

# Webinar powered by

Jurchen Technology

**02 July 2020**

10am – 11am | CEST, Berlin

1.30pm – 2.30pm | IST, Delhi

4pm – 5pm | CST, Beijing

6pm – 7pm | AEST, Sydney



**Mark Hutchins**

Editor | pv magazine



## Maximizing ground coverage and cutting installation costs for a lower LCOE



**Nir Dekel**

Jurchen Technology



**Herman Goulouze**

Volta Solar



# **PEG Substructure System**

**Nir Dekel, Sales Manager**

**2<sup>nd</sup> July 2020**





# PEG: Topics

1. Jurchen Technology - Company Introduction
2. System Benefits
3. Design Characteristics
4. Installation
5. O&M
6. Bankability Report
7. Global Presence & Case Studies
8. Summary: Benefits, Website, How to reach us



# PEG: Jurchen Technology Overview

- Founded in 2009
- HQ in Germany
- Designing and manufacturing **solar substructure and DC cabling**
- **Substructures sold for >2.6GW** projects worldwide
- **DC cabling sold for >3GW** projects worldwide



## Limondale (AUS)

Nominal capacity: 349.00 MWp  
Components: DC Cabling  
under construction



## Barcaldine (AUS)

Nominal capacity: 10.80 MWp  
Components: Substructure  
Commissioning: 2017

# PEG: Jurchen Technology Product Line

- Substructures:

PEG system



Uni base system



Double base system



- DC cabling:

High quality cable harnesses



Cabling for floating PV







# PEG: Main Benefits

- **Extremely high land use.** Comparison per acre:
  - **~225% more yield** vs trackers and other fixed-tilt systems
  - **~3 times more DC** vs trackers, **~twice more vs fixed-tilt**
- **Extremely cost-effective CAPEX** (supply, freight and installations)
- **Low profile & shallow foundations, <1m above & below ground**
- **Very light system, ~12.5 kg per kWp** (400W modules)
- **Proven globally, over 200MWp installed**

The PEG system, an ocean of modules covering the complete site with small gaps between the blocks

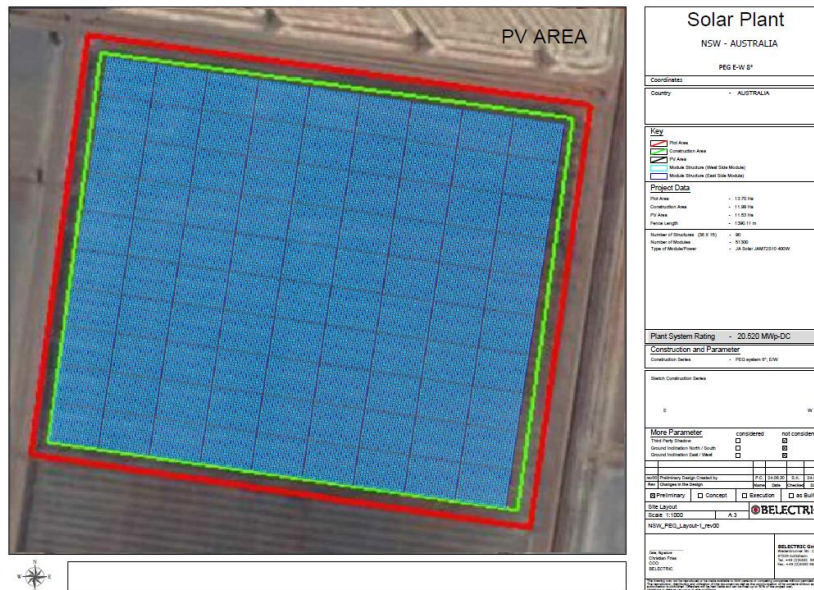


# PEG: Land Use

Layout example: ~3 times more DC with PEG vs Tracker

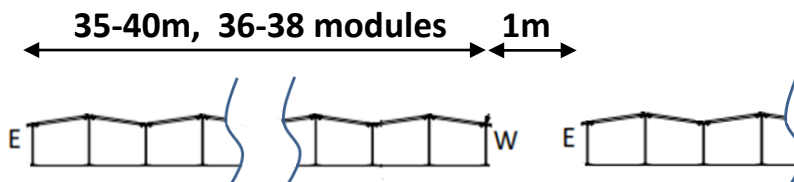
## PEG

~20.5MWp PEG



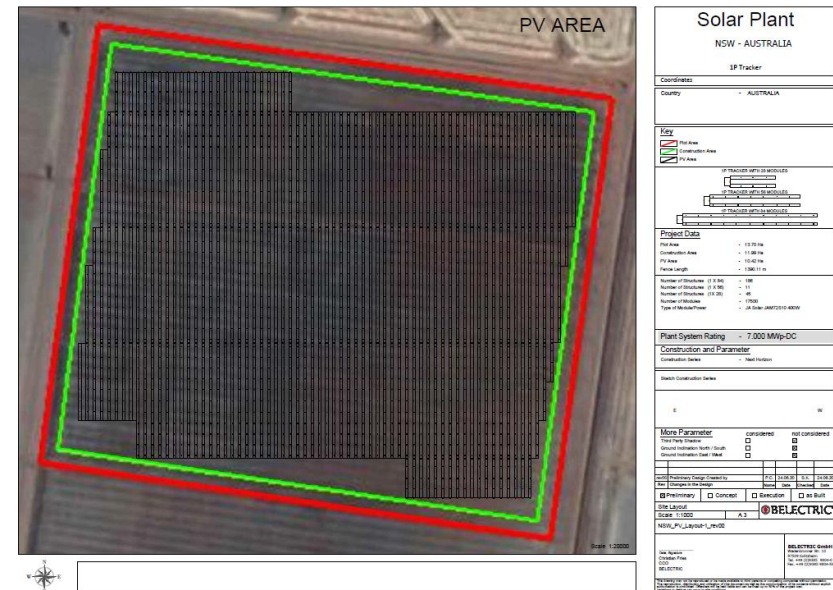
Mainly DC system...

Only few gaps, 1m each



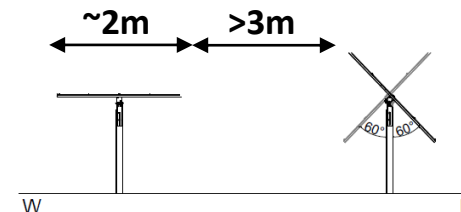
## Tracker

~7.0MWp



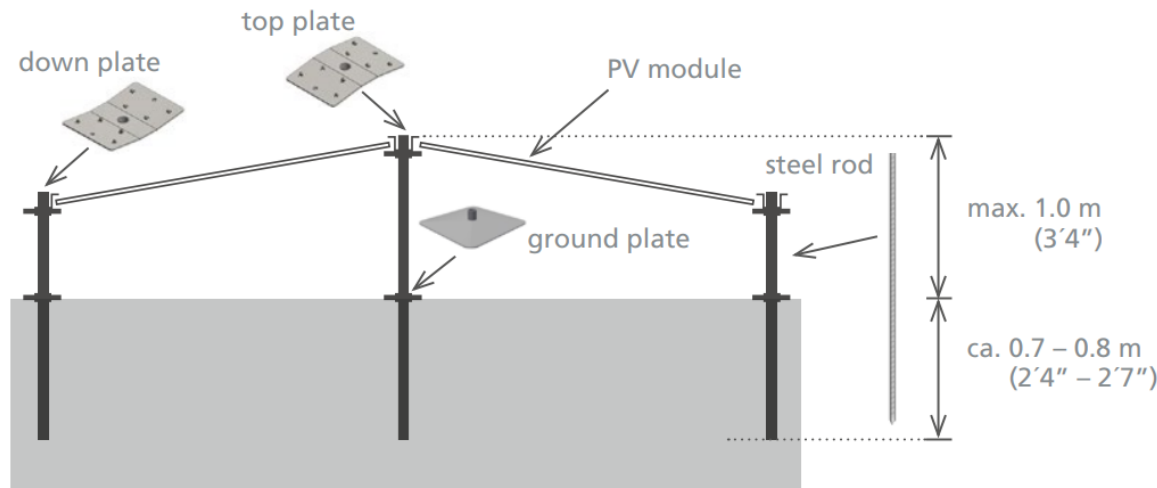
Mainly empty space...

Many large gaps, >3m each

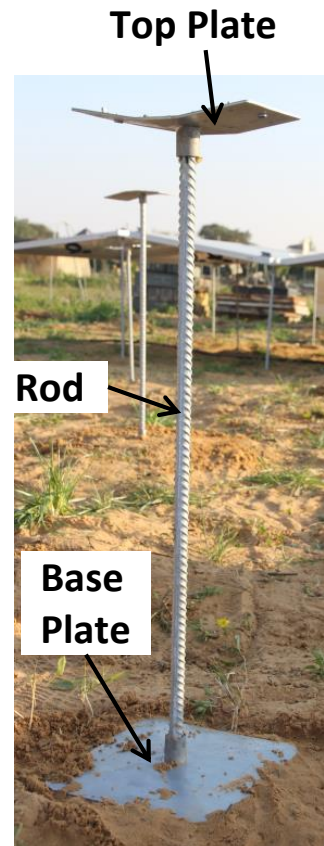


# PEG: Design Characteristics

- Only 3 items: Steel rod, ground plate and top plate
- Modules at 8 deg E-W laid on the top plates under the corners
- Optional **anchor rods** for sandy soil or shallow foundations



Optional  
anchor rod

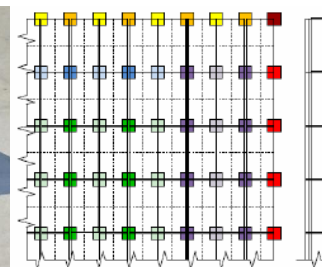




# PEG: Design Robustness

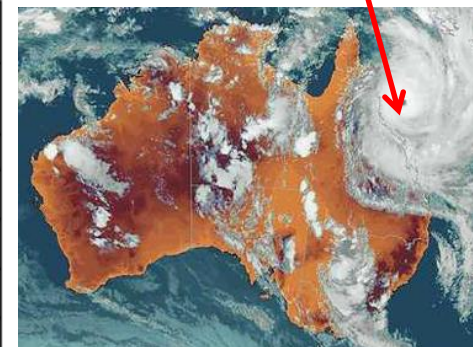
- Wind Tunnel tests successfully completed by IFI in Germany
- Max wind speed (ASCE 7-10): 160mph (~257km/hour)
- Compliance with Australian wind regions A, B and C (**tropical Australia**)

PEG wind tunnel tests done by IFI



72 Cell Modules, Wind Region C, Terrain Category 2					
		Resultant Wind Pressure (incl Dead Load), kPa		Resultant Force on PEG (for pull testing), kN	
		Uplift	Downforce	Uplift	Downforce
	Zone B - 1st Row	0.92	0.94	1.59	0.93
	Zone B - Other Rows	0.92	0.74	1.59	0.73
	Zone A - 1st Row	0.72	0.33	1.14	0.33
	Zone A - Other Rows	0.51	0.33	0.68	0.33

PEG is **certified for cyclone regions** of tropical Australia!






# PEG: Installation Methodology

Construction practices are irrelevant!

From **E P Construction**:



- 
- Small amount of material and labor
  - Without concrete, trenching and heavy machines
  - Working height is ~1m
  - Lightweight substructure, <3kg (~6.6lb) per item

...to **E P Installation**:





# PEG: Installation Process

- Extremely simple, safe and fast installation
- Heavy machinery not required. Electric hammer and hydraulic pressing tool
- ~0.8 man-hours / kWp for all DC plant
- Ramming depth up to **800mm (2.6ft)** underground
- >MWp installed **per week**







# PEG: O&M

- “Gal-In”, a lightweight and **efficient manual cleaning**, 18kg, requires **one man-hour to clean 250 modules**
- System **access from underneath** using trolley, **along the walking paths** between the blocks and **remote access using drone**
- **Methods for Vegetation control:** Fabric sheet, mowing robot, chemicals and crust dust in top soil

“Gal-In” cleaning system



Mowing robot machine



Trolley to access underneath the PEG



Fabric sheet under the PEG





# PEG: Bankability

- Debt finance already provided, for PEG projects in Australia
- DNV-GL bankability report completed in June 2020



## TECHNOLOGY ASSESSMENT

### PEG Solar Racking

Jurchen Technology GmbH

Document No.: 10188745-OAL-R-01

PEG's main advantage is in the efficiency of land use (the energy output per acre) and CAPEX reduction.

the area-related energy harvest per acre is almost the same for either the fixed-tilt or single-axis tracker systems, while the PEG system exhibits a comparative 227% advantage over either of these types.

The PEG product has been installed in the field since 2014 and Jurchen has not received any warranty claims to date.

Jurchen has performed geotechnical and structural engineering which is typical for a product of this type,

#### Energy land-use efficiency (MWh/acre/yr)

Location	Gain PEG vs. FT/SAT
<b>St. Cloud, Minnesota</b>	+217% FT +224% SAT
<b>Las Vegas, Nevada</b>	+227% FT +222% SAT
<b>Raleigh, North Carolina</b>	+231% FT +241% SAT

Mounting type	GCR (Ground Cover Ratio)
<b>PEG</b>	≈ 1.0
<b>Fixed-tilt, ground- mount</b>	US locations: 0.40 Tropical locations: 0.87-0.93
<b>Single-axis tracker</b>	0.33





# PEG: Global Presence

Over 200MWp PEG systems installed worldwide

Barcaldine, Qld, Australia, 10.8MWp



Hoensbroek, Netherlands, 2MWp



Adam, Oman, 500kWp



Goondiwindi, Qld, Australia, 4.8MWp



Haidt, Germany, 1.7MWp



Coronel Suarez, Argentina, 333kWp



Mesilot, Israel, 4.6MWp



Somaliland, 500kWp



Tan Chau, Vietnam, 22kWp







# PEG: Case Studies

Example of PEG success stories:

## **Goondiwindi, Qld, Australia, 4.8MWp**

The first unsubsidized commercial solar project in Australia



## **Mesilot, Israel, 4.6MWp**

PEG the only system to achieve the required DC capacity and yield



## **Dareton, NSW, Australia, 3.7MWp**

Low profile PEG (<1m) essential for permit process & neighbors' consent



## **Barcaldine, Qld, Australia, 10.8MWp**

Government OH&S audit indicated PEG installation safety standards are exceptionally high



# PEG: PEG projects in the Netherlands

- **Volta Solar:** Dutch EPC, Owned by Essent/EON, build 60-80MW/Yr
- **More than 40MWp PEG installed in the Netherlands** over 17 sites.

Key benefits of the PEG system:

- **Maximizing land use** through the PEG **flexible design**, for land constrained sites and sites with challenging shape
- **Significantly reduction of council approval risks**, through the PEG low profile and visual impact
- **Reducing soil risks and tests**, due to the PEG **flexible foundation with 40cm underground** ramming depth using the anchor rods





# PEG: Summary

- **By far the most efficient land use** (MWh per Hectare), **~225% more** than Trackers & Fixed-Tilt
- **Competitive LCOE vs Trackers and Fixed-Tilt** (AUS customers feedback)
- **Significant CAPEX reduction** (both supply and installations)
- **Simpler permit process**, due to lower profile & shallow foundation
- **The PEG online:**

## Web page:

JURCHEN TECHNOLOGY COMPANY SOLAR PV POWER PLANTS DE SYSTEMS ACCESSORIES DOWNLOAD

PEG® Substructure for Photovoltaic Power Plants



The most efficient and innovative PV substructure on the market sets standards in terms of material consumption, OPEX savings and reduced need for heavy machinery. The PEG system is an integral and easy-to-install construction solution.

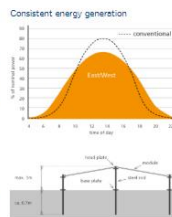
Over the last 10 years, increasing civil construction budgets for a guaranteed power plant in short, is the construction one, the material costs and the required machinery. In reducing the PEG substructure, we have achieved exactly these three factors. The result is a simple and efficient design. The PEG substructure has a low ground height and uses a simple steel rod, instead of an iron and steel welding rods. Due to the lightweight construction, no foundation is needed. As a consequence, the needed material is reduced to less than 10% compared to conventional solutions. Less material and a simple design lead to reduced steel costs and the time between planning and commissioning is reduced significantly.



### Efficiency improvement



### Cost reduction



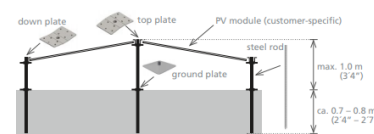
## Data sheet:

### EFFICIENCY IMPROVEMENT



### SIMPLICITY

- Self stabilizing
- Robust & certified for tropical weather
- Low visual impact



## Case studies:



## Projects list:

JURCHEN TECHNOLOGY



**AUSTRALIA - DARETON**  
Project size: 3.7 MWp  
Modules: Ja Solar  
Commissioned: 2019



**ISRAEL - MESILOT**  
Project size: 4.7 MWp  
Modules: Trina Solar  
Commissioned: 2019

**GERMANY - MAINBERNHEIM**  
Project size: 0.75 MWp  
Commissioned: 2019

**GERMANY - BAD ESEN**  
Project size: 0.75 MWp  
Commissioned: 2019

**GERMANY - ROSCHE**  
Project size: 0.75 MWp  
Commissioned: 2019

**GERMANY - TRAPPSTADT**  
Project size: 0.75 MWp  
Commissioned: 2019

...and much more, available at:  
**[www.jurchen-technology.com](http://www.jurchen-technology.com)**





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