

# GameChange Solar Bankable Quality at Value Pricing



# How GameChange Came About



## **Our Parent Company Invested \$480,000,000 primarily in Clean-Tech Metal Fabricators**

Our owner Barron Group Holdings invested over \$480,000,000, heavily in metal fabrication companies. This gives us a strong working knowledge of cost effective scale metal manufacturing processes.



## **Our Parent Company Built 10 Solar Power Plants and Learned the Solar Business**

Starting in 2011, Barron invested over \$50,000,000 to develop and built 10 solar power plants 18.9 MW.



## **Experiencing that Racking Systems were Overpriced, Overcomplicated and Slow to Install, GameChange was Founded to do it Better**

As these plants were built, we saw that PV mounting structures were too expensive, complicated and slow to install and needed better integrated wire management and grounding



GameChange Solar was started in 2012 to provide the most cost effective, high quality and fast installing solar racking systems

We have built a superior engineering team, leveraged our legacy skillset in solar system installation, design and metal fabrication, and developed the best racking systems in the industry.



# GameChange Mission:

Change the World by Making Solar Energy Affordable

- Uncompromising, Bankable Quality Racking at Value Pricing
- Superior Engineering with Highest Steel Strength in the Industry
- Optimized Design with Less Parts, Less Cost, Fastest Install

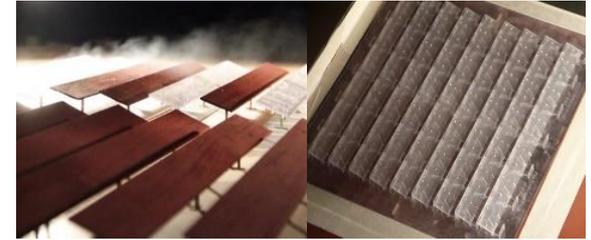




# Bankability

GameChange Solar has industry leading quality & the backing of Barron Group Holdings, giving us a world class level of bankability to give you the peace of mind you need.

- Financial strength: backed by Barron Group Holdings with assets substantially in excess of \$100,000,000
- 20 year warranty
- Strict adherence to required engineering standards
- Projects utilizing GameChange Racking financed by Key Bank, M&T Bank, Bridge Bank, US Bancorp, Duke Energy, True Green, PJM Utility, Laurel Capital Partners, and many others
- All systems wind tunnel tested by industry leader CPP
- 2703 and 467 ETL/UL tested
- Independent assessment by industry leader Black & Veatch



Safety first: boundary layer wind tunnel Testing of GameChange roof & ground systems by industry leader CPP



Rigorous field testing of GameChange Post System Sticky-Post™



# Excellence in Customer Service

Delivery time:  
2-4 wks Roof, 5-7 wks Ground Systems

Responsiveness:  
1-2 day for quotes, 2-8 days for layouts

Staged or completed deliveries scheduled as needed by GameChange in-house logistics team

In house structural, mechanical and electrical engineers

Stamped layouts and calculations in 50 states and internationally

Free on site field training and site supervision services

Industry's most thorough and user friendly layout/permit drawings:

The image displays four technical drawings for a solar racking system, arranged in a 2x2 grid. Each drawing includes the GameChange Racking logo and the slogan 'QUALITY. VALUE. INNOVATION.'.

- Top Left (1 of 4):** A site plan drawing showing the layout of the racking system. The legend indicates various purlin spans: 4-Span Notched Purlin, 4-Span Purlin, 5-Span Purlin, 6-Span Purlin, 7-Span Purlin, 8-Span Purlin, 9-Span Purlin, 11-Span Purlin, 12-Span Purlin, and 13-Span Purlin. It also includes a scale bar and a north arrow.
- Top Right (2 of 4):** Another site plan drawing, similar to the first, but with a legend for GC tubs: 21" GC Tub and 15" GC Tub. It also includes a scale bar and a north arrow.
- Bottom Left (3 of 4):** A detail drawing showing exploded views of the racking components, including purlins, rails, and brackets. It includes detailed notes and a table of parts.
- Bottom Right (4 of 4):** Another detail drawing showing exploded views of the racking components, including purlins, rails, and brackets. It includes detailed notes and a table of parts.



# Max-Span™ Post Driven System

- Industry's best quality, test & certification and bankability
- Industry's longest spans and fewest foundations: as few as 240 per MW
- Patent pending articulating purlin connections to navigate up to 15% terrain slopes
- Supports all poly, glass and thin film modules including First Solar Series 4
- Post/beam/brace assembly has industry's lowest part count and fastest assembly
- Rugged design enables 150mph wind and 90 psf snow loads
- Turnkey install, geotech services available
- 20 yr. warranty – Made in USA
- ETL / UL 2703 tested
- Independent assessment by Black & Veatch
- Wind tunnel tested by industry leader CPP



“GAMECHANGE'S INNOVATIVE (POST-DRIVEN) SOLUTION OFFERED A QUALITY PRODUCT AT THE BEST VALUE IN THE MARKET.”

CHRIS BULLINGER  
CEO, Hecate Energy LLC



# Industry's Lowest Part Count for Pile Systems

- Assembles faster due to lower part count
- Three axes of adjustability demanded by installers for navigating real world site conditions where significant adjustability in the field is required
- The unmatched span capability of the Max-Span™ means there are fewer foundations than competing systems, which also means less piles and less pile installation cost.



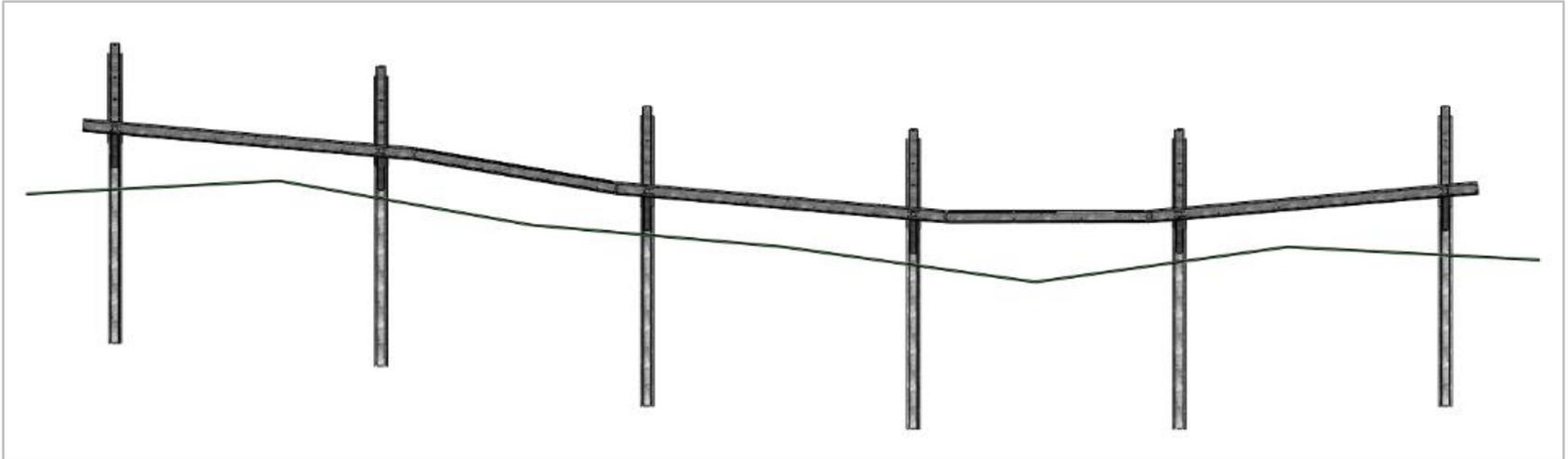
Nesting components eliminate brackets, have long slots enabling 3 axes of adjustability

## Part Count Comparison for A Frames ( Post, Brace, Beam)

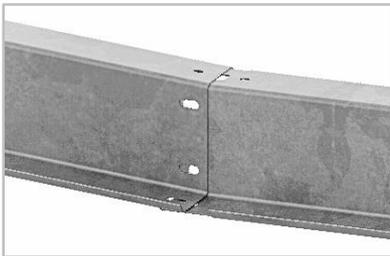
	Components	Bolts	Total Parts	Piles/MW	Total Components Per MW
GC Max-Span™	3	6	9	240	<b>720</b>
Competitor S	5	8	13	280	1400
Competitor D	5	14	19	280	1400
Competitor R	8	14	22	280	2240



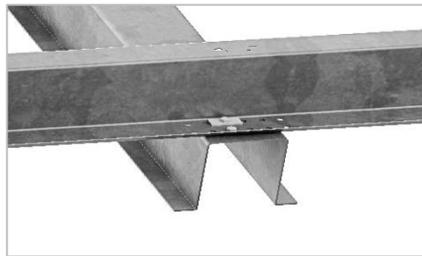
# Superior Terrain Navigation Adjustability



Articulating purlins between tables allows up to 15% east-west terrain slopes



Patent pending articulating purlin connection to navigate sloping terrain



Fast installing direct mount purlin Option has multiple mounting holes allowing 6" east-west adjustability



Articulating purlins between tables enable installation on sites with complex slope issues including up to 15% east-west terrain slopes



Nesting components eliminate brackets, have long slots enabling three axes of adjustability



# Max-Span™ Post Systems Across the USA

32 MW, NC



12 MW, NJ, Frameless Modules



43 MW, NC – Group of 8 Systems



7.3 MW, MD



39 MW, NC – Group of 6 Systems



4 MW, Coastal MA



41 MW, NC – Group of 7 Systems



3.5 MW, Central MA



3.7 MW, MA



3.5 MW, NJ



# Max-Twin™ Post Driven System

- Industry's best quality, test & certification and bankability
- Rugged design enables 135mph wind and 50 psf snow loads
- Industry's longest spans and fewest foundations: as few as 240 per MW
- Patent pending articulating purlin connections to navigate up to 15% terrain slopes
- Supports all poly, glass and thin film modules including First Solar Series 4
- Turnkey install, geotech services available
- 20 yr. warranty – Made in USA
- ETL / UL 2703 tested
- Wind tunnel tested by industry leader CPP



# Pour-in-Place™ Ballasted Ground System

- Patent pending protected system w/ self leveling technology: 68% faster install than precast
- Substantial labor savings by eliminating moving and shimming heavy, precast blocks
- Integrated grounding and wire management
- Supports all poly, glass and thin film modules including First Solar Series 4
- Gen4 Pour-in-Place™ Ballasted Ground System with round forms now available – no supports while pouring, faster install, steeper slopes
- Available in both 1 & 2 panels up in portrait
- Landfill solar racking leader
- 20 year warranty – Made in USA
- ETL / UL 2703 tested
- Independent assessment by Black & Veatch
- Wind tunnel tested by industry leader CPP



“FASTEST BALLASTED GROUND SYSTEM I’VE INSTALLED: WE JUST DROP THE RACKS INTO THE FORMS AND THEN POUR THE CONCRETE. VERY FEW PARTS, VERY SIMPLE TO DEPLOY.”

TED GADOMSKI  
Operations Manager, Pro Star Electric Inc.



# Fastest Install of any Ballasted Ground System



Place supports, attach rails, then level rail supports quickly prior to pouring concrete



Slots combined with rail support self-leveling technology enable up to 10" vertical adjustability



Available with galvanized purlins with large wire management tray



North-south wire management trays for homerun wires mounted on Pour-in-Place™ system



String inverters and homerun wiring attach easily to Pour-in-Place™ System



East-west slopes up to 15% for continuous systems no ground prep required. North-south slopes up to 5% need no gravel buildup under forms, over 5% up to 15% need buildup



# Concrete and Combiner/Inverter Installation Methodologies



East-west slopes up to 15% for continuous systems no ground prep required. North-south slopes up to 5% need no gravel buildup under forms, over 5% up to 15% need buildup



Combiner boxes and string inverters mounted on to support structure in Pour-in-Place™ forms



Gen4 Pour-in-Place™ Ballasted Ground System with round forms shipping Q4 2015: no temporary bracing, less concrete, faster install, steeper slopes up to 17% in all directions



Pouring bucket on bobcat for concrete pouring of Pour-in-Place™ forms on sensitive landfill caps



Filling Pour-in-Place™ forms using concrete pump



Standard concrete pump truck has long range and fills up to 2.5 MW of Pour-in-Place™ forms per week



# Landfill Racking Industry Leader

GameChange Solar is a leader in landfill solar PV racking with installations at numerous landfill and brownfield sites in multiple states nationwide

- In house structural, mechanical and civil engineers to support all aspects of complex landfill and brownfield sites
- Extensive experience working with landfill and brownfield regulatory entities and stakeholders in 12 states
- Ability to support projects in all states



GameChange Pour-in-Place™ System 12.9 MW – New Jersey Landfill Site - Largest Superfund Site in the United States

# Pour-in-Place™ Ballasted Ground Systems Across the USA

12.9 MW, NJ – Largest Superfund Site in USA



2.6 MW, CT



6.5 MW, MA



2.8 MW, MA



6.24 MW, Central



2.5 MW, NY



4 MW, Rocky Site, MA



1.2 MW, NY



## 12.9 MW – New Jersey Landfill Site - Largest Superfund Site in the United States

This 12.9 MW Solar Project was built in record time on a Landfill in New Jersey and powers 40,000 homes nearby.



The L&D Landfill 12.9 MW GameChange Racking Pour-in-Place™ System is the largest superfund landfill project in the United States.

The system installed quickly onto a challenging landfill with several difficult sloping areas. Stringent requirements were followed during the installation to make sure all local, state and other regulations were followed.

## 6.5 MW - Three Closed Solid Waste Landfills in Western MA

All three sites were built on top of closed solid waste landfills, creating valuable re-use of otherwise useless land.



All three sites were built on top of closed solid waste landfills, creating valuable re-use of otherwise useless land.

These western Massachusetts landfills requires very stringent design guidelines to be followed. The landfill cap was not allowed to be disturbed and all vegetation required to be left in place to required height for storm water management reasons. The sites were completed in only two months through difficult fall and winter conditions.

## 2.5 MW – Largest Landfill Solar System in New York State

This site is the largest solar PV installation on a landfill in New York.

The install process is straightforward and quick. Bobcats with pouring buckets filled the forms, then modules were mounted.



Clarkstown, NY - 12 men installed 2.5 MW racking in under one week

"WE SELECTED GAMECHANGE'S POUR-IN-PLACE™ BALLASTED GROUND SYSTEM FOR ITS SUPERIOR QUALITY, VALUE, AND SPEED AND EASE OF INSTALLATION. IT WAS A PLEASURE WORKING WITH THEIR TEAM."

Charles Feit, CEO, OnForce Solar

## 1.2 MW – Superfund Site in Patterson NY

This site is on a 10 acre closed municipal landfill in Putnam County New York.



12 men installed 1.2 MW racking in 3.5 days

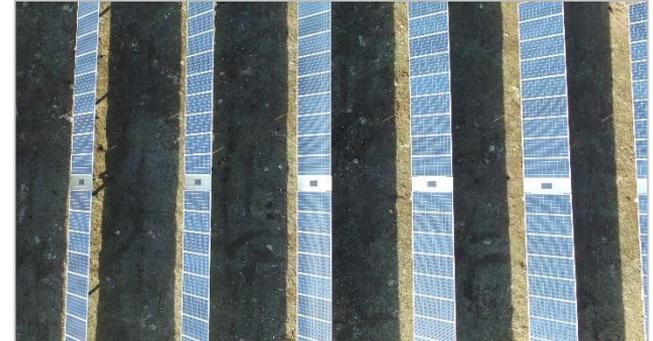
"WORKING ON A LANDFILL REQUIRES THAT YOU PAY CAREFUL ATTENTION TO ANY EQUIPMENT THAT WILL CONTACT THE EXISTING GROUND SURFACE, SO THAT THE ENVIRONMENTAL INTEGRITY OF THE SITE CAN BE MAINTAINED. WORKING WITH GAMECHANGE RACKING ALLOWED US TO DESIGN THIS INSTALLATION COST EFFECTIVELY TO ENSURE THAT OUR PROJECT RESULTED IN AN OVERALL ENVIRONMENTAL GAIN IN THE TOWN OF PATTERSON."

Paul Curran, Managing Director, BQ Energy



# Genius Tracker™ System

- Breakthrough Technology Enables Lowest Cost and Highest Reliability Tracker with Fastest Install and Lowest O&M Cost
- Black & Veatch Technical Assessment, CPP Wind Tunnel Tested and Rated 150mph, ETL/UL 2703 Testing Completed April 2016
- Highest Power Density of Any Single Axis Tracker, 99.3% Panel Density on Rows Vs. 94.0% Best Competitor
- Robust Linear Actuator Drive System Has 40 Year Operating Life and is IP 66 Rated for Operation in Harsh Environmental Conditions
- Every Drive Actuator Has its Own Battery Backup and Wirelessly Linked Controllers, Eliminating All Trenching, Tru3D-Gimbal™ Bearings Account for Pile Installation Being Out of Plumb, Out of Azimuth and Out of Vertical & East-West Alignment
- Self-Powered Rows Eliminate Central Drive, Allow for Uninterrupted Grass Cutting and Panel Washing
- 10 Person Crew Installs 1.70 MW Trackers and Panels Per Week



“You don't have to be a genius to install their tracker, but you sure feel like one for doing it!”

Peter Greenberg  
CEO, Energy Wise, Oregon



# Fast Installation, Optimal Performance



Tru3D-Gimbal™ Gen3 Bearings allows for 4.5% plumbness & azimuth tolerance, 2" vertical & 1.5" east-west adjustment



Tru3D-Gimbal™ technology aligns, self-lubricating HDPE UV proof bearings to have 20+ year life due to elimination of misalignment grinding



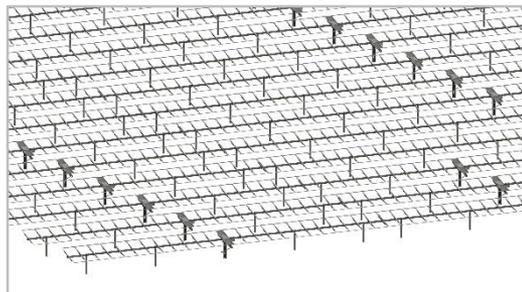
Purlins attach quickly from above using minimal components, bottom mount option available



Linear actuator robust stainless steel & aluminum actuators with 40 year operation in harsh environmental conditions



Mounts all poly and thin film modules including First Solar Series 4



Self powered rows eliminate central drive, allow for easy maintenance



# Genius Tracker™ Features

- Encryption Protection: ZigBee Wireless Network
- Tracking: Single Axis Horizontal
- Rotational Range (East/West): 90° Standard  
120° Available
- Tracking Method: Time and Location Based Algorithm (Based on NASA)
- Anti-Shading (Backtracking): Prevent Panel Shading for Entire Operational Range
- Panel Mount: Large Modules - Portrait 1 UP, Thin Film First Solar Series 4 Modules - Landscape 3 to 4 UP
- Supported Modules: All Major Brands Including Thin Film
- Array Configuration: Array May Be Built with Complete Flexibility in Both East-West and North-South Directions
- Table Length: Up to 90 72 Cell Modules Driven by One Actuator
- Slope Tolerance: Handles Slopes North-South +/- 6.5° and East-West +/- 9°
- Remote Communication: Secure Monitoring and Control Tracker Array in Real-Time Via an Encrypted Cloud Portal Full Stop; SCADA Solution Available
- Wind Load Capacity: CPP Wind Tunnel Tested, Rated Up to 150 mph
- System Power Density: Highest Power Density of Any Single Axis Tracker, 99.3% Panel Density on Rows Versus 94.0% Best Competitor
- Ground Coverage Ratio: 0.25 to 0.65 (IAs Required)
- Stow Wind Speed: 70mph+ Typical Time of Day Weighted Average
- Time to Stow: 0.8 Minutes Time of Day Weighted Average
- Stow Strategy: 45° Tit. Least Stow Downtime in Industry with Typical Time Less Than 3 minutes
- Backup Power: Every Linear Actuator has Integrated Solar Panel and Battery Providing Integrated Backup - Typically 5 Days
- Drive Type: Linear Actuator Robust Stainless Steel & Aluminum, 40yr. Life IP Rated for Operation in Harsh Environmental Condition



# Genius Tracker™ System Features

- Linear Actuator Motor: 24 Volt or 12 Volt DC
- Controller: Microcontroller Driven, Field Replaceable Real-Time Swappable Controller Spares Provided
- Control Board: PCB with Standard Semiconductors
- Warranty: 10yr Structural Components, 5yr Warranty on Control & Drive Systems (20yr/10yr Also Available)
- Grading Requirements: Least Site Grading Required of Any Tracker System
- Monitoring: Operational Alert Emails and Web Portal for Viewing Site Installations
- Parasitic Load: Zero Draw on Solar Array - Small Solar Panel Charges Battery In Controller
- Module Attachment: Fast Installation with Bottom or Top Mount Attachment for All Framed and Double Glass Modules
- Design Efficiency/Damping: Industry's Highest Intrinsic Damping Eliminates Costly Dampers and Reduces Material Cost

## Test & Certification

- CPP Wind Tunnel Tested and Rated 150mph
- ETL/UL 2703 Testing Completed April 2016
- Black & Veatch Technical Assessment

## Calculations

- Structural PE Stamped Drawings and Calculations
- Site Specific Code Compliant System Structural Calculation Based on Values for Any Location

## Material

- Post: G235 Galvanized Steel (HDG ASTM 123 Option Also Available)
- Tubes: G90 Galvanized Steel
- Purlins and Other Components: G90 Galvanized Steel
- Tracker Hardware: Magnacoat 3/8" & 1/2" x 1" Hex or Serrated Flange Hex Bolts & Threaded Rods, 3/8" & 1/2" Serrated Flange Nuts & Washers
- Panel Mounting Hardware: Stainless Steel 1/4 - 20" Serrated Flange Nuts 1/4 - 20 x 3/4 in Long Bolts Plus Star Washers for Grounding
- Tru 3D-Gimbal™ 6005A-T6 Aluminum and UV Proof HDPE



# Grid – Lite™ Roof System

## Low/Zero Ballast, Seismic Optimized Design

- Interlocking grid design combined with NextGen wind deflector reduces ballast to minimal or zero
- Industry's best system to handle most severe seismic conditions
- Integrated wire management trays enable string wiring throughout entire array for NE & EW runs prior panelizing
- Near zero ballast saves up to \$.02/watt
- Fast install with minimal components
- 5 and 10 degree tilts
- ETL/UL 2703 listed, ETL/UL 1703/2701 Class A fire rated
- 20 year warranty – Made in USA
- Wind tunnel testing by industry leader CPP and rated for 150 mph wind speed



# Robust Grid Installs Fast, Excellent Wire Management



Ultra high grade galvanized interlocking rails install quickly to build grid



Interlocking grid design combined with NextGen wind deflector virtually eliminates ballast to minimal or zero



Integrated wire management trays enable string wiring throughout entire array for NE & EW runs prior to panelizing



Panel support for both 5 and 10 degree tilts: EPDM block available in place of slip sheets



Pre-punched slots in wind defectors enable fast east-west string wiring prior to panelizing



Fire proof, durable galvanized and stainless steel components



# GameChange Roof Systems Across the USA

1.9 MW, NY



478 KW, Gardner MA



1.2 MW, Providence RI



402 KW, Burlington CT



500 KW, Cumberland RI-A



287 KW, Irving



500 KW, Cumberland RI-B

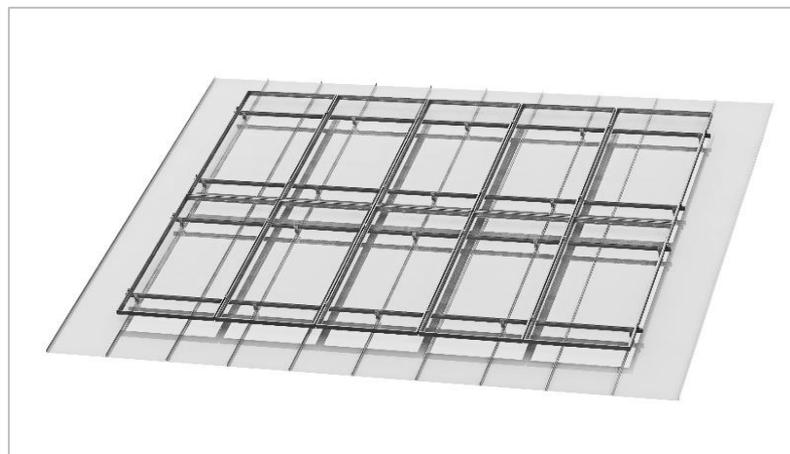


389 KW, White Plains NY

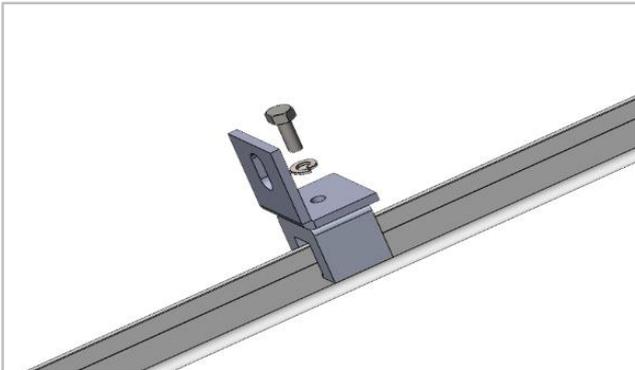


# Standing Seam Roof System

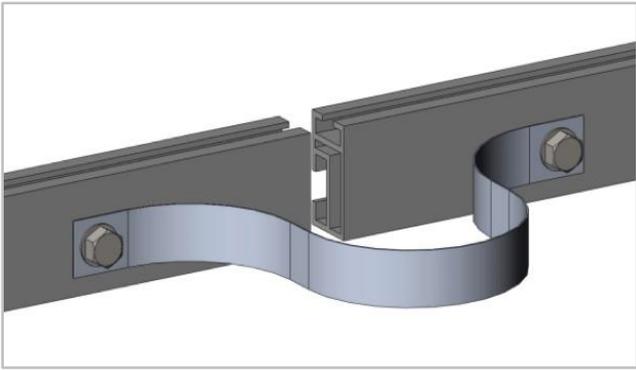
- Rail Mount option includes rails, rail jumpers, L feet, seam clamps, self grounding ETL/UL panel clamps and all hardware
- Direct Mount option includes seam clamps, panel mounting plates, self grounding ETL/UL panel clamps and all hardware
- Flush mount, 5 and 10° standoffs available with Rail Mount option
- Seam clamps available for standard metal seam roofs
- Zero ballast and no penetrations
- Fast install with minimal components
- Integrated grounding
- Rated for 130 mph wind and 60 psf snow loads
- 20 year warranty - Made in USA



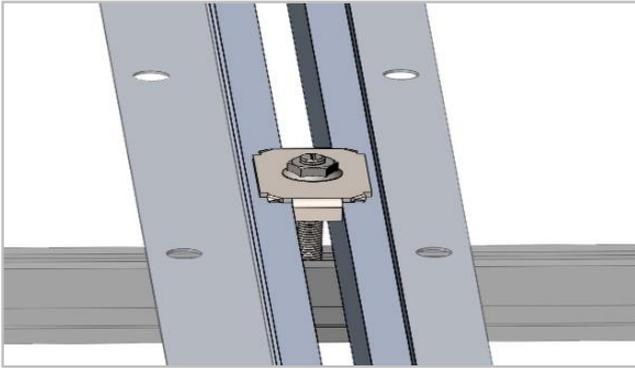
# Low Cost, Fast Install



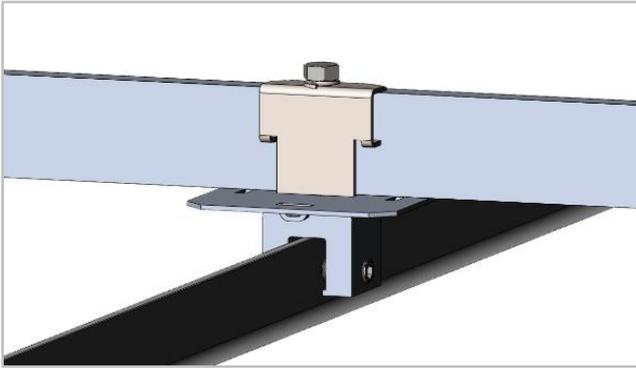
L foot attached from above with one tool



Aluminum jumper strip provided for bonding rails



Stainless steel self grounding mid panel clamps



Direct Mount option includes seam clamps, mounting plates, panel clamps & all hardware



Get on board with GameChange Solar  
Let's repowering the planet

