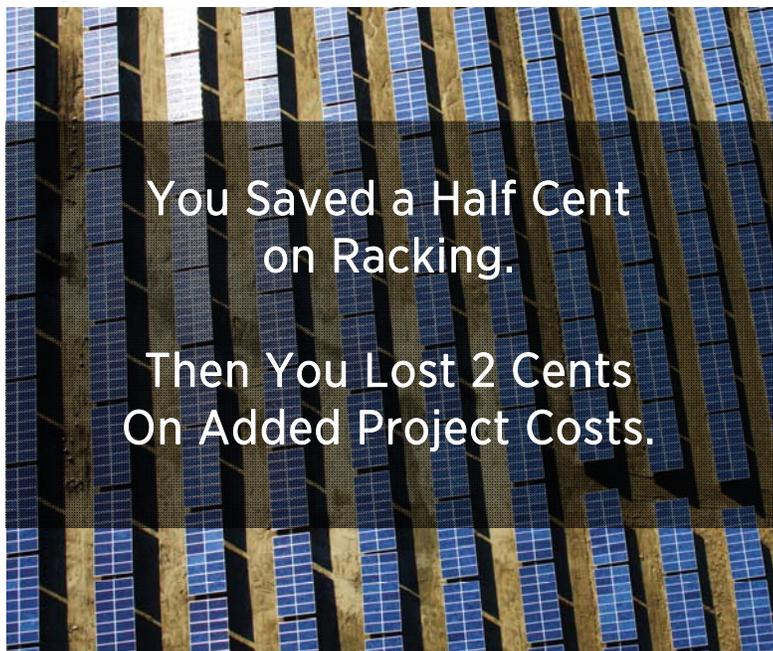




# Reducing Solar Project Costs



The team has invested a chunk of change surveying the site, completing terrain analysis and finalizing initial contracts. Financing is in place and while surveys are being wrapped up, you get a call that an endangered species has been identified on location. Now you're sorting out whether your project can still move forward.

Your team opens communications with local jurisdictions and discovers they are willing to work on solutions, but it's going to be up to them to sort out the options, identify real solutions and manage costs. There will be some unique challenges to resolve and pencil sharpening on the budget is in order. As the team assesses the situation, they realize the racking solution they had originally selected may not accommodate the new requirements.

They need a new solution and a services partner who can help them maneuver the alterations, meet the requirements of the agencies and the project site, and stay within budget.

## Has anything like this ever happened on your project site?

You need a crackerjack racking services team who can work with the modifications and deliver a cost-effective, racking solution that gets you there on time. How about from a company with a heritage of designing labor-savings that carry over to everything they do and a world-class technical team at your beckon call who have over a gigawatt of product successfully installed?

## Snapshot of a successful, fixed tilt solar project in spite of ecological challenges

Located in the Mojave Desert, just outside of Pahrump, Nevada, the 17.5 MW solar power generation project is installed with Solar FlexRack's G3-X fixed tilt racking system, one of the smartest and most cost-effective racking solutions available today. The solar project is under construction by [Bombard Renewable Energy](#), Nevada's leading solar installation company, a division of Bombard Electric, LLC who have been around since 1982, *but this project almost didn't happen.*

Sixty miles west of Las Vegas, outside of Pahrump is a pretty tough environment. The average low temperatures are in the 20's and the average highs are over 100. With varied elevations and rock formations, the Mojave is the driest of the North American high deserts. Rattlesnakes, coyotes, wild horses and burros also call it home.

[Valley Electric Association, Inc.](#) (VEA), a nonprofit, member-owned electric cooperative in Nevada reached out to Bombard Renewable Energy to construct a solar power generation plant on an 80-acre site. During the survey, the team discovered an endangered species in the area by the name of *Gopherus agassizii*.

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Racking Technology: G3-X

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Project Size: 17.5 MW dc

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Racks: 2,860

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EPC: Bombard Renewable Energy

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Project Completion: Expected in August 2016



Scientific name *Gopherus agassizii*, is the Desert Tortoise.

*Gopherus agassizii* is the Desert Tortoise, Nevada’s official state reptile and a threatened species. The team contacted the US Fish and Wildlife Service and opened discussions to explore their options. Initial suggestions posed challenges that could delay the project for up to a year. New plans needed to be devised. There were very specific design and construction alterations necessary to accommodate the tortoises’ habitat. The Fish & Wildlife Service set up a research and monitoring station onsite. The organizations worked closely to orchestrate ground plans that would protect the tortoise, their habitat and co-existence with the solar plant.

## Protecting an endangered species & a solar energy project

### PRESERVING THE TERRAIN’S ECOLOGY AND GROUND CONDITIONS

Ground vegetation was essential to the tortoise’s environment and food source. To reduce impact, the project site was not graded and the existing vegetation was mowed so the root system would stay intact and regenerate. Project plans also needed to provide the tortoises entry to the feeding grounds and the ability to move easily below the solar modules. The project perimeter fencing was built with one foot openings at consistent intervals around the periphery for tortoise access. The project array was re-designed with a higher module leading edge for animal access (birds and other small animals, in addition to the Desert Tortoise). Normally the module leading edge is 18-24”. By raising the level to an average of 42”, it allowed for the re-establishment of vegetation. This ground cover also provides protection for the tortoises from predators while they are foraging for food.

The solar project was re-designed with racking that could accommodate sloping due to the ungraded, uneven terrain. Trenching was limited to the center access road with less disturbance to the habitat. The spacing on the southern half of the array was increased for ongoing, in-depth research and monitoring studies funded by the VEA to evaluate the impact of solar panel configuration on local vegetation, the tortoise population and birds. The new solar project plans were approved by the US Fish and Wildlife Service saving over a year’s worth of prep work - thanks to the innovations to the project design. Through collaboration, the VEA Community solar project was able to move forward and is currently ahead of schedule.

## How project costs were controlled

1. Services - Solar FlexRack’s Services team performed pull testing for optimal foundation design
2. Product selection - Uniquely-designed, Solar Flexrack’s [G3-X](#) system accommodated the necessary increased ground clearance and slope, reducing labor time and overall project costs
3. Additional support equipment - Solar FlexRack’s value-add equipment increased installation speed

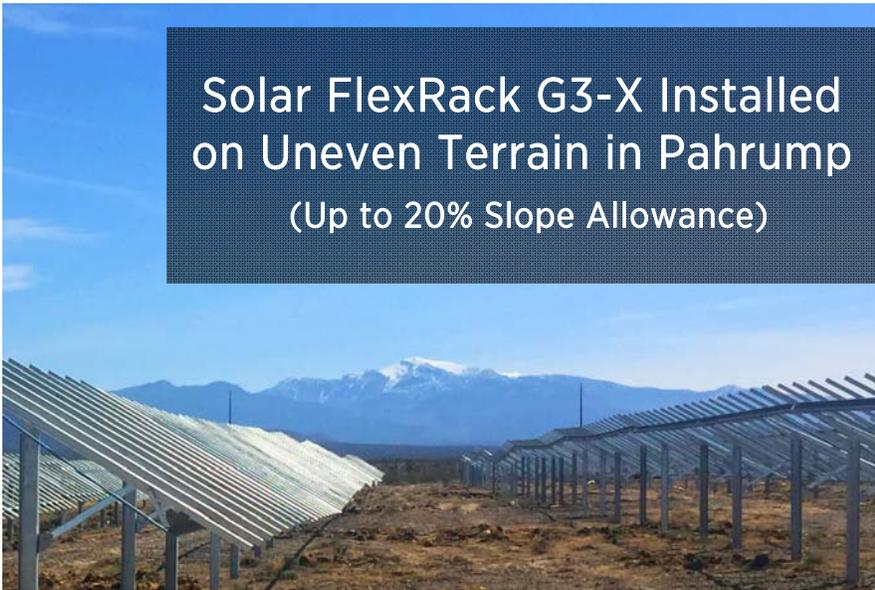
Solar FlexRack’s intelligent design + world-class services = reduced project costs

“Solar FlexRack’s solution worked great with our system and terrain. The ease and speed of installation helped to manage labor costs.”

- Bo Balzar, Division Manager,  
Bombard Renewable Energy



Solar FlexRack’s provides additional equipment to make installation faster and easier. Pictured above is a Solar FlexRack’s [QuikCart](#).



**Solar FlexRack G3-X Installed  
on Uneven Terrain in Pahrump  
(Up to 20% Slope Allowance)**

## About G3-X

### EASY ASSEMBLY

The series G3-X Ground Rack is easily staged on the jobsite and can be assembled in the field by crews of any skill level. It's been third party verified for speed of installation by Industrial Time Study Institute, Inc.

### SEAMLESS FLEXIBILITY

The unique design of the series G3-X makes it a perfect fit for nearly any installation. A flexible and adaptable model on the jobsite, G3-X can accommodate up to 20% slope in the E/W direction.

### INTELLIGENT DESIGN

The series G3-X is value engineered by our world-class team to optimize materials, limit components and create a cost effective solution. Lateral bracing is used to stabilize and square the racks creating both a durable system and one that actually accelerates the module installation process by preventing spacing issues during installation. The horizontal rail bracket allows the horizontal rails to be set in place with no hardware during initial placement and be easily adjusted in the field.



## Solar FlexRack: A Bankable Solution

### Solar FlexRack products are built to last.

All of the G3-X Series has undergone atmospheric boundary layer wind tunnel testing in accordance with section 6.6 of ASCE 7-05, Chapter C31 of ASCE 7-10 and also applicable to the National Building Code of Canada (same as the US National Building Code). This enabled the Solar FlexRack engineering team to use the most realistic wind load possible to design a more cost-

efficient system. It allows potential reduction of wind loading by as much as 32% for ground mount arrays.

The G3-X Series has also undergone structural load-testing by [Aecon](#) (a leader in construction and infrastructure development). It is UL 2703 Issue 2 and TUV Rheinland certified.



Solar FlexRack, an industry-leading racking solutions company, is a division of [Northern States Metals](#) (NSM). NSM has been in the aluminum-extrusion business for almost 50 years. The company fabricates industrial aluminum products for a variety of industries including aerospace, medical, military,

robotics, lighting and automotive. Solar FlexRack's well-capitalized parent, Northern States Metals, forms a strong foundation and delivers long-term financial stability for the racking and project services company.

# Solar FlexRack, A World-Class Leader



Solar FlexRack is an integrated solar company that offers best-in-class custom-designed, fixed tilt ground mount and single-axis tracking systems in the commercial and utility-scale solar mounting industry. Solar FlexRack also provides a full scope of services from design to delivery and installation, including engineering, geotechnical, pullout testing, field, layout, and installation services to address the actual site conditions of an installation. Solar FlexRack has completed more than 1 GW of solar racking installations in 32 states across America and five countries globally. More information on Solar FlexRack can be found at [www.solarflexrack.com](http://www.solarflexrack.com)

Contact a Solar FlexRack Sales Manager to learn more at [Info@solarflexrack.com](mailto:Info@solarflexrack.com) or call 1-888-380-8138.

Sign-up for the Solar FlexRack eNewsletter to get monthly updates on products, services, company news, and projects: <http://eepurl.com/G6P7X>

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*Solar FlexRack thanks its partners for their collaboration in the completion of this milestone solar power generation project:*



Bombard Renewable Energy, a division of Bombard Electric, LLC,  
is a wholly owned subsidiary of MDU Resources Group Inc. (NYSE: MDU)