Ebook

Minimize Your Shading Losses with pvDesign

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When designing a solar photovoltaic (PV) installation, there are a number of variables to consider. In order to design a plant with the maximum generation potential and efficiency, **it is important to model and optimize every aspect** during the design process.

One of the most important variables to consider is your potential shading losses.

Let's look more closely at what shading losses are, the different types of shading, and **what you can do to minimize the shading losses** of your next PV installation.

01. What are shading losses?

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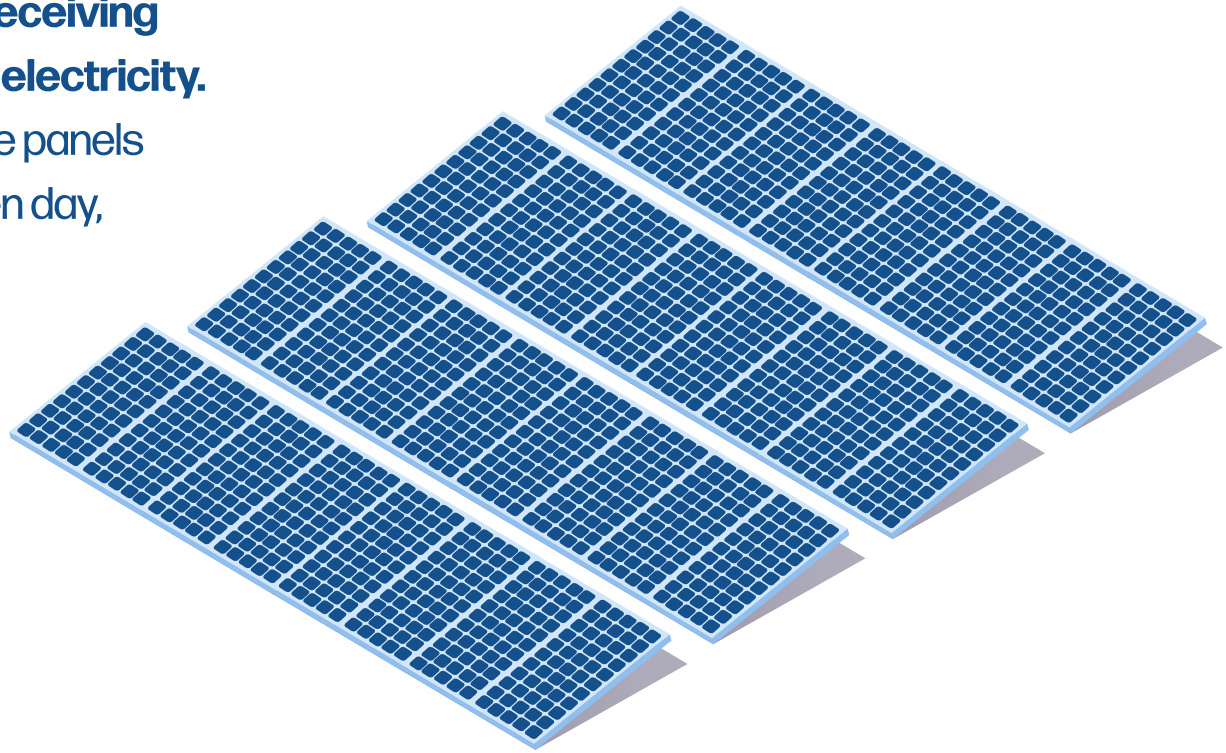
Shading losses are what they sound like, the amount of output lost from PV panels due to shading.

If part or all of your **solar panels are in the shade for part or all of the day, they are not receiving sunlight and, therefore, not producing electricity.** Even if there are only a few hours when the panels are not in direct sunlight throughout a given day, you are still losing out on potential power generation.



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Shading losses fall into **three main categories:**

Meteorogical conditions – This is shading due to the weather. So, suppose your installation is in a region with heavy cloud cover. In that case, you can expect your panels to be shaded for far greater periods than if you were operating in a region with primarily clear skies.

Far shading – This is an overall shading cast on the entire solar plant by objects or topography distant from the installation. For example, suppose mountains surround your installation. In that case, you can expect higher levels of far shading as the sun moves across the sky and is occluded by the topography than if the plant is located on a plain or mountaintop.

Near shading – This shading occurs from objects closer to the PV system and is often cited as the biggest challenge when optimizing shading losses. Near shading can be caused by any number of things, such as trees, electrical poles, and even other panels.

It is important to consider how these factors may affect the shading profile of your installation to **avoid ending up with a plant operating at a far lower efficiency than it could be.**

02. How pvDesign can help model shading losses

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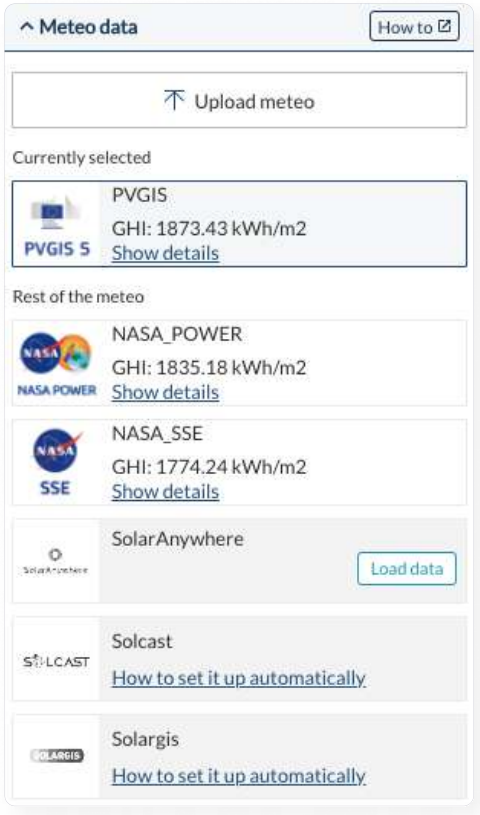
Luckily, pvDesign by RatedPower has all the tools you need to model your shading losses during the design phase. Let's look at how you can gain accurate information about each type of shading using pvDesign.

Meteorogical conditions

The weather conditions of your chosen site will go a long way to determining the output and efficiency of your solar installation. Regions with high irradiance and low cloud cover levels will perform far better than those with low irradiance and heavy cloud.

In pvDesign, you can select the exact location of your proposed site using our comprehensive tools. Once that is in place, **you can import typical meteorological year (TMY) data** into the program.

With this data in place, pvDesign is able to model the weather conditions for your chosen site, giving you highly accurate projections on the output, shading, and efficiency of your proposed site on an hour-by-hour basis. This will allow you to determine whether the chosen location is suitable and consider any modifications you may need to make.



How pvDesign can help model shading losses

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Far shading

Given that far shading is due to objects distant from the installation, it is often concerned with the topographical characteristics of your proposed site. To this end, **pvDesign has the perfect tool for taking far shading into account, the Horizon Importer.**

With the Horizon Importer, you are able to import the horizon file for your specific location, not just a general location like many other design tools, and model the far shading. With your horizon imported, **pvDesign can then model how often and when topographical features or other distant objects will shade your plant.**

This allows you to **determine the optimal azimuth angle for your solar arrays to maximize the irradiance** they receive and optimize their generation and output. For more information about far shading and pvDesign's Horizon Importer, read our blog here!

Want to gain a deeper understanding of far shading losses and their impact on PV system performance?

Then tune into this webinar Mastering far shading: Strategies for designing efficient PV systems and learn how to optimize PV system design, overcome far shading losses and discover advanced software tools and techniques to maximize the performance and profitability of your PV system.

Watch

How pvDesign can help model shading losses

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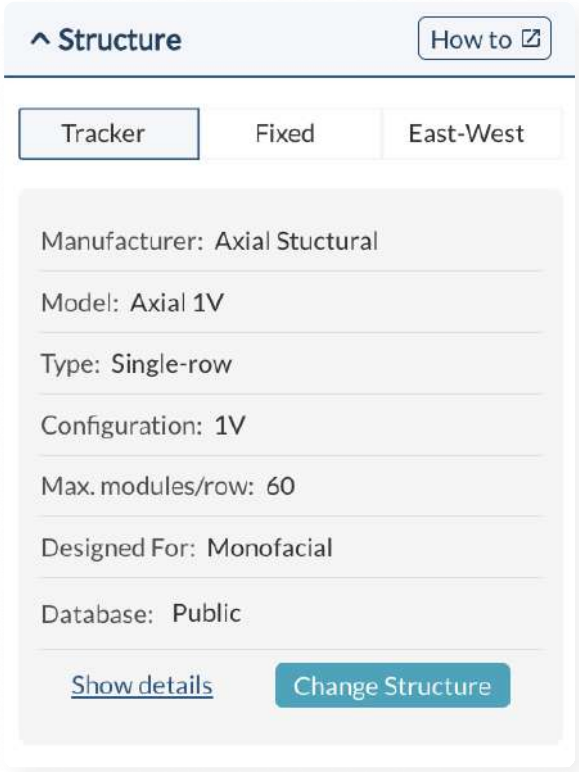
Near shading

Often the trickiest of the three types to model and optimize, **near shading can greatly impact your installation's output** if not properly modeled.

Again, this is where pvDesign can help. **After finishing your design in the program, pvDesign can then calculate the near shading effect**. Users can also define a "Restricted Area," places that will be shaded due to nearby objects or other arrays that can then be avoided from installation.

With this in mind, **it can plan how to arrange arrays to minimize the amount of array shading using hourly yield data. It can also model and make recommendations** for grouping designs, pitch distances, tracker vs. fixed structures, horizontal vs. vertical configurations, and ground clearance.

With this data, **you can fine-tune the layout of your solar arrays** to ensure the least amount of near shading at all times and improve your design output.



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03. Optimize shading losses with pvDesign

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The biggest strength of pvDesign is that it allows you to generate and compare multiple designs all at once.

You can tweak designs to determine the **perfect set-up** for your installation. pvDesign allows you to **compare a vast range of variables** such as specific power, levelized cost of electricity, and performance ratio. **The program will highlight the designs with the best outputs** for each variable, allowing you to see which design minimizes shading losses and produces the best results.

If you would like more information about minimizing shading losses in your solar PV designs, **we recently held a webinar covering everything to do with shading losses and how to optimize your design** using pvDesign. You can watch the full webinar here!

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Crafted solutions for every solar professional

And if you are looking to try out pvDesign for yourself,
book a demo today and take your PV designs to the next level!

Discover pvDesign

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