



An Extended Guide · No. 1610

Margin and Headroom: Don't Size to the Edge

Why a little extra keeps
everything running smoothly

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! Read this first — size for safety, not just comfort

Getting the size right is not only about comfort — it is about safety, too. An undersized unit gets overloaded and pushed harder than it should be: it runs hot, it strains, and a motor that can't get the surge it needs can hum, overheat, and be damaged. So take the size seriously and always leave yourself a margin — a little extra room — rather than sizing right to the edge. And one safety rule never changes: any fuel-burning generator gives off carbon monoxide, an invisible, deadly gas, so it runs **OUTDOORS ONLY**, well away from the house (the safety agencies say at least 20 feet), never in a garage or on a porch even with the door open. A battery or power station makes no exhaust and is safe to use indoors. Margin is the whole point of this guide — a unit sized right to the edge runs hot and strains, so a comfortable cushion above your number is a safety measure, not a luxury.

Don't size to the edge

You did the arithmetic and landed on a number. Here's the one more thing worth knowing before you shop: don't buy a unit that just barely matches it. Leave yourself a little room.

I'm Bill. A common call I get is from someone whose generator 'should have been exactly enough' but stumbles the moment the furnace kicks on. Almost always, they sized right to the number with nothing to spare — and real life needed a bit more.

This guide is about that little bit more: why a cushion matters, how much is sensible, and why you shouldn't overdo it in the other direction either. It's the difference between a unit that's a pleasure to live with and one that's always on the edge.

★ Not sure how much cushion to leave?

Tell me your number and your loads and I'll help you find a comfortable margin — not too tight, not wastefully big. Call or text me at (330) 200-8042, free, with nothing to sell you.

The whole idea, on one page

If you remember only this page, you'll size with a cushion and sleep easier during the next outage.

- ❑ Never size right to your calculated number — always leave a comfortable cushion above it.
- ❑ Motors kick on when they please, a unit run at its ceiling runs hot and wears, and you'll want one more thing.
- ❑ But don't massively oversize either: too big costs more, weighs more, burns more fuel, and loafs along.
- ❑ Heat, high altitude, and running on propane can all lower a unit's real output below its label.
- ❑ A long, thin extension cord loses voltage along the way — use a heavier-gauge cord for long runs.
- ❑ Aim for a sensible cushion, not the biggest unit on the lot.

✓ The one-sentence version

Leave enough room that the unit isn't straining when everything's on and a motor kicks on — but not so much that you're hauling and feeding a giant you'll never fill.

Why you never size right to the number

Your calculated number is honest, but it describes a tidy world where everything is predictable. Real outages aren't tidy.

There are three reasons a cushion pays off. First, motors cycle on when they feel like it — the fridge, the furnace, the well pump — and now and then two overlap. Second, a unit run right at its ceiling has nothing left for that moment. Third, and I promise this happens, you'll want to plug in one more thing you didn't count.

A comfortable cushion above your number quietly absorbs all three. It's the buffer that turns 'just barely enough' into 'runs smoothly, every time.'

✓ The number is a floor, not a target

Think of your calculated total as the least a unit must handle — the floor you build above, not the mark you aim to hit exactly.

What running at the edge does to a unit

A unit asked to run flat out, hour after hour, is an unhappy machine — and it lets you know.

Push a generator to its very ceiling and it runs hot, works hard, and wears faster, with nothing held back for the next motor that kicks on. A battery or power station driven right to its limit heats up and strains the same way. Neither has any reserve for a surprise.

That's why margin is a safety matter, not just a comfort one. A unit with headroom runs cooler and calmer, lasts longer, and shrugs off the little surges that would trip one sized to the edge.

! No reserve is the real danger

A unit with no headroom has nothing left when a motor jumps to life or you add a load. It bogs down, overheats, or trips — and the motor it couldn't start can hum and overheat too. The cushion is what stands between you and that moment.

How big a cushion is sensible

There's no single magic figure — and anyone who gives you one flat rule is guessing. But the idea is easy to feel.

You want enough room that when everything you planned for is running and a motor kicks on, the unit takes it in stride rather than lurching. Not the bare minimum, not a mountain of spare — a comfortable, everyday cushion. When your math lands right between two sizes, that's your sign to step up rather than down.

How much depends on your own loads: a home with a big well pump wants more headroom than an apartment with a fridge and some lamps. The steadier and smaller your loads, the less cushion you need; the bigger the motors, the more.

✓ Comfortable, not cramped, not cavernous

If picturing everything running plus one motor starting makes you wince, the cushion's too thin. If you're buying capacity you can't imagine ever using, it's too fat. Somewhere in between is right.

The other ditch: don't massively oversize

Margin is good, so more must be better, right? Not quite. You can overshoot, and it costs you in ways that aren't obvious at the store.

A much bigger generator than you need costs more up front, weighs more to move and store, and drinks more fuel for the same work. And a big engine run lightly loaded nearly all the time isn't good for it — engines prefer a healthy, steady load to loafing along half-awake.

Batteries have their own version: an oversized power station is simply money spent on watt-hours you'll never draw down. The goal isn't maximum capacity — it's the right capacity, with a sensible cushion on top.

✓ Right-sized beats oversized

The biggest unit on the lot isn't the safest choice — it's often the heaviest, thirstiest, and priciest. Aim for your number plus a comfortable cushion, and stop there.

Derating — the margin the label quietly loses

Here's a subtle one that catches even careful planners: a unit often delivers a little less than its label under real conditions.

This is called derating. On a hot day, a generator makes somewhat less than its rated output. At high altitude, an engine breathes thinner air and loses a bit more. And a generator running on propane typically puts out a little less than the same unit on gasoline. None of these are faults — they're just physics.

The takeaway isn't a number to memorize; it's a reason. Because the real-world output can sit below the label, a cushion you built in keeps you covered when conditions aren't ideal — which is exactly when you're leaning on the unit.

✓ Plan for a warm day, not a lab

The rating on the box is measured in ideal conditions. Your outage might be a sweltering afternoon or a bitter cold snap — so leave room for the unit to fall a little short of its best.

Long extension cords eat margin too

The cord between your unit and your appliance can quietly steal some of the power you planned for — and it's easy to fix.

Electricity loses a little push, or voltage, as it travels down a cord, and the longer and thinner the cord, the more it loses. Run a heavy load through a long, skinny cord and the appliance at the far end sees less than it should — lights dim, and motors may struggle to start.

The remedy is simple: for a long run, use a heavier-gauge cord — that's a thicker wire, which loses less along the way. A short, generous cord protects the margin you worked out. Our guide on connecting a generator covers safe, sensible cords.

✓ Thicker and shorter is better

If you must reach a long way, reach for a heavier-gauge cord rather than the thin one in the drawer. It keeps the power you planned for from leaking away before it arrives.

Continuous power versus a brief burst

Units usually list two numbers, and knowing which is which keeps you from leaning on the wrong one.

There's a steady rating — what a unit can supply hour after hour — and usually a higher figure it can deliver only for a brief moment, to help a motor start. Size your always-on loads against the steady number, and treat the brief, higher one as headroom for surges, not as everyday capacity.

Leaning on that brief figure for steady work is a classic way to run a unit past what it can sustain. Our running-watts-versus-starting guide explains the two numbers in full; here, the lesson is that your margin lives above the steady rating.

✓ Live under the steady number

The big burst figure is for a motor's split-second jolt, not for keeping the house running. Plan your steady loads — with a cushion — under the continuous rating.

Where headroom matters most: the surge

Of all the reasons to leave a cushion, the biggest motor's starting jolt is the loudest.

When a motor kicks on, it asks for a brief jolt several times its steady draw — and if the unit is already near its ceiling, there's nothing left to give. The motor hums and won't catch, and the unit strains. Headroom is precisely the reserve that lets a motor start without drama.

So when you size, leave room above your steady total for the single biggest surge — and then a little more on top. Our running-watts-versus-starting guide walks through adding the biggest surge; margin is the cushion you add after that.

✓ The surge is why 'just enough' isn't

A unit sized to the steady number alone has no room for the jolt. That's the single most common reason a fridge or pump won't start on a generator that looked big enough on paper.

Two kinds of homes, two sets of needs

How much cushion is sensible depends on where you live — because a well pump and a long outage both call for more headroom than a quiet night in town.

If you live in town or the suburbs

In town or a tighter suburban lot, a modest cushion is usually plenty. Your loads are lighter, your biggest surge is often just the fridge or a window air conditioner, and if a unit ever falls short you can pop out for a bigger one.

- A comfortable cushion above your steady total, plus room for the fridge's jolt, generally does it.
- City water keeps flowing, so there's no big pump surge forcing extra headroom.
- Shorter outages mean less time leaning hard on the unit, so a modest margin holds up.
- Our guide on choosing a portable generator helps match that to the right size class.

If you are out in the country on a well

Out in the country on a well, leave a bigger cushion. The well pump's starting surge is large, rural outages tend to run for days, and you can't just run to the store for a bigger unit when the roads are down.

- The 240-volt well pump's surge is big, so size generous headroom for that single jolt above all.
- Long outages mean the unit runs hard for days — more reason to keep it off its ceiling.
- Heat, cold, and a far-flung generator on a long cord all nibble your margin; plan for them.
- Our well-pump guide covers the surge, and our runtime-and-fuel guide covers planning for the long haul.

★ On a well, headroom is peace of mind

A rural home leans on its generator harder and longer, so a generous cushion is money well spent. Tell me your pump and your loads and I'll help you size it with room to spare. Call or text me at (330) 200-8042.

Batteries and power stations want headroom too

Margin isn't just a generator idea. A battery wants a cushion in both of its numbers.

A power station has a power rating — how much it can hand out at once — and a store of energy, its watt-hours, which decide how long it lasts. Leave headroom in the power rating so a motor's jolt doesn't max it out, and leave a cushion in the watt-hours so you're not scraping empty before the power returns.

Sizing a battery right to the edge on either number is the same mistake as with a generator. Our watts-versus-watt-hours guide explains the two numbers; the margin rule follows you from fuel to batteries unchanged.

✓ Cushion the power and the hours

For a battery, ask two things with room to spare: can it deliver the biggest jolt without straining, and will its stored energy comfortably outlast the outage?

Finding the just-right zone

Picture a line with a ditch on each side. Your job is to stay out of both ditches and cruise down the middle.

On one side is 'too small': a unit at its ceiling, running hot, tripping, with no reserve. On the other is 'too big': a heavy, thirsty machine loafing along, costing more than it needs to. The just-right zone is your calculated number plus a comfortable cushion — and nothing wilder.

Most sizing regret comes from landing in one ditch or the other. Aim for the middle on purpose, and you get a unit that starts your motors, runs cool, and doesn't punish you at the fuel can or the checkout.

✓ Middle of the road, on purpose

The sweet spot isn't a lucky accident — it's your total, plus room to spare, minus the temptation to super-size. Steer for it deliberately.

A margin you can feel, day to day

Headroom isn't just insurance for emergencies — it makes the whole experience of running on backup power nicer.

A unit with a cushion runs quieter and cooler, because it isn't straining. It lasts longer, because it isn't worked to the bone. And it leaves you free to plug in one more thing — a phone charger, a fan, a coffee maker — without holding your breath.

That last part matters more than folks expect. An outage is stressful enough; a unit that can absorb a little extra without complaint takes one worry off your plate.

✓ Comfort is part of the payoff

The cushion you pay for once rewards you every hour the unit runs — in quiet, in cooler operation, and in the freedom to not think about it.

How to add your cushion, step by step

Here's how the margin fits into the sizing you've already done, without any new arithmetic.

- ❑ Start with your total: the running watts of everything on at once, plus the single biggest surge.
- ❑ Step up to a comfortable cushion above that — more if you've got a big well pump or long outages.
- ❑ Factor in derating: on a hot day, at altitude, or on propane, the unit gives a little less.
- ❑ Mind your cords: a long run wants a heavier gauge so you don't lose power on the way.
- ❑ Land on a unit whose steady rating clears all of that without working flat out.

★ Rather size it together?

Send me your total and your loads at (330) 200-8042 and we'll add a sensible cushion side by side — so you buy once, and buy right.

Common margin mistakes

Nearly all sizing regret is a margin story — too little or too much. Now you'll spot both coming.

- **Sizing right to the calculated number**, leaving nothing for a motor's jolt or a surprise load.
- **Leaning on the big 'peak' figure** for steady work instead of the continuous rating.
- **Forgetting derating**, then wondering why a unit falls short on a hot afternoon.
- **Feeding a heavy load through a long, thin cord**, losing power before it arrives.
- **Massively oversizing 'to be safe,'** and paying in weight, fuel, and a lightly loaded engine.

! Both ditches cost you

Too little margin strains the unit and won't start your motors; too much wastes money and fuel and isn't kind to a big engine. Aim for the comfortable middle — and see our guide on common sizing mistakes for the fuller roundup.

Questions worth asking before you buy

Whether you're talking to a salesperson or to me, these keep your margin honest.

Q: Is this the steady rating or the brief peak?

Always ask. Size your always-on loads to the steady (continuous) number, and treat the higher peak as headroom for a motor's jolt, not as everyday capacity.

Q: How does this unit hold up in heat, or on propane?

Both can lower its real output below the label. If you'll run it on a hot day or on propane, that's a reason to leave a little extra cushion when you size.

Q: How far will my cords have to reach?

A long run loses voltage, so plan a heavier-gauge cord for distance. It protects the margin you worked out and helps motors start.

Q: Am I buying more unit than I'll ever use?

A fair question in the other direction. A sensible cushion is wise; a giant you'll never fill just costs more to buy, move, and feed.

✓ There's no silly question

If 'how much cushion' still feels fuzzy, that's completely normal. Call or text me at (330) 200-8042 and we'll find your comfortable middle together.

A quick self-check at your kitchen table

You can pressure-test your margin in about a minute with these questions.

- ☐ Have I left a comfortable cushion above my calculated total?
- ☐ Does that cushion cover my single biggest motor's starting jolt?
- ☐ Have I allowed for a hot day, altitude, or propane taking a little off the top?
- ☐ Will my cords be short and heavy enough to not lose power on the way?
- ☐ Have I resisted the urge to massively oversize 'just in case'?

✓ If any answer is 'not sure', that's fine

That's exactly what this guide, and a friendly phone call, are for. Reach me at (330) 200-8042 and we'll fill in the blanks together.

Common Questions

The margin questions I hear most, answered plainly.

Q: Why did my 'big enough' generator still stumble?

Almost always because it was sized right to the number with no cushion. When a motor kicked on, there was nothing in reserve. A comfortable margin above your total is the fix.

Q: Is a bigger generator always safer?

No. A sensible cushion is wise, but massively oversizing costs more, weighs more, burns more fuel, and a big engine run lightly loaded all the time isn't ideal. Right-sized beats maximal.

Q: Does running on propane really change my sizing?

It can. A generator on propane typically delivers a little less than on gasoline. If propane is your fuel, factor that into your cushion rather than sizing to the edge.

Q: How long a cord is too long?

There's no single limit, but the longer and thinner the cord, the more voltage it loses. For any long reach, step up to a heavier gauge so the power arrives intact.

Q: Does a battery need margin like a generator does?

Yes — in both its numbers. Leave headroom in the power rating for a motor's jolt, and a cushion in the watt-hours so it comfortably outlasts the outage. See our watts-versus-watt-hours guide.

★ Still weighing how much cushion?

Send me your number and your loads at (330) 200-8042 and we'll land on a comfortable margin together — with nothing to sell you.

When your math sits right near a line

Sometimes your total lands so close to a unit's rating that you can't tell if the cushion's enough. That's a good moment for a pro.

A licensed electrician can do a proper load calculation and measure your real draw with a clamp meter, turning a careful estimate into a measured number. When you're near the line between two sizes — or covering the whole house, or a big 240-volt pump — that measurement is worth it, and it tells you exactly how much margin you truly have.

Our guide on when to get a professional load calculation covers what to expect. I help you gather your must-run list and nameplates, then coordinate the electrician who measures and confirms.

★ When in doubt, measure

If your number sits right at a unit's edge, don't guess — call or text me at (330) 200-8042 and I'll help you get a measured answer before you buy.

Bringing it all together

Margin is the quiet hero of good sizing: a comfortable cushion above your number keeps everything running smoothly, and steers you clear of both ditches.

Never size to the edge — motors cycle on, units run hot at their ceiling, and you'll want one more thing. But don't massively oversize either. Allow for derating and for long cords, keep steady loads under the continuous rating, and land in the comfortable middle.

Our running-watts-versus-starting guide gets you the number, our worksheet guide helps you add it up, and our guide on common sizing mistakes rounds up the rest. Then add your cushion, and you're done.

★ Let's find your comfortable middle

If you'd rather talk it through than puzzle it out, that's exactly what I'm here for. Call or text me at (330) 200-8042 with your number and we'll add a sensible cushion — free, with nothing to sell you.

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 leaving the right margin in your backup power 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 the licensed electrical or gas work myself — for that 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

Too Small, Just Right, Too Big

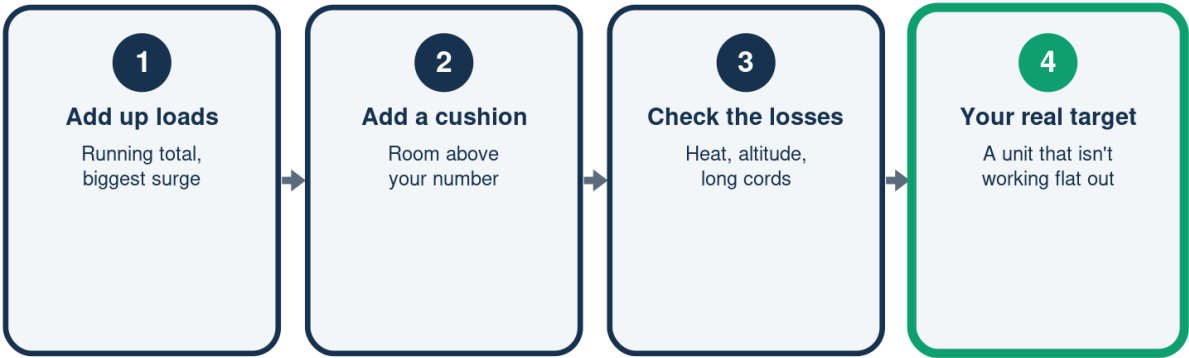
What happens at each end -- and in the middle

	What happens	The verdict
Sized too small	Runs hot, trips	Wears, no reserve
Just right	A comfy cushion	Cool and steady
Sized too big	Loafs along	Costs, drinks fuel

Aim for a sensible cushion -- not the edge, not the biggest unit.

Adding Your Cushion

From your number to a target you can trust



The cushion is the buffer that keeps everything running smoothly.

At the Edge vs. With Headroom

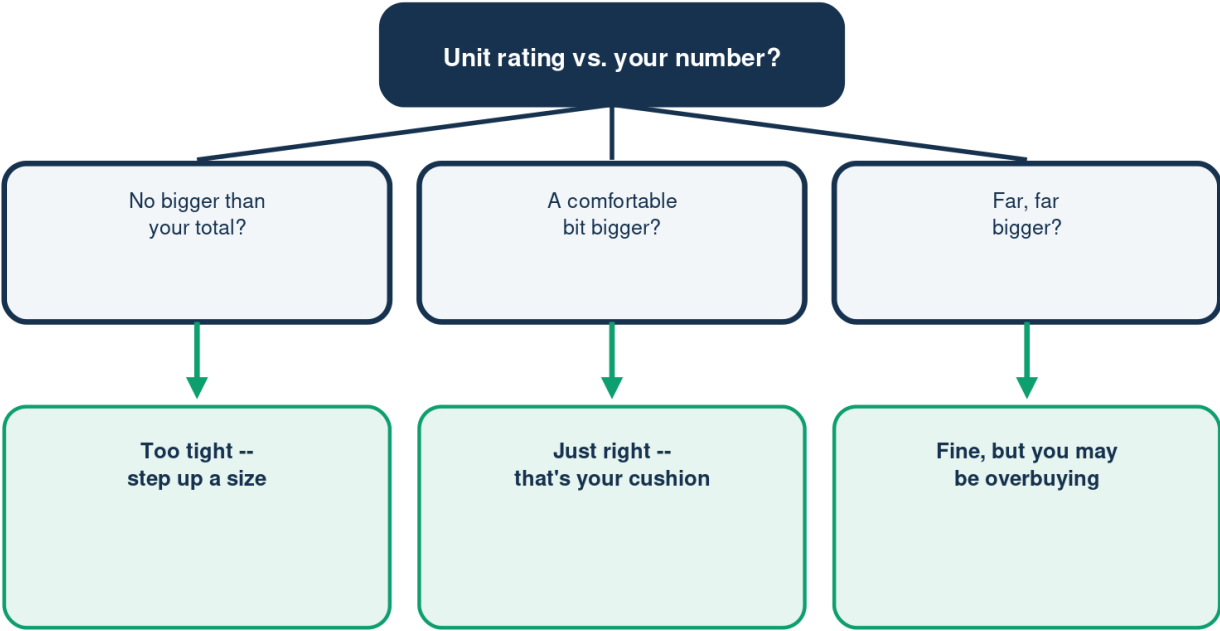
The same loads, a very different unit to live with

	At the edge	With headroom
Running temp	Hot	Cooler
Strain and wear	High	Low
Reserve for a surge	None	Ready
Room for one more	No	Yes

A little extra room is what makes a unit pleasant to live with.

How Close Is Your Math to the Rating?

Let the gap between them point the way



Heat, altitude, propane, and long cords all quietly shrink your real margin.

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



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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.

— *Bill*



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