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How Many Panels Will My Roof Hold? Sizing a System in Plain English

Use your electric bill and a look at your roof to estimate a sensible system size

Plain-English tech help from:
Bill's Home Tech
Portage County, Ohio

Tech Made Simple. Service Made Personal.

Bill Davis — Bill's Home Tech
(330) 200-8042 · bill@billshometech.com · Atwater, Ohio

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SUMMARY

The 60-Second Version

Sizing a solar system starts with your electric bill, not your roof. Find your yearly electricity use in kilowatt-hours. Divide by about 1,200 (a reasonable yearly output per kilowatt in Northeast Ohio) to get a rough system size in kilowatts.

Divide that by your panel wattage — modern panels are about 400-450 watts — to get a panel count; a 10-kilowatt system is roughly 23 panels. Then check whether your roof has room: each panel needs 18-20 square feet of sunny, unshaded roof, and south faces beat east and west, with north usually skipped. You do not have to cover 100 percent of your usage, and oversizing can waste money.

This gives you a ballpark to sanity-check any installer's proposal.

- Usage sets the target; the roof decides whether there's room.
- Yearly kWh ÷ 1,200 = rough kilowatts; ÷ panel wattage = panel count.
- Shade, roof direction, and future plans all shift the right size.

1 The Short Version

The question sounds simple — how many panels will my roof hold? — but the honest answer has two parts. One is how many physically fit up there, and the other is how many you actually need to cover your electricity. The right system size is usually set by your needs, with your roof deciding whether there is room for it.

This guide walks you through both, in plain words, using nothing more than your electric bill and a rough sense of your roof. You will come away able to estimate a sensible system size yourself and to sanity-check whatever an installer proposes.

- Two numbers matter: how much roof you have, and how much power you need.
- Your electric bill tells you your yearly usage — the starting point for sizing.
- A rough rule: modern panels each make a few hundred watts; it takes many to add up.

- The installer confirms the details, but you can estimate the ballpark yourself.

> **WATCH OUT**
>
> You do not need the exact number to have a good conversation. If you know roughly how much electricity you use in a year and roughly how big your usable roof is, you can tell whether an installer's proposal is in the right ballpark.

2 Start With Your Electric Bill, Not Your Roof

The best place to begin is not the roof at all — it is your electric bill. The goal of most home solar is to cover some or all of the electricity you already use, so your usage sets the target, and the roof simply has to accommodate it.

Look for your yearly electricity use, measured in kilowatt-hours. Many bills show a twelve-month history or an average. If you can find your total for the year, you have the single most important number for sizing a system — far more useful than guessing at panel counts.

1. Find a recent electric bill, paper or online.
2. Look for 'kWh' — kilowatt-hours — and a yearly total or monthly average.
3. If only monthly is shown, add up twelve months or multiply an average month by twelve.
4. Write that yearly kWh number down; it is the heart of sizing.

> **GOOD TO KNOW**
>
> A kilowatt-hour is just a unit of electricity — using one thousand watts for one hour. Your bill is measured in them. A typical home uses somewhere in the range of ten to twelve thousand kilowatt-hours a year, though yours may be higher or lower.

3 Turning Usage Into a System Size

Once you know your yearly usage, turning it into a rough system size is straightforward thinking, not hard math. Solar systems are measured in kilowatts, and in our part of Ohio each kilowatt of panels produces a certain amount of electricity over a year.

Northeast Ohio is not the sunniest place in the country, but it is far from the worst, and solar works well here. As a planning rule of thumb, each kilowatt of installed panels tends to make somewhere around eleven to thirteen hundred kilowatt-hours a year locally. That lets you work backward from your usage to a system size.

- Take your yearly usage in kilowatt-hours.
- Divide by roughly 1,200 (a reasonable local yearly output per kilowatt).
- The result is a rough system size in kilowatts to cover that usage.
- Example: 12,000 kWh a year divided by 1,200 is about a 10-kilowatt system.

WATCH OUT

These are planning estimates, not promises. Your actual output depends on your roof's direction, tilt, shade, and the weather any given year. A good installer gives you a specific production estimate for your exact roof — treat this rule of thumb as a sanity check, not a guarantee.

4 From Kilowatts to a Panel Count

Now the part everyone asks about: how many panels is that? This step is easy once you have a system size. Each modern panel makes a few hundred watts, so you simply divide your target system size by the panel wattage.

Modern residential panels are commonly around 400 to 450 watts each. So a 10-kilowatt system — that is 10,000 watts — needs roughly twenty-two to twenty-five panels. Bigger panels mean fewer of them; smaller panels mean more. The total power is what matters, not the exact count.

System size	At ~440W panels	Rough panel count
6 kW	6,000 W	~14 panels
8 kW	8,000 W	~18 panels
10 kW	10,000 W	~23 panels
12 kW	12,000 W	~27 panels

WATCH OUT

Do not fixate on the panel count. Twenty 450-watt panels and twenty-three 400-watt panels make nearly the same power. Installers may reach a target with different counts depending on the panels they use, and that is fine.

5 Does Your Roof Have Room?

With a panel count in mind, the next question is whether your roof can hold them. A rough way to picture it: each panel is roughly the size of a door laid flat, a little under twenty square feet. So two dozen panels need a few hundred square feet of clear, usable roof.

But not all of your roof counts. Only the sections that face the right way, sit at a reasonable slope, and stay out of shade are prime real estate. Chimneys, vents, skylights, and the edges the code requires to be left clear all shrink the usable area. So your true capacity is usually less than your total roof size suggests.

- Each panel needs roughly 18 to 20 square feet of roof.
- South-facing sections are best; east and west are good; north is poor.
- A moderate slope is ideal; very flat or very steep roofs complicate things.
- Shade from trees, chimneys, or neighbors cuts a section's value sharply.
- Code requires clear 'setback' paths for firefighters, reducing usable area.

GOOD TO KNOW

A simple way to estimate: look at your roof's biggest, sunniest, least-shaded face and picture doors laid side by side across it. That rough count tells you more than the roof's total square footage, because only the good sections truly count.

Rather not do this yourself? I'll come to your home and set it up for you — a flat $99 first visit across Portage County, Ohio and nearby communities. Outside the area? I also help remotely by phone or screen-share. Book at billshometech.com/book or call (330) 200-8042.

6 Which Direction and Slope Matter

Panels care which way they face, because that determines how much sun they catch over a day and a year. In our hemisphere, south is the champion, catching sun all day. East and west faces work well too, just with a little less total output. North faces are the weak spot and are usually skipped.

Slope matters less than direction, but it still counts. A moderate pitch, like a typical house roof, is close to ideal for our latitude. Dead-flat roofs can work but may need tilted racking, and very steep roofs can lose a little in winter. None of this is a dealbreaker; it just shifts how many panels a given face is worth.

Roof face	How good for solar
South	Best — full-day sun
East or West	Good — strong morning or afternoon
North	Poor — usually skipped
Flat	Workable, often with tilted racking

7 The Shade Problem

Shade is the quiet enemy of solar, and it deserves its own moment. A panel in shade for part of the day makes far less power, and depending on the system, shade on one panel can drag down others wired with it. A beautiful big roof under a big maple may hold fewer useful panels than a smaller roof in full sun.

The good news is that modern systems handle shade better than old ones did, using small electronics on each panel so a shaded one does not sink the rest. Still, the honest rule stands: the less shade, the better, and a serious shade problem is worth understanding before you size anything.

> **WATCH OUT**
> If trees shade your best roof face for much of the day, be cautious about a quote that ignores it. Ask specifically how shade was accounted for in the production estimate. Trimming or routing around shade is possible, but it should be discussed openly, not glossed over.

8 Do You Want to Cover All of Your Usage?

A common assumption is that you must cover one hundred percent of your electricity. You do not have to. Many people size a system to cover most of their usage, or as much as their roof and budget comfortably allow, and that is a perfectly sound choice.

There are also practical reasons not to oversize. Depending on your utility's rules, the value you get for extra power you send back to the grid may be limited, so building far beyond your own usage can waste money. The sweet spot is usually sizing to your real needs, with a modest margin for the future.

- You can aim for 100 percent, but you are not required to.
- Roof space or budget may set a sensible ceiling below 100 percent.

- Oversizing past your usage can waste money, depending on utility rules.
- Leaving a little margin makes sense if you expect to add an electric car or heat pump.

> **GOOD TO KNOW**
> How your utility credits the extra power you send to the grid varies, so it is worth asking plainly how that works for your account before deciding to build big. Covering most of your usage is often the practical, cost-effective target.

9 Planning for the Future

It is worth thinking a few years ahead when you size a system, because adding panels later can cost more per panel than including them now. If you expect your electricity use to rise, a little foresight saves money.

- An electric vehicle can add significantly to your yearly usage.
- Switching from gas to an electric heat pump raises electricity use.
- Growing family or a home addition can nudge usage up.
- If any of these are likely, size with a sensible margin rather than exactly to today.

> **WATCH OUT**
> You do not have to build for a future that may not happen. But if an electric car or heat pump is clearly on your horizon, mention it, because it changes the right size and is cheaper to plan for now than to bolt on later.

10 Putting It All Together

Here is the whole method in one place, so you can run it yourself before any salesperson arrives. None of it requires anything more than your bill and a look at your roof.

1. Find your yearly electricity use in kilowatt-hours from your bill.
2. Divide by about 1,200 to get a rough system size in kilowatts.

3. Divide that by your panel wattage (say 440) to get a rough panel count.
4. Look at your best, sunniest, least-shaded roof faces and picture whether that many panels fit.
5. Adjust for shade, direction, and any future plans, then compare with the installer's proposal.

> *You can walk into a solar conversation already knowing your own ballpark. That one piece of preparation turns a sales pitch into a comparison you control.*

11 Sanity-Checking an Installer's Proposal

When a proposal arrives, you can check it against your own estimate in a few minutes. You are not redoing their engineering; you are making sure nothing is wildly off.

- Does the system size roughly match your usage-based estimate, or is it far larger?
- Does the production estimate account for your roof's direction and any shade?
- Is the panel count sensible for your usable roof, not crammed onto north faces?
- If it is much bigger than you need, ask why — and how the extra power is valued.

WATCH OUT

A proposal far larger than your usage deserves a plain explanation. Sometimes there is a good reason, like a planned electric car. But oversizing is also a way to sell a bigger, pricier system, so a clear answer matters.

Rather not do this yourself? I'll come to your home and set it up for you — a flat $99 first visit across Portage County, Ohio and nearby communities. Outside the area? I also help remotely by phone or screen-share. Book at billshometech.com/book or call (330) 200-8042.

12 A Worked Example, Start to Finish

Let us size a system the way a careful installer would, using round numbers you can follow. Say your electric bills show you use about 10,000 kilowatt-hours a year — a fairly typical all-electric-ish Ohio household. That yearly usage, not your roof, is the starting point.

1. Start with yearly usage from your bills: about 10,000 kWh.
2. In our area, each kilowatt of panels makes very roughly 1,100 to 1,200 kWh a year, so divide: 10,000 ÷ ~1,150 about 9 kilowatts of panels to cover it all.
3. Modern panels are commonly around 430 watts each, so 9,000 watts ÷ 430 about 21 panels.
4. Check the roof: 21 panels need roughly 400 square feet of clear, well-aimed roof — a figure your installer confirms with a real layout.
5. Adjust for shade, roof direction, and how much of your bill you actually want to cover.

Step	Figure in this example
Yearly usage	~10,000 kWh
Production per kW (NE Ohio)	~1,100-1,200 kWh/kW/yr
System size needed	~9 kW
Panel wattage	~430 W each
Panel count	~21 panels

GOOD TO KNOW

Every number here is a planning estimate. The honest way to pin it down for your home is the free PVWatts tool from NREL (a U.S. government lab) or an installer's estimate for your exact address and roof. I am glad to run PVWatts with you so you can sanity-check any proposal.

13 Panel Wattage Has Gone Up — What That Means

A panel today is far more powerful than one from a few years ago. Where a panel might once have been rated around 300 watts, a common modern residential panel is around 400 to 440 watts. That matters for your roof in a simple way: you need fewer panels for the same amount of power.

- Higher-wattage panels mean a smaller panel count for the same system size.
- Fewer panels can fit a system onto a smaller or more broken-up roof.
- A quote with a surprisingly low panel count may simply be using higher-wattage panels — not a mistake.
- What matters is the total system size in kilowatts, not the number of panels by itself.

> **GOOD TO KNOW**
>
> This is why you should compare quotes by total kilowatts, not by panel count. One installer's eighteen big panels can equal another's twenty-two smaller ones. The kilowatt figure is the apples-to-apples number.

14 Roof Obstacles That Eat Panel Spots

A roof is rarely one clean rectangle. Real roofs have things sticking out of them and rules about how close panels may sit to the edges, and each of those quietly removes room for panels. Knowing them helps you read a layout drawing without surprise.

- Plumbing vents, the chimney, and attic fans each block a panel or two around them.
- Skylights and dormers break up the usable area.
- Fire-safety rules leave clear pathways and a gap near the roof's edges and ridge.
- A tree that shades one corner in the afternoon can take that corner out of play.

WATCH OUT

If a proposal seems to ignore your chimney or the vents you can see from the yard, ask about it. A layout that crowds panels into spots a professional would leave clear is a sign the drawing was rushed — and it affects both safety and how much power you really get.

15 Reading the Layout Drawing in a Proposal

A good proposal includes a picture of your roof with little rectangles showing where each panel goes. This drawing tells you more than the sales talk, and you can read it with no training at all.

1. Find the roof drawing — usually an overhead photo of your house with panel rectangles laid on it.
2. Count the rectangles and check that count matches the panel number written in the quote.
3. Look at which roof faces have panels — south and west faces should be favored over north.
4. Check that panels avoid the chimney, vents, and the very edges of the roof.
5. See whether crowded or shaded areas were left clear, which is a good sign, not a loss.

TIP

If the proposal has no roof drawing at all, ask for one before you sign. Any serious installer can produce it, and it is the single clearest way to confirm the system will actually fit and perform the way the quote claims.

16 Common Sizing Mistakes to Avoid

A few avoidable missteps show up again and again when people size a system. Steering around them keeps you from paying for too much or settling for too little.

- Sizing to the roof instead of the bill — filling the roof with panels you do not need.
- Forgetting that your usage may change — an electric car or a heat pump can raise it a lot.
- Ignoring shade and roof direction, which can make a big system underperform a smaller, better-placed one.
- Comparing quotes by panel count rather than total kilowatts.
- Oversizing far beyond your usage, which your utility may not fully pay you back for.

> **GOOD TO KNOW**
> How your utility credits the extra power you send back to the grid varies, and it strongly affects whether a larger system is worth it. It is worth a plain conversation about your specific utility's rules before deciding to cover more than your usage.

17 When to Call Bill

You do not have to sort any of this out alone, and there is real value in having someone with no panel to sell read a quote beside you.

I do not sell or install solar — I am the independent local tech who helps folks in Portage County, with 30-plus years of putting technology into plain English. I can sit down with your electric bill, help you work out a sensible system size for your home and roof, and then read any installer's proposal with you to see whether it fits your real needs or overshoots them.

- You want help turning your electric bill into a sensible system size.
- A proposal looks much bigger than you think you need.
- You are not sure whether shade or roof direction was properly accounted for.
- You want a neutral check before committing to a system size.

CHEAT SHEET

Everyday Cheat Sheet

Keep this with your electric bill when you start sizing a solar system.

I want to...	Do this...
Find my starting number	On your electric bill, find yearly use in kWh (add 12 months if needed)
Estimate system size	Yearly kWh divided by ~1,200 = rough kilowatts (12,000 ÷ 1,200 = ~10 kW)
Estimate panel count	System watts divided by panel wattage (10,000 ÷ 440 = ~23 panels)
Check roof room	Each panel needs ~18-20 sq ft of sunny, unshaded, south/east/west roof
Judge the faces	South is best, east/west good, north usually skipped
Plan ahead	Add margin if an electric car or heat pump is likely
Get help	Call Bill: (330) 200-8042

BEFORE YOU GO

A Note From Bill

A quick note from Bill. I write these guides to make home tech a little less frustrating, and I do my best to keep every step accurate and up to date. Still, every home, device, and setup is a bit different, so I can't promise a guide will match yours exactly or fix your particular problem. These guides are for general information only — they're not professional, legal, or financial advice, and they don't replace your device's own manual or the manufacturer's instructions. Please go slow, use your own good judgment, and use everything here at your own risk. If a step involves electrical wiring, a gas appliance, a water heater, plumbing, or climbing a ladder — or if anything just doesn't feel safe — please stop and call a licensed professional (or give me a call at 330-200-8042). Bill's Home Tech and Bill Davis can't be responsible for any damage, data loss, or injury that results.

HOW I CAN HELP

Your Visit — and My Promise

You don't have to remember all of it — just that a friendly, patient person is one call away, whenever you'd rather have a hand.

KEY SPECS

In your home — $99 flat for the first visit, no contracts and no surprises, with a 30-day come-back-free follow-up. In-home visits cover Portage County, Ohio and nearby communities.
Outside the area? Remotely — $49 for a screen-share session (free for Support Plan members, $39/mo), refundable if I can't fix it — and credited toward a visit if you'd rather have me in person. Book either at billshometech.com/book.

GOOD TO KNOW

My promise — If you're not 100% satisfied with your visit, I'll come back at no charge, or refund the full $99. No questions, no awkwardness. That's how I'd want to be treated.

Whenever you're ready, I'll come to your home anywhere in Portage County, Ohio and nearby communities, at your pace. Too far for a house call? I also help remotely. Book at billshometech.com/book or call (330) 200-8042. — Bill

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