



An Extended Guide · No. 1543

The Parts of a Ground-Mounted Solar Array

What each piece does,
in plain English

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! Read this first — two honest truths about ground-mount solar

Two honest truths before we start, because they surprise a lot of good folks. First, a ground-mounted solar array is a professional job. It takes a licensed installer, real foundation work in your yard, building and electrical permits, and your utility's approval to connect (that approval is called interconnection). This guide is here to help you understand, plan for, and evaluate a ground mount; it is not a do-it-yourself project, and I never want you digging footings, wiring an array, or opening an electrical panel. Second, a plain grid-tied solar system — roof or ground, without a battery — shuts itself off during a power outage, even in bright sunshine. That is a required safety feature, so the system cannot put electricity onto the lines while the crews are repairing them. If keeping the lights on during an outage matters to you, you will need a battery, and we will talk about that plainly. This guide walks you gently through each part of a ground-mounted array — what it is and what it does — so a written proposal reads like plain sense instead of a wall of jargon.

Meet the parts, one at a time

A ground-mounted solar array can look like a lot of mysterious equipment when you first see one. It really isn't. It's a small team of simple parts, each with one job, and once you can name them the whole thing stops feeling complicated.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. For 30-plus years I've helped folks feel at home with the gear in their lives, always in plain words and never in a rush. In this guide I'll take you part by part through a ground array, the way I would standing out in your yard pointing at each piece.

You don't need to memorize any of this, and you certainly won't be building it. Your job is simply to understand enough to follow a proposal and ask good questions. The installer designs and sizes every part of the system for your home — that's their trade, not yours.

★ Want me to point at the real thing?

If you've got a quote in hand, or a neighbor's array to look at, I'm happy to walk through the parts with you and translate the jargon. Call or text me at (330) 200-8042.

The whole array on one page

If you read nothing else, read this. Here are the main parts and what each one is there to do.

- ❑ The foundation holds the array to the earth — posts, piers, or ballast.
- ❑ The racking is the metal frame that holds the panels at their angle.
- ❑ The panels (modules) turn sunlight into electricity.
- ❑ The inverter turns that into the kind of power your house uses.
- ❑ Disconnect switches let the system be shut off safely for service.
- ❑ The meter and your main panel tie it into the house and the grid.
- ❑ Wiring runs underground back to the house; monitoring keeps an eye on it.

✓ You don't have to hold it all in your head

Nobody expects you to remember every part. Skim this list now, and come back to any page when a proposal or an installer mentions a word you'd like in plain English.

Think of it as a small team

Before we take the parts one by one, here's the shape of the whole thing, so each piece has somewhere to fit.

Picture it in layers. Down low, the foundation anchors everything to the ground. On top of that sits the metal racking, tilted toward the sun. The panels bolt onto the racking. From the panels, wires carry the power to an inverter, then on through safety switches and a meter into your home's electrical panel — and, if you have one, a battery.

Every part hands off to the next, like a bucket brigade passing sunlight along until it comes out as ordinary house power. If you keep that chain in mind, the rest of this guide is just a closer look at each hand in the line.

✓ The chain, in six words

Sun, panels, inverter, your panel, grid. Hold onto that little chain and you'll always know roughly where any part sits in the story.

The foundation: what holds it down

Everything starts with a solid anchor in the ground. A ground array has to stand up to wind, snow, and years of weather without budging.

There are a few common ways to anchor an array, and you don't have to choose among them — the installer and, where needed, an engineer do. The usual families are steel posts driven into the soil by machine, concrete piers or footings set into the ground, ground screws that twist in like big anchors, and ballasted mounts that sit on top of the ground held down by heavy weight where digging isn't wanted.

Which one fits depends on your soil, the frost, the water table, and the site — and footings generally have to reach below the frost line so the winter freeze can't heave them. I won't put a depth to that here, because your local building department sets it. Our foundations guide and our frost-and-soil guide go into all of this properly.

✓ You evaluate it; the pros design it

The foundation is the part folks worry about most, and it's exactly the part you never have to figure out yourself. A qualified installer and engineer size it for your ground. Your job is just to understand why it matters.

The racking: the frame that aims the panels

On top of the foundation sits the racking — the sturdy metal framework that holds the panels up and points them at the sun.

Racking is usually aluminum and steel, built to last outdoors for decades. It does two quiet jobs: it holds every panel firmly in place, and it sets the tilt — the angle the panels lean back at — so they catch the most sun for where we live. On some racks that angle is fixed; on others it can be changed a couple of times a year.

The racking is also what ties the whole array together into one rigid, grounded structure. It's plain, honest metal with almost nothing to go wrong, which is a big part of why solar is so low-maintenance once it's up.

✓ Fixed or adjustable? We've got a guide

Whether your panels sit at one set angle or one you can change with the seasons is its own decision. Our rack-types guide and our seasonal-tilt guide walk through it — here we just want you to know the racking is the part that holds the angle.

The panels: where sunlight becomes power

The panels — installers often call them modules — are the flat glass rectangles that do the real magic: turning daylight into electricity.

There are no moving parts inside a panel. Sunlight lands on it and electricity comes out — quietly, with nothing spinning or wearing down. They're built tough, sealed against the weather, and generally rated to take hail. A whole array is simply a number of these panels wired together on the racking.

I won't quote you a wattage or a count, because the right number of panels depends on your electricity use, your budget, and your space — and that's the installer's math to do. What matters here is the idea: each panel is a small, silent generator, and together they make the power your array produces.

! Lovely and low-key, but still electrical

Panels feel harmless — no noise, no heat you'd notice — but a working array is a live electrical system in daylight. Enjoy looking at it, but leave the wiring and connectors to the professionals. Never open or poke at the electrical parts.

The inverter: the translator

Here's the part that surprises people. The power your panels make isn't quite the kind your house uses — so something has to translate it.

Panels make what's called direct current, or DC — steady, one-direction power, like a battery gives. Your home's outlets and appliances run on alternating current, or AC. The inverter is the box that changes DC into AC, so the sunshine your panels caught can run your lights, your refrigerator, and everything else.

It's fair to think of the inverter as the brain and the translator of the system, all in one. It's also usually where the monitoring lives, quietly keeping track of how much power the array is making. The installer picks and sizes it to match your panels — there's no choice you need to make here beyond understanding what it's for.

✓ One plain sentence to remember

The inverter turns the panels' power into the kind your house can actually use. That's the whole job. Everything else about it is detail the installer handles.

One big inverter, or little ones?

You may hear two approaches described. Here's the plain difference, with no need to become an expert.

One way uses a single larger inverter (sometimes called a string inverter) mounted near the array, with the panels wired together into it. The other way puts a small inverter behind each individual panel — those are called microinverters. Both are proven, both are widely used, and both do the same fundamental job of turning panel power into house power.

Each has honest pros and cons — around how they handle a shaded panel, where the equipment sits, and how it's serviced — but this is squarely the installer's call, made to fit your site. I mention it only so the words don't throw you when you see them on a quote.

	One larger inverter	Microinverters
Where it sits	Near the array	Behind each panel
How many	One or two	One per panel
Who decides	Your installer	Your installer

Disconnect switches: the safe off

Any electrical system needs a clear, reliable way to be shut off. Solar is no different, and the code takes this seriously.

Disconnect switches are exactly what they sound like — switches that let a technician or a first responder cut the power to the array so it can be worked on safely. A ground system usually has one or more of them, placed and labeled to meet the National Electrical Code, or NEC, the rulebook installers wire to.

You generally won't touch these in normal life, and you shouldn't need to. They exist so that anyone who does work on the system — an electrician, the utility, a firefighter — can make it safe first. Their presence is a good sign that the job was done properly.

! Switches to know about, not to play with

It's fine to know where the disconnects are, especially so you can point them out to a technician. But flipping switches or opening the equipment yourself is not a homeowner job. If anything seems wrong, call your installer or electrician — never open a live box.

The meter and your main panel

Sooner or later the array's power has to join the rest of your home's electricity. That happens at your main electrical panel and your meter.

The AC power coming from the inverter runs into your home's main electrical panel — the same breaker box that feeds your outlets and lights. From there it powers your house first, and any extra can flow out to the grid. Your utility meter measures what comes and goes.

Connecting to the grid this way needs your utility's approval, called interconnection, and often a meter suited to two-way flow. That's a separate step from the building permit, and it's the utility's process — our interconnection guide explains it. Until it's approved, the system can't be switched on.

✓ Two different approvals, both normal

A building department signs off on the structure and wiring; the utility signs off on connecting to the grid. Both are routine parts of a proper install, and your installer handles the paperwork for each.

Grounding and bonding: the safety net

This is the quiet, invisible part that keeps everyone safe. It rarely gets talked about, but it matters enormously.

Grounding and bonding tie all the metal parts of the system together and to the earth, so that if something ever faults, the electricity has a safe path to follow instead of going somewhere it shouldn't. It's also a key part of how the system handles a nearby lightning strike or a stray fault without becoming a hazard.

You'll never see most of it, and you don't need to understand the details — but it's a big reason a solar install must be done by licensed professionals to code. Done right, it's the safety net under the whole system.

! The reason it's a licensed job

Grounding is precise, code-governed work, and getting it wrong is exactly the kind of thing that makes an electrical system dangerous. This is one of many reasons an array is never a do-it-yourself project — please always leave it to the pros.

Two kinds of homes, two sets of needs

The parts are the same everywhere, but which ones you notice most — and how they're arranged — tends to differ between a town lot and a country property.

If you live in town or the suburbs

In town or the suburbs, everything sits closer together. The array, the inverter, the disconnects, and your panel may be within a short run of one another, and the whole layout is compact and tidy.

- Short wiring runs keep the parts close and the trench brief.
- Equipment is often tucked where it's out of the neighbors' sightlines.
- The same disconnects and grounding rules apply on any size lot.
- Your utility's interconnection step is the same in town as in the country.

If you are out in the country on a well

Out in the country, the same parts may be spread across more ground — an array out toward a sunny field, a longer wiring run, and equipment sized with a barn or a well in mind.

- A longer run back to the house may call for upsized wire — installer's call.
- A battery often matters more here, since a well pump stops in an outage.
- The array may sit handy to a barn or well-house rather than the home.
- More open exposure means the foundation and racking are built accordingly.

★ Not sure how it'd lay out on your place?

Tell me about your yard, your panel location, and how far apart things sit, and I'll help you picture where each part would go. Call (330) 200-8042.

The wiring run and the trench

Because a ground array stands apart from the house, its power has to travel back — and that usually means a trench.

The wiring from the array typically runs underground, inside protective conduit, through a trench dug to your main panel. It's buried at a depth your local code sets, and the farther the array sits from the house, the longer that run. Over a long distance an installer will upsize the wire so the power doesn't weaken on the way — a detail they handle.

This is its own small project within the job, and our trenching guide covers it in full. Here, just know it's the underground bridge that carries the array's power home.

! Call 811 before anyone digs

Before any digging on your property, the buried utility lines must be located — that's a free call to 811, the 'call before you dig' service. Your installer normally handles it, but it's worth knowing why nobody should ever put a shovel in the ground without it.

Monitoring: the system keeps an eye on itself

Most modern systems watch over themselves and can show you how they're doing — a genuinely reassuring feature.

Monitoring usually comes with the inverter and reports how much power the array is making, often to an app on your phone or a page on your computer. You can glance at it if you like the numbers, or ignore it and let it do its job. Its real value is that it can flag a problem — a panel or a part not pulling its weight — so it gets looked at.

You don't have to babysit it. Think of it as a quiet gauge, like the ones on your car's dashboard: there when you want it, and a helpful early warning if something drifts off.

✓ A gentle heads-up, not a chore

If a monitoring app isn't your thing, that's fine — a good installer can keep an eye on it for you or set it to alert them. The point is simply that problems get noticed early, which keeps the system healthy.

How it all connects, start to finish

Let's put the parts back together and follow the power the whole way through, in one plain pass.

Sunlight lands on the panels, which make DC power. That travels to the inverter, which turns it into the AC power your house uses. From there it passes through the disconnects and into your main electrical panel, where it powers your home. Anything extra flows out through the meter to the grid — or, if you have a battery, into storage for later.

That's the entire journey: sun, panels, inverter, your panel, and then the grid or a battery. Every part we've met is simply one stop along that line.

✓ The one-line summary of the whole guide

Sun to panels to inverter to your panel to the grid or a battery. If you remember only that sentence, you understand a ground array better than most folks ever will.

Where a battery fits in

A battery is optional, but it's worth knowing where it would sit in the lineup — especially if outages worry you.

A plain grid-tied array, with no battery, shuts itself off during a power outage. That's a required safety feature, so the system can't put power onto the lines while crews are repairing them — which means, surprisingly, that solar alone won't keep your lights on when the grid goes down. Only a battery does that.

If you add one, it becomes another stop in the chain: the array can charge it, and it powers your essentials when the grid is out. Sizing a battery is the installer's job, and our batteries guide and our well-pump guide dig into it. Here, just know where it belongs in the picture.

! Solar alone won't run during an outage

This one catches good folks off guard, so it bears repeating: without a battery, even a big array goes dark when the grid does. If keeping the lights or the well pump on matters to you, that means planning for a battery — ask your installer.

Why it's all one professional install

Seeing the parts laid out, you might wonder if some of it is do-it-yourself. It isn't — and here's the honest why.

Foundations that must reach below the frost line, code wiring and grounding, disconnects placed just so, a utility connection — each of these is licensed, permitted work for good reason. Get any of them wrong and you've got a safety hazard or a system that won't pass inspection. This is why a real install means a licensed solar installer and electrician, building and electrical permits, and the utility's approval.

None of that should feel discouraging. It's simply why your role is to understand and evaluate — which is exactly what these guides help you do — while the trained folks handle the tools.

★ I help you understand it, not build it

I'm a tech helper, not a licensed installer, and I don't sell solar or do the electrical work. What I do is help you make sense of it all and line up a trustworthy installer. Call or text me at (330) 200-8042.

What you'll actually see in your yard

For all the parts we've named, a finished array is a surprisingly tidy thing to have standing in the yard.

What you'll see is a neat row or two of panels on a metal frame, tilted toward the sun, plus a box or two of equipment — the inverter and the disconnects — usually mounted nearby or on the house. A little conduit heads down and underground toward the house. That's really it.

It's quiet, it doesn't move, and there's nothing that hums or smells. A well-planned install looks intentional and cared-for, not like a science experiment. Many folks come to rather like being able to see their system quietly at work.

✓ Tidy is a sign of care

A clean, squared-up layout with neat wiring is a mark of a good installer. When you look at a company's past work, a tidy array in someone's yard tells you a lot about how they'll treat yours.

Finding these parts on a proposal

Now that you know the parts, a written proposal turns from alphabet soup into a checklist you can actually read.

A good proposal will name the panels, the inverter, the racking, and the foundation approach; it will mention the disconnects and grounding, the wiring run or trench, monitoring, and the permit and interconnection steps. You don't need to judge the brands — just check that the whole team of parts is accounted for and explained.

If something on the list is a mystery, that's a fair question to ask, and a good installer will happily explain it. A proposal you can follow is part of what you're paying for.

✓ Use this guide as your decoder

Keep this guide beside a proposal and match the parts up one by one. Anything that isn't listed or explained is simply something to ask about — not a reason to panic.

Questions to ask your installer

A few plain questions that help you understand the parts they're proposing for your home.

Q: Which foundation type are you planning, and why for my soil?

The answer should tie to your ground — soil, frost, water table — and, where needed, an engineer's input. A thoughtful reply is a good sign; a vague one is worth a second look.

Q: Where will the inverter, disconnects, and meter sit?

You want to know where the equipment lives and that it's placed sensibly and to code. It also helps you picture how the finished install will look on your property.

Q: How will the array connect to my panel, and how long is the run?

This covers the trench and wiring back to the house. The distance affects the work and the cost, so it's fair to understand the path the power takes home.

✓ There are no silly questions here

A good installer welcomes questions about the parts — it shows you care about a proper job. If someone makes you feel foolish for asking, that tells you something useful about them.

Common Questions

The questions I hear most about what's in a ground array.

Q: What's the difference between a panel and a module?

Nothing — they're two words for the same thing. Installers tend to say 'module,' most everyone else says 'panel.' Don't let the jargon trip you up.

Q: What does the inverter actually do?

It turns the direct-current power the panels make into the alternating-current power your house uses. Think of it as the translator between the panels and your home.

Q: Do I need to understand all of this to go solar?

Not at all. The installer designs and sizes every part. Knowing the names just helps you follow a proposal and ask good questions — which is exactly what makes you a confident customer.

Q: Is any part of this something I could install myself?

No, and please don't try. Foundations, code wiring, grounding, and the utility connection are licensed, permitted work. Your job is to understand and evaluate it — the building is a professional's.

★ Still have a part you'd like explained?

Naming the parts is half of feeling in control of a solar decision. If any piece still feels fuzzy, call or text me at (330) 200-8042 and I'll put it in plain words.

You don't have to do this alone

You just have to remember that a friendly, patient person is one call away.

I hope this guide made the parts of a ground-mounted solar array feel a little less daunting and a lot more doable. Keep it in a drawer with your other home papers, come back to a page whenever you need it, and don't worry about memorizing anything.

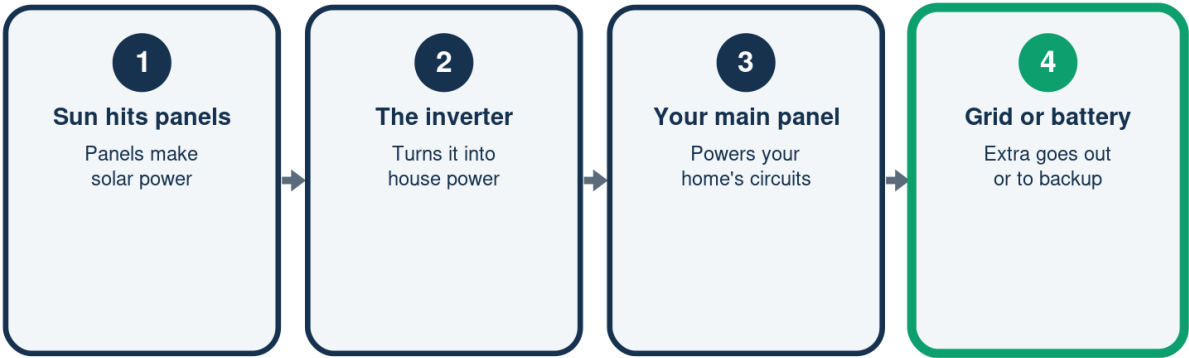
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How the Power Flows

From sunshine to the outlets in your home



A battery is what keeps your essentials on during an outage.

One Big Inverter, or Little Ones?

Both are proven -- your installer picks what fits

	String setup	Microinverters
Where	One or two boxes	Behind panels
How many	One or two	One per panel
Shade on one	Affects a string	Panel by panel
Who decides	Your installer	Your installer

No wrong choice here -- the installer sizes it to your site.

Each Part and Its Job

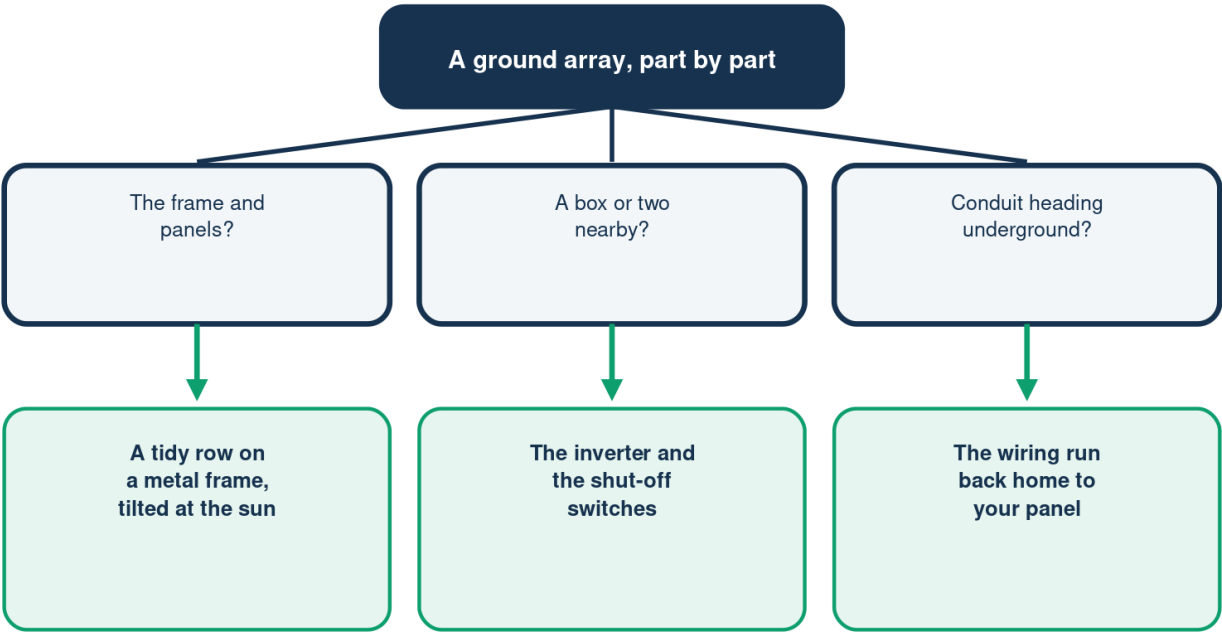
The whole team, and what each one does

	What it does	Where it is
Foundation	Holds it down	In the ground
Racking	Holds the angle	On the footings
Panels	Make the power	Facing the sun
Inverter	Makes it usable	By the array
Disconnect	Shuts it off	By the panel
Meter	Counts the flow	At the house

Your installer designs and sizes every one of these for your home.

What Will I See in My Yard?

A finished array, up close



It is not an eyesore -- a clean install looks neat and cared-for.

Illustration - a schematic, not to scale. Your setup may differ.



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A Note From Bill

A quick note from Bill.

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— *Bill*



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