BILL'S HOME TECH

Home & Small Business Tech Solutions

An Extended Guide · No. 1448

Watts and Watt-Hours, Made Simple

The two numbers that decide what you can run, and for how long

Tech Made Simple — Service Made Personal

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✔ The best news first — this one is safe indoors

Here is the best news about a solar generator, and the reason it earns a place in your home: despite the word 'generator,' it has no engine. At its heart is a big rechargeable battery in a case — a power station — and the panels simply refill it from the sun. It burns no fuel, so it gives off no exhaust and no carbon monoxide — the invisible, deadly gas that makes a gas generator a strictly outdoors-only machine. That means the power station part is safe to use right inside your home, in any room, with the windows closed — beside your chair, on the nightstand, next to a medical device. (The panels sit outside in the sun; the station stays indoors where it is dry.) A few simple habits keep it that way: charge it with the gear it came with, give it a little air while it works (don't bury it under a blanket or shut it in a tight cabinet), keep it away from water and from baking heat, and never use one that is cracked, soaked, or swollen. None of that changes with the two little numbers we're about to meet — watts and watt-hours simply tell you what this safe indoor helper can run, and for how long.

Two numbers, and nothing to memorize

Every solar generator comes stamped with two kinds of numbers, and they're the ones that decide what it can do for you. The good news is you don't need the math. Once you can picture what each one means, the whole thing clicks into place.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. In 30-plus years at folks' kitchen tables, I've watched these two numbers — watts and watt-hours — trip up more good people than anything else about backup power. They sound technical. They really aren't, once someone shows you the simple picture behind them.

So that's all this guide does. No formulas, no homework — just one homely water-tank picture that makes both numbers make sense, so you can shop with confidence and never overpay for a number you didn't need. Think of it as me explaining it slowly at your table, one calm step at a time.

★ Nothing to sell you

I don't sell solar generators, so I've got no reason to talk you into a bigger number than you need. If you'd like me to look at what you want to run and tell you plainly, call or text me at (330) 200-8042 — the conversation's free.

The whole guide, on one page

If you remember only these things, you already understand the two numbers that decide what a solar generator can do.

- ❑ Watts are power all at once — they decide what you can run at the same time.
- ❑ Watt-hours are total energy — they decide how long it keeps things running before it needs a refill.
- ❑ Picture a water tank: watts are how fast it can pour, watt-hours are how much water it holds.
- ❑ Try to draw more watts than the station allows and that thing simply won't run — it may even shut off to protect itself.
- ❑ Things that make heat — a hair dryer, a space heater, a kettle — gulp power fast; small electronics like phones and a CPAP just sip.
- ❑ No number, however big, lets a portable unit run a 240-volt well pump. That's a limit no watt-hours can beat.

> **✔ One line to hold onto**
> Watts are what you can run right now; watt-hours are how long you can run it. Get both to suit the job and a solar generator serves you beautifully.

Watts: how much power, all at once

The first number, watts, is about the here and now. It's the size of the flow — how much power the station can push out at any single moment.

Think of watts as the flow rate from a faucet. A trickle fills a glass; a gush fills a bucket. Watts decide what you can run at the same time. A couple of lamps and a phone charger ask for just a trickle. A hair dryer or a microwave asks for a gush, all at once.

Here's the part worth holding onto: every station has a ceiling on its watts — the most it can pour at one time. Ask for more than that ceiling and the thing you plugged in simply won't run. The station isn't broken; it's protecting itself, and it may click off or flash a warning until you ease the load.

> **✔ Watts answer one question**
> Watts tell you what you can run at the same moment. If everything you want on at once stays under the station's watts, you're fine. Go over, and something has to wait its turn.

Watt-hours: how much energy, in total

The second number, watt-hours, is about staying power. It's not the flow — it's the size of the tank. It decides how long the station can keep things running before it needs a refill.

If watts are how fast the faucet pours, watt-hours are how much water is in the tank behind it. A bigger tank keeps the water coming longer. So the higher the watt-hours, the longer your solar generator can carry your essentials before the battery runs low.

And here's the friendly part: the gentler you draw, the longer the tank stretches. Run just a lamp and a phone charger and a full tank lasts a good long while. Run something hungry and the same tank empties far sooner. How long it lasts depends as much on what you plug in as on the number itself.

> **✔ Watt-hours answer the other question**
> Watts tell you what runs; watt-hours tell you how long. A big tank with a gentle draw is what carries you through a long, quiet evening.

The water-tank picture, all together

Put the two numbers side by side and the whole idea fits in one homely picture: a water tank with a faucet.

The tank holds the water — that's your watt-hours, the total energy stored. The faucet controls how fast it can pour — that's your watts, the power available at once. You want both to suit the job in front of you.

A big tank with a skinny faucet holds plenty but can only trickle — fine for slow, gentle needs, no good for a sudden big demand. A wide faucet on a tiny tank pours hard but runs dry quick. The sweet spot is a tank and a faucet that match what you actually want to do: enough flow for the moment, enough water for the hours.

> **✔ Both numbers, not just one**
> Don't shop on one number alone. A giant tank won't help if the faucet is too small for what you want to run, and a wide faucet won't help once the tank is dry. Look at the pair.

The extra gulp when a motor starts

There's one quirk of watts worth knowing, because it surprises people: anything with a motor needs a brief, bigger gulp of power just to get going.

A refrigerator, a fan, a pump, a power tool — each one draws far more in the first second of starting than it does once it's running smoothly. It's like a car using more gas to pull away from a stop than to cruise. That brief surge is normal, and it passes in a moment.

What it means for you is simple: the station has to handle that starting gulp, not just the steady draw that follows. A unit that could easily run a fridge once it's going might still stumble at the instant it kicks on, if its watts ceiling is too close to the edge. So for anything with a motor, leave a little headroom.

> **✔ Leave a little headroom**
> When you're sizing for a fridge or a pump, remember the start, not just the run. If the station can only just handle the running draw, the brief surge at startup may trip it. A little headroom keeps things smooth.

Reading the label, without the arithmetic

Most appliances tell you what they need, right on a little label or plate — usually on the back or the bottom. Knowing how to glance at it is a handy habit.

Many labels list the watts directly — look for the word 'watts' or the letter 'W'. That's the number you care about most, because watts are what decide whether the station can run it. When it's printed, you're done: that's your figure.

Some labels instead show volts and amps. As a rule of thumb, watts are roughly the volts multiplied by the amps — that's just how the three relate on a nameplate. I won't hand you any homework here; the point is only to know that a label showing volts and amps is still telling you, in a roundabout way, how hungry the thing is. Our sizing guide walks through making a simple list, if you'd like to go further.

> **✔ Look for the 'W'**
> When in doubt, flip the appliance over and find the little label. If it names watts, that's your number. If it shows volts and amps, just know the two together point to the same thing — how much power it wants.

Hungry loads and thrifty ones

Once you can tell a hungry appliance from a thrifty one at a glance, you can guess how it'll treat your battery before you even read a label.

Here's the single best rule of thumb I know: anything whose job is to make heat is hungry. A hair dryer, a space heater, an electric kettle, a toaster, a coffee maker — making heat takes a lot of power, so these gulp from the tank and drain it fast. Wonderful for a quick job; hard on a battery for long.

Small electronics are the opposite. A phone, a tablet, the internet box, an LED lamp, a CPAP — these sip. They ask for so little that a good battery can carry them a long, long time. That's why a solar generator shines at keeping the essentials going: the essentials are mostly thrifty.

Appliance	How it treats the tank
Space heater or hair dryer	Gulps — drains it fast
Kettle, toaster, coffee maker	Gulps while it heats
Refrigerator	Moderate, with a surge to start
Lamp, phone, tablet, router	Sips — lasts a long time
A CPAP through the night	Sips gently for hours

> **✔ Heat is the tell**
> If a thing's whole purpose is to get hot, expect it to be hungry. If it just lights up, charges, or runs quietly, expect it to sip. That one clue predicts most of what you'll see.

The panel's watts are a refill rate

There's a third place watts show up, and it catches people out: the solar panels have a watts number too. But theirs means something different.

The station's watts are about pouring power out. The panel's watts are about pouring power back in — how fast the sun can refill the tank on a good day. Think of the panels as a hose topping the tank back up while you draw from it. More panel watts means a faster refill.

So keep the two straight. The battery's watt-hours are the size of the tank. The panel's watts are how fast the sun fills it. On a bright day a strong panel can keep pace with a gentle draw, or even gain ground — but a panel's watts never change the station's own ceiling on what it can run at once. For how much the sun really gives you, our solar recharging guide sets honest expectations.

> **✔ Out, in, and how much**
> Three numbers, three jobs: the station's watts are how fast it pours out, the panel's watts are how fast the sun pours in, and the watt-hours are the size of the tank between them.

Two kinds of homes, two sets of needs

How much of each number you need depends a great deal on where you live and how long your power tends to stay off. The two numbers matter to everyone, but they matter differently.

If you live in town or the suburbs

In town, in the suburbs, or in an apartment, outages tend to be short and the power's usually back within hours. Your water keeps flowing from the city main no matter what, so you're really just keeping the thrifty essentials going — and that asks little of either number.

- A modest tank of watt-hours easily carries phones, the internet, a lamp, and a CPAP through a typical outage.
- You rarely brush against the watts ceiling, since the essentials sip rather than gulp.
- Skip the hungry heat-makers during an outage and even a small battery stretches a surprisingly long way.
- For most short outages you're sizing for comfort, not survival — a gentle draw is all it takes.

If you are out in the country on a well

Out in the country, outages run longer and the stakes climb, because when the power quits your well pump quits too — no water for drinking, cooking, flushing, or animals. Here both numbers matter more, and one hard limit matters most.

- A longer outage calls for more watt-hours — a bigger tank — so the essentials last day after day.
- It's still ideal for the quiet, thrifty essentials — lights, phones, the internet, a medical device.
- Be honest about the well pump: a 240-volt pump is beyond a portable unit's watts ceiling entirely — no watt-hours number changes that.
- Many rural homes keep both: a gas generator for the pump and heavy loads, a solar generator for silent indoor essentials.

> **★ Not sure how much you need?**
> Tell me your setup — city water or a well, how long your outages usually run, and what you'd want to keep on — and I'll help you land on the right two numbers without overbuying. Call (330) 200-8042.

A quick word on clean power

While we're talking about what a station puts out, there's one more quality worth naming — not how much power, but how smooth it is.

Better stations deliver what's called pure sine wave power. In plain terms, that just means smooth, clean electricity like the kind from your wall outlets at home. It matters for sensitive electronics and for medical devices, which can run rough or complain on the choppier power that cheaper units make.

This isn't about watts or watt-hours at all — it's a separate feature to check for. If you or someone in the home relies on a CPAP or another medical device, look for pure sine wave and don't compromise on it. Our choosing-a-kit guide goes into what to look for when you shop.

> **✔ Smooth power for delicate things**
> For phones and lamps, the power quality hardly matters. For a CPAP, an oxygen concentrator, or fine electronics, insist on pure sine wave — clean power keeps them running happy.

The honest ceiling nobody can raise

Here's the one thing I most want you to carry away, because it saves real disappointment: watt-hours can't rescue you from a watts problem.

It's tempting to think a huge battery can run anything if you just wait for it. It can't. No matter how big the tank of watt-hours, the station can only pour so fast — and that pour, the watts, is a hard ceiling in every single moment. Ask for more watts than the ceiling at any instant and it won't run, full stop, even with a tank that's brim full.

The clearest example is a 240-volt well pump. Your household outlets run on 120 volts, the everyday standard; a well pump runs on 240 volts — twice that, and more power at once than a portable unit can pour. So a well pump stays beyond a portable solar generator no matter the numbers on the box; that stays a gas generator's job. Our what-it-won't-run guide lays out the other big loads in the same honest way.

> **! A big tank can't beat the ceiling**
> Don't let a giant watt-hours number fool you into thinking a unit will run a space heater at full blast or a 240-volt pump. The watts ceiling decides that, moment to moment — and no amount of stored energy lifts it.

Matching both numbers to your job

With the two numbers clear, choosing well comes down to one calm exercise: picture the job, then make sure both numbers suit it.

Start with what you'd want running at the same moment. Picture the hungriest handful you'd have on together — that tells you the watts you need the ceiling to clear. Then picture how long the power might be out. That tells you how big a tank of watt-hours you'd want, so it lasts.

Most folks discover the two numbers pull in the same direction: a home that wants to run more at once usually wants to run it longer too, so a bigger unit answers both. But not always — and that's exactly why it helps to look at each number on its own before you shop. I won't walk the full method here; our sizing guide does that, step by gentle step.

> **✔ Two questions, in order**
> What do I want on at once? That's your watts. How long might I need it? That's your watt-hours. Answer those two and you've done the real thinking.

Little habits that stretch the tank

However big your watt-hours, how long they last is partly up to you. A few gentle habits make the same battery go noticeably further.

- **Run the hungry things briefly.** Use the kettle or hair dryer for its quick job, then unplug it — don't let a heat-maker sit and gulp.
- **Lean on thrifty loads.** LED lamps, phones, and the internet box sip; favor them and the tank stretches for days of quiet use.
- **One big thing at a time.** Running hungry items one after another, not all at once, keeps you comfortably under the watts ceiling.
- **Cool the fridge, then rest it.** Let a fridge run in turns rather than around the clock, and it draws far less over a day.
- **Refill by day.** Set the panels out in the sun so you're topping the tank back up while you draw from it.

> **✔ Gentle wins the long game**
> In a long outage, the calm, gentle user always outlasts the one who runs everything at once. Sip where you can, and save the gulps for when you truly need them.

A few common mix-ups

These two numbers get tangled in the same few ways, again and again. Spotting the mix-ups now saves a letdown later.

- **'A bigger battery runs anything.'** No — watt-hours are the tank, not the faucet. The watts ceiling still decides what runs at once.
- **'Watts and watt-hours are the same number.'** They're not. One is power now, the other is energy over time — different jobs entirely.
- **'If it fits the watts, it'll last.'** Not necessarily. It may run fine yet drain the tank fast, if it's a hungry load.
- **'The panel's watts are the battery's power.'** No — the panel's watts are a refill rate, separate from what the station pours out.
- **'Enough watt-hours will run my well pump.'** No — a 240-volt pump is beyond a portable unit's watts, no matter the tank.

> **! The costly mix-up**
> The one that leads people to overspend is buying a giant tank of watt-hours hoping it'll run a big 240-volt load. It won't — that's a watts-and-voltage limit, not a size you can buy past.

From these numbers to your size

Understanding the two numbers is the groundwork. Turning them into an actual size to shop for is the next, separate step — and a guide of its own.

Now that watts and watt-hours make sense, you're ready to put them to work: make a short list of what you'd want to run, note the hungry ones, and think about how long your outages last. That's the heart of sizing, and our sizing guide walks it through in plain steps, with no numbers to memorize.

And if you're wondering whether a particular appliance is even in reach — a window air conditioner, an electric range, that well pump — our what-it-won't-run guide sorts the everyday loads from the ones that stay beyond a portable unit. Between the two, you'll know both what to buy and what to expect.

> **★ Send me your list**
> That little list of what you'd want running is the whole ballgame. Jot it down and text me a photo, and I'll help you turn it into the two numbers to shop for — no guessing, no overbuying. (330) 200-8042.

Questions worth asking before you buy

Whether you're talking to a salesperson or to me, these plain questions keep the two numbers honest and pointed at your real needs.

- What do I want to run at the same moment — and does the station's watts clear that with a little room to spare?
- How long might my power be out — and are the watt-hours a big enough tank to last that long?
- Does anything I'll run have a motor, so I should leave headroom for the starting surge?
- Is the power pure sine wave, if I'll run a CPAP or other sensitive gear?
- Am I hoping it'll run a big 240-volt load it simply can't — and should I plan for a gas generator instead?

> **✔ There's no silly question**
> If a salesperson makes you feel foolish for asking what the numbers mean, that's a reason to walk away, not to buy. A plain question deserves a plain, respectful answer.

A simple checklist

Keep this handy as you shop. Check each box and the two numbers will steer you right.

- ❑ I understand watts are power at once — what I can run at the same time.
- ❑ I understand watt-hours are total energy — how long it lasts before a refill.
- ❑ I've pictured the water tank: watts are the pour, watt-hours are the tank.
- ❑ I've thought about the starting surge for anything with a motor.
- ❑ I know hungry heat-makers drain the tank fast and thrifty electronics sip.
- ❑ I've accepted the ceiling: no numbers let a portable unit run a 240-volt pump.

> **★ Want a second pair of eyes?**
> Before you spend a dollar, send me what you're looking at and what you want to run. I'll tell you honestly whether the two numbers fit — or whether something else suits you better. (330) 200-8042.

Setting honest expectations

Know these two numbers and you'll be happy with your choice for years, because you'll have bought for the job you actually have.

Picture your solar generator as a right-sized helper, not a bottomless one. Its watts decide what it'll run at once, its watt-hours decide how long, and both were chosen to fit your home. Run within them — the thrifty essentials, a gentle draw, the hungry things only briefly — and it'll carry you through an outage in quiet comfort.

What it won't do is beat its own ceiling or outlast an empty tank, and no clever trick changes that. Accept the two honest numbers for what they are, size them to your real needs, and a solar generator delivers exactly the calm, dependable backup you hoped for.

> **✔ Right-size and relax**
> The happiest owners matched the two numbers to their real needs and never think about them again. Do the thinking once, up front, and the unit just quietly does its job.

Where to go from here

Now that the two numbers make sense, the rest of this series puts them to work, one calm topic at a time.

When you're ready to land on an actual size, our sizing guide turns your must-run list into the numbers to shop for. To learn what's in reach and what isn't, the what-it-won't-run guide sorts the everyday loads from the impossible ones. And when you're comparing units on the shelf, the choosing-a-kit guide covers pure sine wave and the other features worth insisting on.

There's no need to read them all at once, or in order. Pick the question that's on your mind today, and come back to the others when you need them. Every one is written the same plain way, with nothing to memorize.

> **✔ One question at a time**
> You don't have to become an expert. Learn just enough for today's decision, and lean on the guides — or on me — for the rest whenever you're ready.

Common Questions

The questions I hear most about the two numbers, answered plainly.

Q: What's the difference between watts and watt-hours?

Watts are power all at once — what you can run at the same time. Watt-hours are total energy — how long it lasts before a refill. Picture a water tank: watts are how fast it pours, watt-hours are how much water it holds.

Q: Which number matters more?

Both, and they answer different questions. Watts decide whether a thing will run at all; watt-hours decide how long it keeps running. A unit needs enough of each for your job — one won't make up for the other.

Q: Why won't the station run my space heater or hair dryer?

Because heat-makers ask for a lot of power all at once, and they can bump right into the station's watts ceiling. Draw more watts than it can pour and that thing simply won't run — the station may even shut off to protect itself.

Q: Will a bigger battery let me run a well pump?

No. A 240-volt well pump is beyond a portable unit's watts, and it needs a kind of power a portable unit isn't built to give. No amount of watt-hours changes that — a pump stays a gas generator's job.

Q: Do I need to do any math?

Not with me, and not to shop well. Just make a short list of what you'd want to run and roughly how long. That's all it takes — I'll help you turn it into the two numbers, or our sizing guide will.

> **★ Still have a question?**
> That's what I'm here for, and there's never a silly one. Call or text me at (330) 200-8042 and I'll give you a straight, friendly answer.

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 watts and watt-hours 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.

When you'd rather have a hand, that's exactly what I do. I come to your home, work at your pace, and never make you feel rushed or silly for asking. A first visit is a flat $99, and for the parts that don't need me on-site I can often help right on your screen for $49. Every visit comes with a 30-day, come-back-free guarantee. I don't do licensed electrical work myself — for anything that needs to be wired into your home, I'll help you line up a trustworthy local pro.

> **★ Bill's Home Tech — real help, close to home**
> Call or text me at (330) 200-8042, or visit BillsHomeTech.com. Serving Atwater and all of Portage County. 30+ years of patient, plain-English tech help — and if you're ever not 100% happy with a visit, I'll make it right or refund it. That's a promise. — Bill

Watts vs. Watt-Hours

Two numbers, two different jobs

	Watts	Watt-hours
What it means	Power at once	Total energy
Think of it as	How fast it pours	Size of the tank
It decides	What runs now	How long it lasts
If it runs short	It wont run that	It empties sooner

Two jobs: what runs now, and how long it lasts.

Four Simple Steps

Match both numbers to the job

Then let the sun keep the tank topped up.

Hungry Loads vs. Thrifty Loads

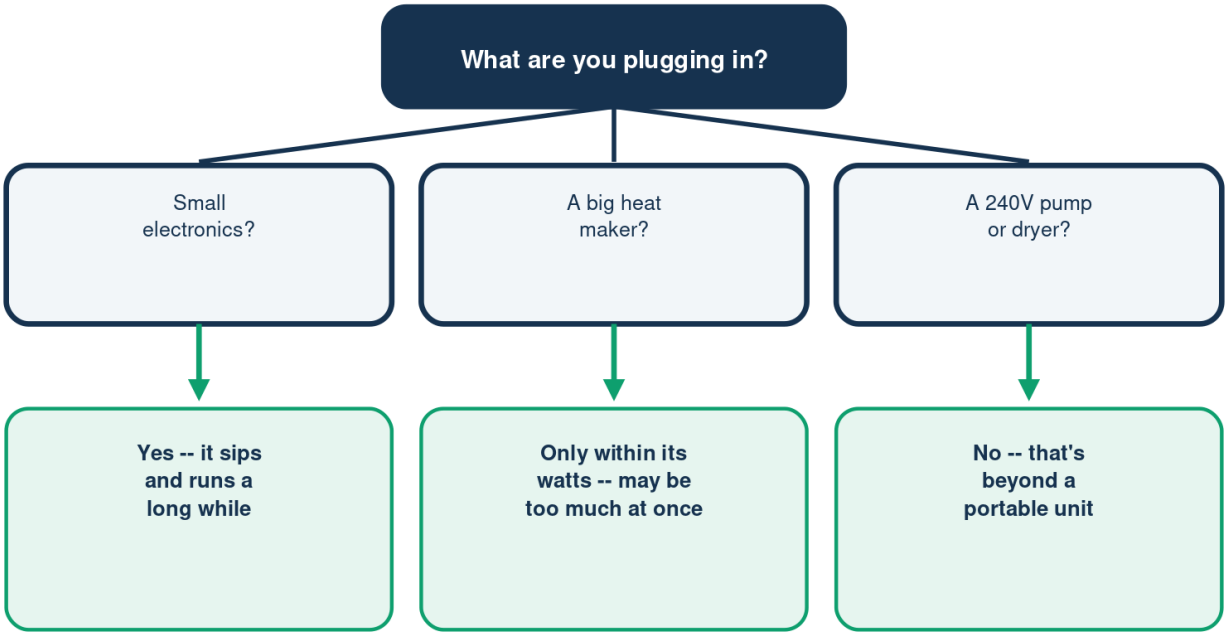
What each one does to the battery

	Hungry loads	Thrifty loads
Examples	Heat makers	Small electronics
What they do	Draw a lot	Sip a little
On the battery	Drain it fast	Last a long time
Best plan	Run briefly	Run for hours

Heat makers gulp; small electronics sip.

Will the Station Run This?

Let the load point the way



A 240-volt load is beyond a portable unit, whatever the watt-hours.

Match the load to the numbers and it rarely lets you down.

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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 comes from using these guides. Thanks for reading, and stay safe out there.

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