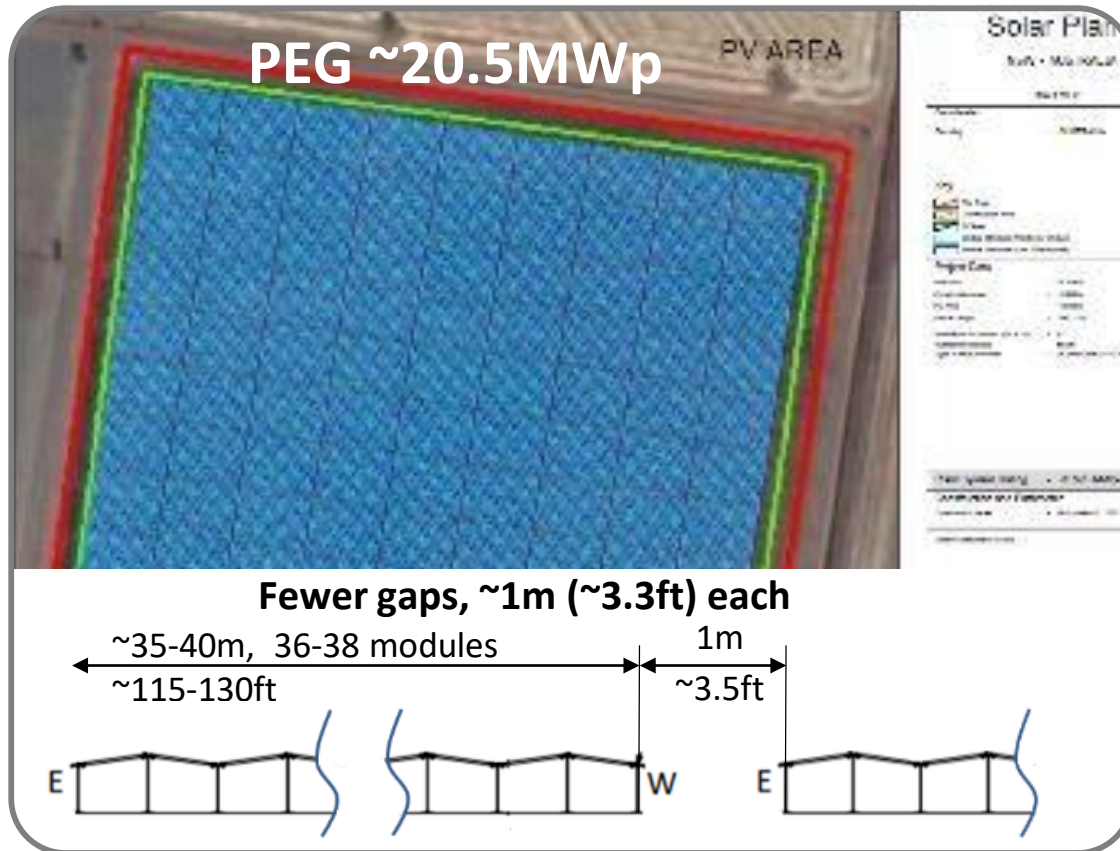
Bert van Woudenberg
Director, ProfiNRG



»» 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. ««

PEG[®]: Land Use – Example

Layout example PEG vs Tracker on the same land with the same modules:
The DC with PEG EW is ~3 times higher vs with Tracker!



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

Mowing Solutions:

- Fabric sheet placed on the ground, prevents vegetation growth. Commercially available product, not flammable, allows water to penetrate
- Robotic mower under the structure, autonomous or operated by a remote control
- Clover grass, ~150mm (~0.5ft) tall, drought-resistant, prevents other plants growth
- Sheep, successful trial in Europe (French Ouessant Sheep) since 2022



PEG®: O&M – Modules Cleaning

Robotic Cleaning Machines:

- GEVA BOT, first productive use since August 2022, ~220 modules/hours with 1m wide brush (for Landscape modules' orientation), or ~470 modules/hours 2m wide brush (for Portrait modules' orientation)
- Serbot pvCLEAN, successfully tested during 2022 for commercial use
- Manual cleaning: Gal-In, a lightweight, 18 kg (40lb), pulled with a rope and operated by two workers. 430 modules cleaned per man-hour.



Additional information is available online

THANK YOU FOR YOUR ATTENTION



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