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THE REFRIGERANT CHANGEOVER

A Homeowner’s Field Guide to R-410A, R-454B, and What Your Repair Quote Actually Means

MAURICE JOHNSON

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Epigraph

> The one who states his case first seems right, until the other comes and examines him.
>
> — Proverbs 18:17

Chapter One: The Deadline That Went Away

If you have searched online in the last year for what is happening with air conditioning refrigerant, you have almost certainly read that there was a hard deadline of January 1, 2026. After that date, the articles said, no one could install a system using R-410A. Contractors wrote it on their websites. Trade publications repeated it. Calculator sites built tools around it.

That deadline no longer exists.

On May 26, 2026, the Environmental Protection Agency issued a final rule titled “Phasedown of Hydrofluorocarbons: Reconsideration of Certain Regulatory Requirements Promulgated Under the Technology Transitions Provisions of the American Innovation and Manufacturing Act of 2020.” Among other changes, that rule removed the installation compliance date for residential and light commercial air conditioning and heat pump systems using refrigerants with a global warming potential of 700 or greater, provided all specified components of the system were manufactured or imported before January 1, 2025.

The EPA’s own sector restriction table now states it plainly: there is no installation compliance date for systems where all specified components were manufactured or imported prior to January 1, 2025.

This is not a technicality. It is the single most consequential fact a homeowner can know about this subject right now, and it is the fact that the overwhelming majority of currently published material still gets wrong.

Why the wrong version is still everywhere

The rule changed three times in under three years.

In October 2023, the EPA finalized the Technology Transitions Rule, which prohibited the manufacture, sale, and installation of residential air conditioning equipment using refrigerants above 700 GWP beginning January 1, 2025.

In December 2023, an interim final rule softened that, allowing equipment manufactured before 2025 to be installed through January 1, 2026. This is the version that entered public consciousness and never left.

In June 2024, the EPA granted reconsideration of four administrative petitions. In late September and early October of 2025, it proposed removing the installation compliance date entirely, citing supply chain problems. And in May 2026, it finalized that removal.

Each of those steps was covered less thoroughly than the one before it. The 2023 deadline was news. The 2026 removal was a regulatory adjustment announced into a subject most readers had already filed away as settled. The result is a large body of confident, well-written, wrong information sitting at the top of search results, much of it published well after the rule changed.

What this means for you, specifically

Three practical consequences follow.

First, if a contractor tells you that you must replace your working R-410A system because of an EPA deadline, that contractor is either behind on the rule or leaning on your assumption that they are not. There is no such deadline for you as a homeowner. There never was one that applied to equipment you already own.

Second, legacy R-410A equipment still sitting in a distributor's warehouse can be installed. Indefinitely. If it was man-

ufactured or imported before January 1, 2025, the clock that supposedly ran out on it has been taken off the wall.

Third, and this is where most of the money is: the restriction has never applied to servicing or repairing what you already have. That distinction is the subject of Chapter Four, and it is worth more to the average homeowner than everything else in this book combined.

What did not change

It would be a mistake to read this chapter as saying nothing happened. Something significant did happen, and it is permanent.

The manufacture and import of new residential air conditioning equipment using refrigerants above 700 GWP did stop as of January 1, 2025. That part of the rule stands. Manufacturers have transitioned their production lines. When the pre-2025 inventory is gone, it is gone, and what replaces it runs on something else.

So the changeover is real. What changed is that it is happening through supply and manufacturing rather than through a date on which your options legally narrowed. That is a slower, softer, and far more manageable transition than the one you have probably been told to expect, and the difference matters when you are standing in your driveway being handed a quote.

Chapter Two: What the Rule Actually Restricts

Here is a sentence that surprises nearly everyone: the EPA rule does not mention R-410A.

It restricts refrigerants by global warming potential, a number that expresses how much heat a gas traps in the atmosphere compared to the same mass of carbon dioxide over a hundred years. Carbon dioxide is the baseline, so its GWP is 1.

The threshold in the rule for residential and light commercial air conditioning is 700.

R-410A has a GWP of 2,088. That is why it is affected. Not because regulators singled it out, but because it sits roughly three times above the line.

The replacements, and why those particular ones

Two refrigerants have taken over the residential market.

R-454B has a GWP of 466. R-32 has a GWP of 675.

Look at those numbers next to the threshold and the industry's choice stops looking mysterious. Both sit under 700. R-32 sits under it by 25 points, which is close enough that some observers have questioned its long-term headroom, but it is under. These were not selected because they are dramatically better for the atmosphere than every alternative. They were selected because they clear the bar while remaining close enough to R-410A in their operating characteristics that equipment design did not have to start over.

Most major manufacturers went to R-454B. If you are shopping for a new system today, that is the name most likely to appear on your quote, and the keyword data behind this book suggests more people are now searching for R-454B than for R-410A. The audience for this subject has quietly shifted from people worried about an old system to people confused by a new one.

A2L: the letters nobody explains

Both R-454B and R-32 are classified A2L. You will see this on equipment labels and in installation manuals, usually with no explanation attached.

The A means low toxicity. The 2L means mildly flammable, with a low burning velocity. R-410A, by comparison, is A1: low toxicity, no flame propagation.

This is a real difference and it is worth understanding without alarm. A2L refrigerants require an ignition source and a fairly specific set of conditions to burn, and they burn slowly when they do. They are not propane. But the classification change is why new equipment includes refrigerant detection sensors, why service procedures have been updated, and why building codes and installation standards were revised ahead of the transition.

For you, the practical effects are narrow but real. Your installer needs current training. Your system will have a sensor that can trigger a fault. And the equipment cannot simply be retrofitted from one refrigerant to the other, which brings us to the question everyone asks.

No, you cannot just put the new stuff in the old system

You will encounter the phrase “drop-in replacement” and it does not apply here.

R-454B operates at pressures similar to R-410A, which is why it was chosen, but the systems are not interchangeable. The oils differ. The A2L classification brings equipment requirements that an older system was never built to satisfy. Components are rated and certified for a specific refrigerant.

If someone offers to convert your R-410A system to R-454B, that is not a service you want to buy.

The one number to carry forward

If you take a single thing from this chapter, make it this: the line is 700, not a brand name. Every confusing claim you encounter about what is banned, restricted, or phased out becomes readable once you ask which side of 700 the refrigerant in question sits on, and whether the claim is about manufacturing the equipment, installing it, or servicing it. Those three

are governed differently, and conflating them is the source of nearly every piece of bad advice in this field.

Chapter Three: The Phasedown Behind the Phaseout

The equipment rules in the last two chapters are only half the machinery. Running underneath them is a separate program that controls how much refrigerant can be produced at all, and it is the one that will actually show up on your repair bill.

Fifteen percent by 2036

The American Innovation and Manufacturing Act of 2020 directs the EPA to phase down the production and consumption of hydrofluorocarbons to 15 percent of historic baseline levels by 2036. You will see this stated two ways, an 85 percent reduction or a reduction to 15 percent of baseline, and they mean the same thing. This book uses the EPA's own framing: down to 15 percent of baseline.

That is a fifteen-year timeline, established by statute, and it aligns with international commitments under the Kigali Amendment. It is a much more durable thing than the installation deadline that came and went. Administrations can and do adjust implementing regulations. The statutory phasedown is a different order of commitment.

It happens in steps, not on a slope

This is the detail that determines what you pay, and almost nothing written for homeowners mentions it.

The phasedown does not tick down a little each year. The EPA allocates allowances in blocks, and the allocation holds steady for a period before dropping to the next level. The

schedule currently runs at 60 percent of baseline through 2028, then steps down to 30 percent of baseline for the 2029 through 2033 period, continuing toward the 15 percent endpoint in 2036.

Prices, therefore, move in jumps rather than climbing steadily. A refrigerant price that has been stable for two years is not evidence that the phasedown has stalled, and a sudden increase is not evidence of gouging. Both are what a stepped allowance schedule looks like from the outside.

The practical read: the step into the 2029 through 2033 period is the one to watch. If you are weighing whether to keep an aging R-410A system running or replace it, the cost of keeping it fed is more predictable before that step than after it.

Reclaimed refrigerant is the escape valve

One more provision matters enormously and gets almost no coverage.

Reclaimed refrigerant does not count against production allowances. Refrigerant recovered from decommissioned systems, cleaned, tested to specification, and resold is outside the cap entirely.

This is deliberate, and it changes the shape of the future. R-410A does not disappear when production winds down. There are tens of millions of systems in American homes holding several pounds each, and as those are eventually retired that refrigerant re-enters the market. Reclaimed supply is expected to become a major share of what is available after 2030.

So the picture of a homeowner in 2032 unable to find refrigerant at any price is not what the rules actually describe. Supply gets tighter and more expensive, and it increasingly comes from a different channel. That is a meaningfully different problem from scarcity, and it is why the repair-versus-replace math in Chapter Five does not come out the way the scare coverage implies.

Chapter Four: What You Can Still Do to the System You Own

Everything so far has been context. This chapter is the one that saves people money.

The restrictions cover manufacturing, importing, and installing equipment. They do not cover servicing, repairing, or maintaining equipment that is already installed and running. Your system is not on a clock, and the difference between a repair and an installation is where thousands of dollars live.

Component replacement is allowed, indefinitely

Your compressor fails. You can have a new R-410A compressor installed.

Your evaporator coil develops a leak. You can have a new R-410A coil installed.

Your system loses charge and needs refrigerant. It can be recharged with R-410A, for as long as R-410A is available, which per the previous chapter is considerably longer than most coverage suggests.

None of this is a loophole or a grey area. Repairing existing equipment sits outside the installation restriction, and there is no expiration date attached to it.

Where the line actually falls

There is a real boundary, and it is worth knowing precisely.

Replacing the condenser and the coil together crosses from repair into new installation. At that point you are not fixing a system, you are putting one in, and the restriction applies to what you put in.

That single distinction explains a great deal of contractor behavior. A quote to replace both halves of your system is a

quote for a new installation, with all the rules that follow. A quote to replace one failed component is a repair. If you are told that a component repair is not possible because of the phase-out, ask directly which component and why, because the general answer is that it is possible.

How this changes the conversation in your driveway

Most homeowners approach a failed air conditioner believing they face a binary: repair a system that is legally doomed, or replace it now. That framing produces bad decisions, and it is the framing a great deal of marketing has been built on.

The accurate framing is that you have a functioning asset with a supply cost that will rise in steps, that can be repaired component by component for as long as parts and refrigerant exist, and that you will eventually replace on a timeline closer to your own choosing than to a regulator's.

That does not mean repair always wins. A fifteen-year-old system with a failed compressor is usually a replacement regardless of refrigerant policy, and Chapter Five works through that math honestly. It means the decision should turn on the age, efficiency, and condition of your equipment, which is what it always turned on, rather than on a deadline that does not apply to you.

The question to ask

When a contractor recommends full replacement, one question separates a sound recommendation from a sales pitch:

"Is this being replaced because the part has failed and repair does not make economic sense, or because of the refrigerant rules?"

A good contractor will give you the first answer with numbers behind it. The second answer, offered on its own, is now demonstrably incomplete.

Chapter Five: What a Recharge Actually Costs, and Why Nobody Agrees

Try to find out what it costs to recharge an air conditioner with R-410A in 2026 and you will get a genuinely absurd range of answers. Not from disreputable sources. From established cost-guide sites, contractor blogs, and industry suppliers, all publishing in the same year, all sounding equally certain.

Here is a sample of what is currently published, all of it for R-410A, all of it dated 2026.

One supplier states that R-410A wholesales at roughly four to eight dollars per pound and that homeowners typically pay forty to ninety dollars per pound installed.

A major home services directory states that R-410A costs forty to seventy-five dollars per pound.

Another supplier page gives forty to seventy-five dollars per pound for a typical recharge call, with some markets and emergency calls reaching ninety.

A cost guide gives fifty to eighty dollars per pound, with a total recharge of two hundred to six hundred dollars.

Another pricing guide gives fifty to eighty dollars per pound and expects most standard recharges to land between two hundred and four hundred dollars.

And a calculator site states that as of mid-2026, R-410A runs approximately eighty to one hundred fifty dollars per pound installed.

The top of that range is more than thirty times the bottom.

The range is not the problem. The silence is.

A spread that wide would be survivable if each source told you what it was measuring. Almost none of them do.

There are at least three different things being priced here, and they are being reported under the same label.

The first is the wholesale cost of the refrigerant itself, what

a distributor charges a contractor for a jug. That is the four-to-eight-dollar figure.

The second is the refrigerant as billed to you, marked up, which is where numbers in the forty-to-ninety range live.

The third is the fully installed cost, which bundles the refrigerant together with the technician's time, the recovery procedure, leak detection, and the shop's overhead. One supplier is admirably explicit that its per-pound figure covers exactly that bundle. That is where the eighty-to-one-hundred-fifty figure comes from, and it is not really a refrigerant price at all. It is a service call expressed in dollars per pound.

Once you know that, the numbers stop contradicting each other and start describing three different transactions. But you have to know it, and the articles do not tell you.

Why this costs you real money

A typical three-ton residential system holds somewhere between six and twelve pounds of refrigerant.

Run that through the published range and the spread is not academic. At the low installed figure, a full charge on that system is a few hundred dollars. At the high installed figure on the larger charge, it is over a thousand. Same system, same refrigerant, same year, entirely different conversation about whether to repair or replace.

If you go into that conversation having read an article that quoted the wholesale price, you will think you are being gouged. If you go in having read the high installed figure, you may agree to replace a system that did not need replacing. Both errors come from the same source, which is a number published without its units of meaning attached.

The most honest sentence in the entire body of coverage

Among everything published on this subject, one source states the thing the rest dance around: there is no reliable universal percentage or figure, because what gets bundled into the price varies by shop, by market, and by job.

That is correct, and it is worth more than a confident number. Pricing in this trade is not standardized. Two contractors in the same city can quote a recharge on the same system differently and both be operating in good faith, because one is billing refrigerant and labor separately and the other is rolling everything into a per-pound rate.

The questions that resolve it

You cannot fix the published data. You can make any individual quote legible with three questions.

First: how many pounds is my system taking, and is that a top-up or a full charge? A partial recharge and a full one are different jobs with different totals, and the per-pound number is meaningless until you know the quantity.

Second: does that per-pound price include labor, recovery, and the leak check, or is labor billed separately? This single question collapses most of the confusion described in this chapter.

Third, and most important: what is the leak, and what does it cost to repair it?

The subscription problem

That third question is the one that matters, and one industry source puts it better than I can improve on: a recharge without fixing the leak is a subscription, not a repair.

Refrigerant is not consumed. A sealed system does not use it up the way an engine uses oil. If your system is low, refrigerant

left, which means there is a hole. Recharging without finding that hole buys you a season, maybe less, and then you buy the same service again at a price that steps upward with the allowance schedule described in Chapter Three.

This is where the phasedown actually reaches your wallet. Not as a deadline. As the rising cost of a repair you keep deferring.

So: repair or replace?

Here is the honest framework, and it deliberately does not produce a single answer.

Refrigerant cost alone is not a reason to replace a working system. One supplier states this plainly and it is right. If your system is eight years old and holding charge, the refrigerant situation changes nothing for you this year.

The calculation shifts when refrigerant cost lands on top of a real repair on aging equipment. The same source frames it well: a leaking twelve-year-old condenser needing twelve hundred dollars of repair plus six hundred in refrigerant is a different conversation entirely. For scale, that source puts a coil replacement plus an eight-pound R-410A refill on a four-ton system at two to thirty-five hundred dollars in 2026, while a new system runs several thousand more.

So the factors that decide it are the ones that always decided it. The age of the equipment. Whether the failure is a single component or a system in decline. The cost of the specific repair against the cost of replacement. Your efficiency gain. How long you intend to stay in the house.

What has changed is only this: you now have the information to keep the refrigerant question in proportion. It is a line item that will grow in steps over the next decade. It is not a countdown, and anyone presenting it as one is telling you something the EPA's own current rule does not support.

Chapter Six: The Price of a New System, and the Four Different Answers You Will Get

If you are buying a new air conditioner in 2026, you are buying an R-454B or R-32 system. That part is settled. The question you want answered is simple: does the refrigerant change make it cost more, and if so, how much more?

Here again the published answers do not agree, and here again the disagreement is instructive.

One analysis puts equipment prices roughly 8 to 10 percent higher than the outgoing generation.

A contractor-facing guide says the transition adds 15 to 30 percent to equipment costs, attributing it to leak detection sensors and updated certification requirements.

A regional installer reports that manufacturers estimate low-GWP equipment costs 10 to 20 percent more, due to sensors and redesigned compressors.

Another industry source says new systems will cost 15 to 25 percent more in many markets, citing redesigned coils, cabinets, controls, and leak detection.

And a consumer guide takes a different position altogether: the new equipment works just as well, is widely available, and in most cases costs about the same.

That last one deserves attention precisely because it disagrees with the others.

Why the estimates diverge

The spread is not random. These sources are measuring different things and comparing against different baselines.

Some are comparing the list price of a new R-454B model against the list price of the R-410A model it replaced. Others are comparing what a homeowner pays today against what a homeowner paid last year, which folds in ordinary inflation, labor cost increases, and tariff effects that have nothing to do

with refrigerant.

Some are quoting equipment cost. Others are quoting installed cost, where the equipment is one line among several and a percentage increase on the equipment gets diluted across the whole job.

And some are describing the early part of the transition, when new lines were scarce and priced accordingly, while others are describing a market where supply has caught up.

This is the same failure as the last chapter in a different costume: numbers published without stating what they measure or what they measure against.

What the actual dollar figures look like

Percentages are slippery. Absolute quotes are more useful, and a few sources give them.

One analysis prices a reference replacement, a ducted heat pump for a 2,000 square foot home, at 7,750 to 16,000 dollars installed as of July 2026.

A 2026 pricing guide cited by an installer lists central air installations at 5,200 to 10,300 dollars.

Notice that these ranges overlap but are anchored differently, and notice how wide each one is on its own. The range within a single source is larger than the refrigerant premium that every source is arguing about. A 2,000 dollar swing between contractors on the same job is entirely normal, and the refrigerant difference on a 7,000 dollar system at 10 percent is 700.

That is the proportion worth holding onto. The refrigerant transition is real and it does cost something. It is also smaller than the variation between two contractors quoting the same house.

What you are paying for, when you are paying more

Where the premium is real, it is not the refrigerant itself. R-454B material is not dramatically more expensive per pound than R-410A was, and a system holds a fixed amount.

The cost is in the equipment. A2L classification brought design changes: integrated refrigerant detection sensors, revised control boards to act on those sensors, redesigned compressors and coils, and in some cases modified cabinets. Contractors also needed updated training and certification, which enters the labor line.

These are one-time transition costs being absorbed across the industry. That is worth knowing because it tells you the premium is not permanent in the way a recurring tax would be. As production lines mature and the new designs become the only designs, the comparison stops having anything to compare to.

The supply question

One more factor is worth flagging honestly, because it affects timing more than price.

There have been reports through 2026 of R-454B supply constraints stretching installation timelines, in some cases to six weeks or more. If that applies in your market, the practical consequence is not a higher bill but a longer wait, which matters a great deal if your system fails in August in Texas and rather less if you are planning a replacement in the spring.

Ask about lead time as a separate question from price. They are separate problems and a contractor can be excellent on one and constrained on the other.

How to read your quote

Three things make a new-system quote comparable to another new-system quote.

First, get the model numbers. A percentage premium means nothing without knowing whether you are comparing equivalent tiers. Two quotes that differ by 20 percent may simply be a mid-tier system against a premium one.

Second, ask what is in the installed price beyond the equipment. Line-set replacement, electrical work, permits, disposal of the old unit, and any ductwork are where quotes genuinely diverge, and none of them are refrigerant-related.

Third, ask whether the price includes the leak detection sensor and its associated controls, because that is a real component of the new design and its presence is not optional.

If a contractor attributes a large increase specifically to the refrigerant, it is fair to ask them to show you the difference on the equipment line. The honest answer, based on what the industry itself is publishing, is that the refrigerant transition accounts for something in the range of 8 to 20 percent of equipment cost, which lands as a smaller percentage of the installed job. Anything substantially beyond that is coming from somewhere else, and you are entitled to know where.

Chapter Seven: How Long Your System Actually Has, and How to Time the Decision

After two chapters of sources contradicting each other, this one comes as a relief. On the question of how long equipment lasts, the industry broadly agrees.

Central air conditioners last 15 to 20 years with proper maintenance. That figure appears from manufacturers and independent guides alike, with remarkable consistency.

Heat pumps are the exception worth knowing about, and the reason is mechanical rather than qualitative. Sources put them at 10 to 20 years, 10 to 16, or 12 to 17, and they all give the same explanation: a heat pump provides both heating and cooling, so it runs year-round rather than seasonally. More annual run hours, shorter calendar life. One source notes di-

rectly that the lower end of the range is the more common outcome for that reason.

Gas furnaces outlast both, typically 15 to 25 years, occasionally longer.

So if you have a heat pump, do not measure it against the central-AC number you will see quoted most often. Fifteen years on a heat pump is a full life. Fifteen years on a central AC is late middle age.

Why this chapter exists

The refrigerant changeover did not change any of these numbers. Equipment lasts what it lasts.

What the changeover did was give the industry a reason to talk to you about replacement on a schedule that was not yours. If you were told in 2024 or 2025 that you should replace ahead of a deadline, the lifespan of your equipment was not the argument being made. The deadline was. And per Chapter One, that deadline is gone.

Which returns the decision to where it always belonged: the age and condition of what you own.

The signals that actually matter

Across the guidance, the same replacement triggers recur, and none of them is a date on a calendar.

A major confirmed repair on equipment near or beyond its expected life range. Not a capacitor. A compressor, or a coil, on a system already at fifteen years.

Recurring failures. One repair a decade is maintenance. Two or three in consecutive seasons is a system telling you something.

Parts becoming unavailable. This is a genuine and underappreciated constraint on older equipment, and it arrives independently of refrigerant policy.

Comfort that has degraded, rooms that no longer hold temperature, or run times that have quietly lengthened year over year.

And for furnaces specifically, any unsafe combustion or heat-exchanger condition, which is not a cost calculation at all. That is a replace-now situation.

Putting the refrigerant question in its place

Now combine this chapter with the three before it, because together they produce an actual decision framework.

If your system is under ten years old and holding charge, nothing in the refrigerant transition asks anything of you. Not this year, not for years. Component repairs remain available indefinitely, and R-410A remains available, increasingly from reclaimed supply.

If your system is between ten and fifteen and needs a repair, the refrigerant cost belongs in the math but does not decide it. Price the repair, price the refrigerant honestly using the questions from Chapter Five, and weigh it against a new system priced with the questions from Chapter Six. Often the repair still wins.

If your system is past fifteen and has a major failure, you were probably replacing it regardless of what the EPA did or did not finalize in May 2026. The refrigerant transition means your replacement runs on R-454B or R-32. It does not mean the decision was made for you.

And if your system is past fifteen and running fine, you are in the one genuinely interesting position. There is an argument for planning the replacement rather than waiting for the failure, and the argument has nothing to do with deadlines. It has to do with lead times, which as noted in the last chapter have stretched to six weeks or more in some markets for R-454B equipment. A planned replacement in March is a different experience from an emergency replacement in August.

The asset you already own

One last framing, because it runs against the grain of most coverage.

A working air conditioner is a functioning asset that someone already paid several thousand dollars for. The case for keeping it running is stronger than the volume of replacement marketing suggests, and the rules as they now stand support that: repair is unrestricted, component replacement is unrestricted, and supply persists through reclamation well past the point where production winds down.

The case for replacing it is real too, and it rests on efficiency gains, reliability, warranty coverage, and the cost of the next repair. Those are legitimate reasons. They are just not urgent ones, and urgency is what has been sold.

Take the decision on your own timeline. You have more of it than you have been told.

Chapter Eight: R-454B or R-32, and Whether You Get to Choose

When your quote arrives, it will name a refrigerant. In the American residential market it will almost certainly say R-454B. If you are pricing a ductless mini-split, it may say R-32. This chapter explains the difference, and then explains why the difference matters less to you than to the people arguing about it.

The two candidates

R-454B has a global warming potential of 466. It is a zeotropic blend, meaning it is made of more than one component. Crucially, it operates at pressures almost identical to legacy R-410A, which meant manufacturers could adapt existing equipment architecture rather than redesign from scratch.

R-32 has a GWP of 675. It is a single-component refriger-

ant rather than a blend, which gives it more straightforward thermodynamic behavior. It requires less refrigerant charge for the same capacity, in some comparisons up to 40 percent less, and it is cheaper per pound.

Both sit under the 700 threshold. Both are A2L. Neither can go into your old system.

Where the market landed, and why

North American manufacturers converged on R-454B. Carrier, Trane, and Rheem are all named among the major manufacturers choosing it, and one source describes R-454B as the path of least resistance for mainstream contractors in 2026 because it is what the market standardized on.

The pressure similarity to R-410A is the reason. It let manufacturers reuse packaging, existing service channels, and much of the installed knowledge base.

R-32 dominates elsewhere in the product landscape. It is the leading choice for ductless mini-splits and VRF systems, and it has a long track record in global markets, particularly in Asia and Europe, where it has been in wide use for years.

So the practical answer to “which one am I getting” is usually determined by what you are buying rather than by preference. Ducted central system from a major American brand: R-454B. Ductless mini-split: quite possibly R-32.

The genuine disagreement, stated fairly

Most sources are careful to say neither refrigerant is objectively better, and they are describing a real trade-off rather than hedging.

The case for R-454B is its lower GWP, 466 against 675, roughly 30 percent lower. That matters because the 700 threshold is not necessarily permanent. R-32’s 675 leaves 25 points of headroom. If regulators ever lower the line, R-454B

has far more room. One source frames this as better long-term regulatory protection.

The case for R-32 is performance and serviceability. Being a single component, it does not fractionate, which means a partial leak does not change the composition of what remains in the system. A technician can top it up rather than recover and recharge the whole charge. One regional source makes the practical point well: that serviceability matters most when you have a leak in a hundred-degree afternoon.

R-32 also delivers higher efficiency in direct comparison, one source putting it at 107 percent of the R-410A baseline, and it costs less per pound with a smaller charge required.

And at least one supplier takes a harder position than the others: that R-454B is a safe bridge refrigerant rather than a long-term winner, and that R-32 wins on performance, efficiency, and servicing over the long run.

That is a minority view, and it is worth knowing that it exists rather than pretending the field is unanimous. It is also, notably, a view about where the industry should go, not advice that should change which system you buy this month.

Why this is not really your decision

Here is the part that keeps this chapter honest.

You are not choosing a refrigerant. You are choosing a system, from a contractor who installs particular brands, and the refrigerant comes attached. The efficiency difference between the two refrigerants is smaller than the efficiency difference between equipment tiers within either one. The serviceability difference matters to your technician more than to you. And the regulatory headroom argument concerns a rule change that has not been proposed.

The variables that will actually determine whether you are satisfied with this purchase in ten years are the ones that always did: correct sizing for your house, quality of the installa-

tion, the condition of your ductwork, and whether the contractor stands behind the work.

A well-installed R-32 system will outperform a badly installed R-454B one, and the reverse is equally true. The refrigerant is not the variable to optimize.

On A2L safety, briefly

Because it comes up in every one of these comparisons: A2L classification means mildly flammable with a low burning velocity, not dangerous in ordinary use. One supplier puts it in useful perspective, noting that gas stoves, water heaters, and household aerosols carry higher real-world risk profiles than an A2L charge sealed in a system.

The design response is already built into the equipment you would buy: refrigerant detection sensors, updated controls, revised installation standards. It is handled. It is worth understanding, and it is not worth worrying about.

What to ask

If your quote names a refrigerant and you want to understand the choice, two questions are enough.

Does this brand offer the same tier of system in the other refrigerant, and if so what is the price difference? Usually the answer is no, because manufacturers picked a lane.

And: are your technicians certified on A2L service, and do you stock what this system needs? That question is more useful than anything about GWP, because the thing that will affect you is whether the person who installed it can service it three years from now.

Chapter Nine: Sizing, and the Mistake That Outlasts the Refrigerant

Every chapter so far has been about a change in the rules. This one is about something that has not changed in decades and goes wrong constantly, and if you are buying a new system it will affect your comfort and your bills far more than the refrigerant in it.

Your system has to be sized to your house. The standard method for doing that is a Manual J load calculation, published by the Air Conditioning Contractors of America and recognized as the ANSI standard for residential load calculation.

A Manual J is a room-by-room analysis. It accounts for square footage, insulation values, window types and orientation, ceiling height, air infiltration, where the ductwork runs, occupancy patterns, and local design temperatures. It produces a number in BTUs: what your specific house actually needs.

Without it, as one guide puts it plainly, contractors are guessing.

The rule of thumb, and the damage it does

The guess has a name. One ton per 500 square feet, or some local variant of it, or simply matching whatever was there before.

The consequences are well documented. One source notes that most older homes in the United States have wildly oversized equipment, precisely because installers historically used those rough rules or matched the existing unit, which was itself sized by rule of thumb a generation earlier. The error compounds across replacements.

A worked example makes the scale of it clear. One analysis compares a 1950s house needing four tons of cooling with a modern house of similar size needing one and a half, because

insulation, windows, and air sealing have improved that much. Apply the rule of thumb to the newer house and you land at roughly 160 percent oversized.

Why bigger is worse, not better

This is counterintuitive to most homeowners, so it is worth stating mechanically.

An oversized air conditioner cools the air to the thermostat setpoint quickly and shuts off. That sounds efficient. It is not, because removing humidity takes run time, and a system that satisfies the thermostat in short bursts never runs long enough to dehumidify.

The result is a house that is cold and clammy. The short on-off cycling, called short-cycling, also puts repeated startup stress on the compressor, which is the single most expensive component in the system. Sources consistently link oversizing to higher utility bills and shortened equipment life.

Undersizing has its own failure mode, running constantly and never reaching setpoint on the hottest days, but it is the less common error by a wide margin.

One source notes that oversizing by even half a ton is enough to produce short-cycling. This is not a tolerance you want to be generous with.

What to require

Three things turn this from a worry into a checklist item.

First, require a Manual J, and require it to be done in your house. Any contractor who quotes a system size over the phone, without an in-person assessment, is giving you an unreliable number. That is stated flatly across the guidance and it is correct.

Second, ask to see the results. Not a summary, the calculation. Any licensed contractor can run a Manual J, and asking

to see it before signing is an entirely ordinary request.

Third, compare the proposed size to the calculated load. One source gives a usable threshold: if a contractor proposes a system more than 15 to 20 percent above the calculated load without explaining why, treat that as a red flag and get another opinion. There are legitimate reasons to round up, availability of sizes among them, but the contractor should be able to say what the reason is.

And the clearest warning sign of all: if a contractor dismisses Manual J and falls back on one ton per 500 square feet, that tells you how the rest of the installation will be approached.

The permit angle, which works in your favor

There is an enforcement mechanism here that many homeowners do not realize they have.

Most building departments now require a load calculation for permitted work. Equipment selected by matching existing tonnage, with no documentation, is exactly the deficiency inspectors look for. The building code requires that heating and cooling equipment be sized from building loads rather than from what was there before.

So asking whether the job will be permitted is not just a question about legality. A permitted replacement brings a documentation requirement that protects you from the most common installation error in the trade.

Where refrigerant fits into this

Barely, and that is the point of putting this chapter here.

You can buy the most current A2L system from the best brand your contractor carries, with a refrigerant chosen for optimal regulatory headroom, and if it is a ton oversized for your house you will be uncomfortable and your compressor

will wear out early. None of the material in the preceding eight chapters will save you from that.

The refrigerant changeover is the thing everyone is talking about. Sizing is the thing that determines whether you are satisfied. If you only have the energy to be insistent about one item in this entire book when you are standing in your kitchen with a salesperson, be insistent about the load calculation.

Chapter Ten: The Tax Credit That Is Gone, and What Replaced It

If a contractor's quote in 2026 mentions a federal tax credit, ask when they last checked.

The federal Energy Efficient Home Improvement Credit, known by its tax code section as 25C, expired on December 31, 2025. Equipment installed in 2026 does not qualify for it. Section 25D, the Residential Clean Energy Credit that covered geothermal systems, ended on the same day.

The expiration came through the One Big Beautiful Bill Act, signed July 4, 2025, which moved the sunset date forward from what the Inflation Reduction Act had originally set.

This is the second major correction in this book, and it has the same shape as the first. A widely known incentive changed status, the change was less publicized than the incentive itself had been, and a great deal of material written for homeowners still describes the world as it was.

Who can still claim it

One group can, and the distinction is precise.

If your system was purchased, installed, and placed in service by December 31, 2025, the credit still applies to that tax year. You claim it on your 2025 return using IRS Form 5695, filed in 2026.

Placed in service is the operative phrase. Not ordered, not

paid for. Up and running. If your installation straddled the new year, that detail decides it, and it is worth confirming with whoever prepares your return.

If your system goes in during 2026, there is no federal credit available to you. Not a reduced one. None.

What is still available

The federal picture is not entirely empty, and this matters if you are budgeting a replacement.

Two Inflation Reduction Act rebate programs remain active pathways in 2026: HOMES, which rewards whole-home energy reduction, and HEAR, also called HEEHRA, the High-Efficiency Electric Home Rebate program. These are structured differently from 25C. They are rebates administered through states rather than a credit you claim on a federal return, they are income-qualified, and their availability and timing vary considerably by state because each state runs its own program.

Beyond those, state and utility rebates continue independently, and these are frequently overlooked. Utility programs in particular can be substantial for high-efficiency heat pumps, and multiple sources note that state and utility rebates can stack with the federal rebate programs.

How to actually find them

Rebate research is tedious and it is worth an hour of your time on a several-thousand-dollar purchase.

Start with your electric utility’s website, searching for rebates or energy efficiency programs. Utility rebates are often the largest remaining incentive and they are usually the easiest to claim, sometimes applied at the point of sale by a participating contractor.

Then check your state energy office for the status of HOMES

and HEAR in your state, because implementation has varied and some programs have been slower to launch than others.

Then ask your contractor which rebates they handle paperwork for. Many participate in utility programs directly, which saves you the filing.

What you should not do is take a quote's rebate figures on faith. If a proposal shows an incentive reducing your net cost, ask which specific program it refers to and confirm it independently. The 25C expiration is recent enough that some quoting software and some sales material has not been updated.

The timing question this creates

Combine this chapter with Chapter Seven and a genuine planning consideration emerges.

If you were deferring a replacement partly on the expectation of a federal credit, that reason has evaporated. There is nothing to wait for on the federal side, and no announced successor to 25C.

That cuts both ways. It removes an argument for delaying, and it removes an argument for hurrying. What remains is the equipment-condition analysis from Chapter Seven, plus whatever your state and utility offer, which unlike the federal credit can change on their own schedules in either direction.

If your utility has a rebate program with an annual budget, there is a real argument for applying earlier in the program year rather than later. That is a far more local consideration than a federal deadline, and it is the kind of thing your contractor will actually know.

The pattern, one more time

Three times now in this book, a widely repeated claim has turned out to describe a rule that changed: the installation deadline, the price of refrigerant, and now the tax credit.

The common thread is not that anyone is lying. It is that this subject changed several times in a short span, and written material ages badly and silently. A page published in 2024 looks identical to one published last month.

Which suggests a habit worth keeping past the end of this book: for anything involving a federal deadline, credit, or rule, check the date on what you are reading, and then check whether the rule still says what the page says it says.

Chapter Eleven: Choosing the Contractor, Which Matters More Than Choosing the Equipment

The equipment you buy is manufactured to a specification. The installation is not. Two identical systems, same brand, same model, same refrigerant, installed in two identical houses by two different companies, will not perform the same and will not last the same. The difference is the installer.

This chapter is about how to tell them apart, and it draws on a body of guidance that is unusually consistent. The warning signs repeat across source after source, which is itself informative: this industry has recognizable failure patterns.

The credentials question, first and briefly

Licensing and insurance come first because they are verifiable and because their absence ends the conversation.

Reputable contractors are licensed as their state requires and carry insurance protecting both the company and you. Reluctance to provide a license number is named repeatedly as a red flag, and it is one of the easier things to check, since most states publish a license lookup.

For this particular moment in the industry, add one more: A2L certification. The new refrigerants brought updated service procedures and training requirements. Asking whether the technicians are current on A2L is a fair and timely ques-

tion.

The written estimate

No written estimate, no deal.

Verbal agreements offer zero protection if a dispute arises, as one source puts it bluntly. A proper proposal outlines every component, the labor charge, and the warranty terms.

Specifically, your quote should name the brand and model numbers of the equipment, state whether the permit cost is included, and specify the labor warranty. Vague estimates are named across sources as a warning sign, and vagueness is often not carelessness. It is what allows the scope to shift after you have signed.

High-pressure sales, and the exact phrases

Nearly every source identifies high-pressure tactics as the single biggest red flag in the trade, and several quote the language directly.

“This price is only good today.” A discount that expires today, and that the company will not honor if you need time to think, is a pricing tactic rather than a price.

“Your system could fail any minute.” Urgency manufactured from uncertainty.

One source names something more specific and, given everything in this book, more relevant: recommending complete system replacement when a targeted repair would resolve the issue. That is listed as a pressure strategy in its own right.

Which connects directly to Chapter Four. You now know that component replacement is unrestricted and that repair sits outside the installation rules entirely. If someone is pushing full replacement on a system with one failed part, you have the information to ask why, and their answer is diagnostic.

Trustworthy professionals, the same sources note, welcome

questions and encourage you to take the time you need. That is the tell. Not friendliness, patience.

The unusually low estimate

Low bids are named as a red flag alongside high-pressure ones, which surprises people.

The mechanics are straightforward. A price well below the others usually means something was left out or downgraded: substandard equipment, inflated markups on parts that appear later as change orders, unlicensed labor, or a skipped permit.

This is not an argument for taking the highest bid. It is an argument for understanding why a number is what it is. If one quote is dramatically below the rest, the useful question is what the others included that this one did not, and comparing model numbers usually answers it.

Warranty, where the real differences hide

Manufacturer warranties typically cover parts for five to ten years and are broadly similar across major brands. That is the equipment manufacturer's promise, not your contractor's.

The labor warranty is the contractor's own, and it varies enormously. One source notes the range runs from thirty days to a year or more.

That spread is worth understanding, because it is a signal. Companies whose installations rarely fail can afford to warrant their labor generously. An extended labor warranty is a contractor betting their own money on their workmanship.

And get it written down. Verbal promises about warranty coverage mean nothing if they are not in the contract, which should state what is covered, for how long, and what voids it.

Presence and track record

Several sources make a point that is easy to overlook: a contractor with no verifiable physical address, no local track record, and no service fleet is a risk regardless of how good the quote looks.

You are buying a fifteen-to-twenty-year relationship, not a transaction. The company that installs your system is the company you will call when something goes wrong in year three, and the labor warranty is worthless if they are gone.

The short version

If you want the chapter as a checklist to carry: verify the license, confirm A2L certification, require a written quote with model numbers and permit status, get at least three, compare what is included rather than the bottom line, ask for the labor warranty in writing, and treat any urgency that did not come from a failure as a reason to slow down rather than speed up.

And one final connection to everything preceding. A contractor who tells you in 2026 that an EPA deadline requires you to replace your system has given you a genuinely useful piece of information about themselves.

Chapter Twelve: The Leak, Which Is the Actual Problem

Chapter Five ended on a sentence worth repeating: a recharge without fixing the leak is a subscription, not a repair. This chapter is about the repair.

Start with the physics, because it corrects a belief almost every homeowner holds. Refrigerant is not consumed. Your air conditioner is a sealed system, and the refrigerant inside it circulates indefinitely, changing state but never being used up. It is not like fuel or oil.

So there is no such thing as a system that is simply due for

more refrigerant. As one contractor puts it, low charge is a condition, not a diagnosis. If your system is low, refrigerant left the system, and it left through a hole.

How to tell before the technician arrives

Several signs are consistent across manufacturer and contractor guidance.

Air that is not as cold as it should be, and a system that runs longer and longer trying to reach setpoint. Before assuming the worst, check your filter, because a clogged filter produces similar symptoms and costs almost nothing to fix.

A hissing sound near the refrigerant lines. Sources compare it to air escaping a tire, and it usually indicates a small continuous leak. A bubbling or gurgling noise suggests something larger, refrigerant escaping from a part of the system carrying oil or moisture.

Oil stains or an oily residue around fittings, valves, or either unit. Refrigerant carries oil with it, so where refrigerant has escaped over time, oil is often left behind as a visible mark. Trane specifically recommends looking at the fittings and valves for this.

Ice on the refrigerant lines or the indoor coil, which seems contradictory but follows from low charge causing the coil to drop below freezing.

What a proper diagnosis involves

Knowing what should happen protects you from what sometimes does.

A proper leak diagnostic starts with an assessment of system pressure and performance, then moves to actual detection: an electronic leak detector, a UV dye test, or a soap-bubble test at suspected connections, depending on the situation.

Once located, the repair depends entirely on where the leak

is. A leak at a fitting or connection can often be resealed. A leak in a coil usually means replacing that section or the whole coil, because coils generally cannot be patched in a way that lasts.

After the repair, the system should be pressure-tested to confirm the seal before being recharged with the correct amount and type of refrigerant, then tested under normal operating conditions.

That sequence, diagnose, locate, repair, pressure-test, recharge, verify, is what you are paying for. A visit that consists of adding refrigerant and leaving has skipped every step that matters.

What it costs

The numbers here are more coherent than the per-pound figures in Chapter Five, though still wide.

Detection alone runs 150 to 600 dollars depending on severity and how hard the leak is to find, with another source putting a leak test at 100 to 330 dollars for detection only. Leaks hidden in complex or inaccessible areas cost more to locate, which is simply labor.

For finding and fixing the leak plus refilling refrigerant, one cost guide gives 200 to 1,500 dollars. Another gives a range of 250 to 1,600 with an average around 800.

The variation is driven by location of the leak more than anything else. A fitting is cheap. An evaporator coil buried in the air handler is not.

The decision this forces

Here is where it gets genuinely difficult, and where the honest answer is not comfortable.

If the leak is at a fitting and the system is ten years old, repair it. That is an easy call.

If the leak is in the evaporator coil and the system is fifteen years old, you are looking at a repair that costs a meaningful fraction of a replacement, on equipment near the end of the life expectancy established in Chapter Seven. That is the conversation where replacement genuinely earns consideration, and it has nothing to do with refrigerant policy.

And recall the boundary from Chapter Four. Replacing the coil alone is a repair, and an R-410A coil can be installed in an R-410A system indefinitely. It is replacing the condenser and the coil together that crosses into new installation. So a coil repair remains available to you regardless of the system's age, if the economics justify it.

The cost of waiting

One contractor names the danger that most homeowners underestimate: the most expensive risk is often indirect, from running a low-charge system too long.

A compressor operating under low charge runs hot and works against conditions it was not designed for. What began as a leak repair can become a compressor replacement, which is a substantially different bill on the same equipment.

So the argument for prompt diagnosis is not about the refrigerant you are losing, though at current prices that is not trivial. It is about protecting the most expensive component in the system from damage that is avoidable this week and expensive next month.

The one question

If a technician tells you the system is low on refrigerant, one question follows.

Where is it leaking, and can that leak be repaired in a way that lasts?

A good technician expects that question and has already

been working toward the answer. Anyone who responds by recommending a recharge without addressing the leak is proposing that you buy the same service again next season, at a price that will have stepped upward by then.

Chapter Thirteen: Keeping What You Have

Everything in this book points toward one conclusion for most readers: your best move is usually to keep your existing system running well. This chapter is about how.

It is also the cheapest chapter to act on. The single most valuable maintenance task costs a few dollars and takes two minutes.

The filter, which is not a small thing

Change your air filter. Multiple sources call it the single most important task a homeowner can perform, and the reasoning is mechanical rather than promotional.

A clogged filter restricts airflow. Restricted airflow forces the system to work harder, drives up energy bills, and creates a genuine risk of the evaporator coil freezing, which is a service call arising entirely from a neglected five-dollar part.

On frequency, the guidance converges. Inspect monthly. Replace every thirty to ninety days, or every one to three months, depending on your household. Homes with pets, heavy foot traffic, or allergy sufferers need changes at the shorter end. During peak cooling season, checking every thirty days is the standard advice.

Note the pattern in the symptoms: weak cooling, long run times, ice on the coil. Those are the same signs listed in the last chapter for a refrigerant leak. Check the filter before you conclude anything expensive. It is free to rule out.

What else you can do yourself

Manufacturer guidance is consistent about the boundary between homeowner tasks and professional ones.

You can clean the condenser and evaporator coils with a brush or vacuum. You can clear leaves, grass clippings, and debris from around the outdoor unit, which needs clear airflow on all sides. You can treat the condensate drain line with vinegar or algaecide tablets, which prevents the clog that produces a water leak around the indoor unit. And you can check that supply and return vents throughout the house are open and not blocked by furniture or drapes.

That last one is quietly common. A system fighting closed or blocked vents behaves like an undersized system in a house that does not need one.

Carrier draws the line clearly: refrigerant levels and electrical work are for professionals. That is not liability language. Refrigerant handling requires certification and recovery equipment, and now, with A2L refrigerants, additional considerations.

The professional tune-up

Guidance says annual at minimum, twice yearly if you have both heating and cooling to maintain.

ENERGY STAR's recommendation on timing is practical: check the cooling system in spring and the heating system in fall, before contractors get busy, and one suggestion is to tie it to the clock changes so you remember.

A proper tune-up covers refrigerant charge, electrical components, ductwork, lubrication of moving parts, and both the evaporator and condenser coils. ENERGY STAR calls out two items specifically that homeowners rarely think about: tightening all electrical connections and measuring voltage and current on motors, because faulty connections cause unsafe

operation and shorten the life of major components. And lubricating moving parts, because friction in an unlubricated motor costs electricity continuously.

Ask for a maintenance log, a record of what was done at each visit. It is useful when you eventually sell the house, and more useful when a technician you have never met needs to know the system's history.

Why this chapter is worth more in 2026 than it was in 2020

Two reasons follow directly from earlier chapters.

The first is cost. When refrigerant was cheap, a slow leak was an annoyance. With prices stepping upward on the allowance schedule from Chapter Three, a system that loses charge slowly is now leaking money at a rate that increases every few years. Maintenance that catches a developing leak early is worth more than it used to be.

The second is that keeping your system healthy extends the window in which you get to choose when to replace it. Chapter Seven made the case for planning a replacement rather than suffering an emergency one. Maintenance is what buys you that choice, and a system that fails in August does not offer it.

On maintenance plans

Most contractors sell annual agreements bundling one or two visits with priority scheduling and a discount on repairs.

Whether one is worth it depends on the price against what the visits would cost separately, and on whether priority service has value where you live. In a market where August wait times run days, it can matter a great deal.

The part worth reading closely is what the plan actually includes. A plan covering one visit a year at a price close to a single tune-up is fine. A plan covering less than that, with the

value concentrated in a repair discount you may never use, is worth questioning. And as with everything in Chapter Eleven, get the terms in writing.

The short version

Check the filter monthly, change it every one to three months. Keep the outdoor unit clear. Treat the drain line. Keep the vents open. Have it professionally serviced before each season rather than during it.

None of this is difficult and none of it is expensive. It is simply the difference between a system that reaches the top of its expected life range and one that does not, which on a several-thousand-dollar asset is the highest return available to you in this entire book.

Chapter Fourteen: How Long Will R-410A Actually Be Available?

This is the question underneath every decision in this book, and it deserves a direct answer rather than the vague menace most coverage offers.

R-410A itself was never banned. The restriction covers equipment, not the refrigerant. As one supplier states plainly, manufacturers and importers can no longer produce or import new residential AC and heat pump equipment designed to use R-410A as of January 1, 2025, but the refrigerant itself remains legal to produce, sell, and use for service.

So the question is not legality. It is supply and price.

The full schedule, which is worth seeing in one place

Chapter Three introduced the stepped allowance schedule. Here it is complete, because the later steps matter for a decision you might make this year.

The HFC production cap sits at 60 percent of baseline through 2028. It drops to 30 percent from 2029 through 2033. Then to 20 percent from 2034 through 2035. Then to 15 percent from 2036 onward.

Four steps, not a slope. Each one is a discrete tightening, and each is a plausible moment for a price adjustment.

Note also that this cap covers all HFCs, not R-410A specifically. As the industry consumes its allowances across many refrigerants, the allocation to any one product is a commercial decision by producers, not a regulatory one.

The situation right now

The near-term picture is more relaxed than the coverage suggests.

One trade publication reported that manufacturers are not currently concerned about the availability of either A2L refrigerants or R-410A for service, while cautioning that prices may rise as supplies reduce.

An industry survey found nearly 80 percent of distributors reporting R-410A inventories at or above their targets ahead of the summer season, with no widespread shortage in the U.S. market.

That is the current state. It is also, as the same source carefully notes, not a forecast: today's availability does not necessarily represent the coming years.

Where it goes

The consensus across manufacturers and industry analysts runs roughly like this.

R-410A remains available for servicing existing systems for the foreseeable future. Carrier says exactly that, adding that it may become more expensive as supply decreases.

Prices rise. Trane puts it concretely: as inventory dwindles

it becomes more expensive, and a recharge five years from now will cost considerably more than one today.

Supply shifts to reclamation. This is the structural change. One source projects that by 2030 most remaining R-410A will come from recycled or reclaimed sources. Another frames the same point from the industry side: as permitted production falls toward 30 percent of baseline by 2029, an increasing share of service demand must be met from existing stocks and reclaimed refrigerant.

Recall from Chapter Three why this works: reclaimed refrigerant does not count against production allowances. The reclamation channel is not capped. That is the mechanism by which R-410A persists after virgin production winds down, and it is deliberate policy rather than a loophole.

Aftermarket demand is expected to persist into the early 2030s and then steadily decline, which is simply the installed base aging out.

The honest synthesis

Put those together and the picture is neither reassuring nor alarming.

Through the late 2020s, R-410A remains available. It gets more expensive in steps rather than smoothly. The source of supply gradually shifts from virgin production to reclamation, which is a change in channel rather than a cliff.

Into the 2030s, it becomes a specialty product: available, more costly, sourced from reclaim, and serving a shrinking installed base. That is the trajectory of every legacy refrigerant, and R-22 walked the same path before it.

What does not appear anywhere in the credible material is a date after which you cannot get R-410A. The people who would know, manufacturers and distributors, are not describing one.

What this means for your decision

If your system is healthy, the supply picture does not ask you to act. Not this year, and not on any date currently identifiable.

If your system is aging and leaking, the supply picture is one input among several, and Chapter Twelve covers the rest. The cost of feeding a leaking system rises in steps, which strengthens the case for fixing the leak rather than for replacing the system.

If you are planning a replacement in the next five to ten years, the supply picture mildly favors earlier rather than later, mostly because the 2029 step is the largest single drop in the schedule. That is a nudge, not a deadline.

And if a contractor tells you R-410A is about to become unavailable, you can now ask the specific question: unavailable when, and on what basis? The EPA schedule is public, the distributor inventories are reported, and neither supports the claim.

One practical note

You cannot buy R-410A yourself. Carrier notes it directly: individuals cannot purchase it without EPA certification.

So stockpiling is not an option available to homeowners, which spares you a decision. Your access to R-410A runs through your contractor, and that is one more reason the relationship covered in Chapter Eleven is worth getting right.

Chapter Fifteen: If You Are Buying or Selling a House

An aging air conditioner is a private inconvenience right up until a house changes hands. Then it becomes a line item that two parties argue about, and the numbers involved are large enough to deserve a chapter.

The threshold that matters

Appraisers and inspectors work from the same lifespan data in Chapter Seven, and they apply it bluntly.

Systems 15 to 20 years old or older are commonly flagged as deferred maintenance. That is the recurring language, and it is the point at which the appraiser assumes the buyer will need to replace the system soon and adjusts valuation accordingly.

One useful refinement is the distinction between chronological age and what one source calls effective age: how the system behaves and presents based on condition and maintenance history. A well-maintained twelve-year-old system with clean coils, quiet operation, and documented service records can carry a lower effective age than a neglected seven-year-old unit that is rusted and struggling.

That distinction is your leverage as a seller, and it is the second good reason to keep the maintenance log recommended in Chapter Thirteen.

What sellers are actually asked to give up

The concession numbers are substantial and they vary by source, which by now should surprise nobody.

One analysis says that at 16 to 20 years old, sellers should expect buyers to request 10,000 to 18,000 dollars in concessions.

Another gives a more moderate figure: for a system over 15 years old, a reasonable ask is a closing credit of 4,000 to 8,000 dollars, framed around documented replacement cost, with a contractor quote provided to anchor the request.

The gap between those ranges is itself the lesson. Concessions are negotiated, not calculated, and the party arriving with documentation sets the anchor. A seller with a recent contractor quote showing a realistic replacement figure is in a far stronger position than one responding to a number a buyer

invented.

The costs that do not appear as a price cut

Several sources make a point worth taking seriously: the damage from an old system shows up in ways that never appear as a valuation adjustment.

Homes with known mechanical issues sit on the market longer and generate fewer offers. Buyers negotiate more aggressively once they know a system needs replacing. An inspection noting equipment that still works but is past typical lifespan hands buyers a lever for renegotiation.

There is also a financing dimension that is easy to miss. Appraisers note system ages in reports that lenders review. A very old system rarely kills a deal outright, but it can contribute to a lower appraised value or to lender concerns that complicate closing, particularly in marginal financing situations. A non-operational system is worse and can trigger real problems.

Should a seller replace before listing?

The honest answer is that it depends on numbers specific to your house, and the framing matters more than any rule.

Replacing costs you the full price of a system. Not replacing costs you some concession, plus longer time on market, plus negotiating friction. If the likely concession approaches the replacement cost, replacing and marketing it as new is often the better trade, because you also remove the inspection finding and the financing wrinkle.

If the concession would be well below replacement cost, taking the credit is usually cheaper.

One additional factor now sits on the replace side of the ledger: a new system installed in 2026 runs on R-454B, and a buyer’s inspector will not be flagging it as legacy equipment.

That is worth something in a market where buyers have started asking about refrigerant.

And one factor sits against: there is no federal tax credit to offset the cost, per Chapter Ten. If you were counting on 25C to soften a pre-sale replacement, that is gone.

If you are buying

The advice here is simple and rarely followed.

Find out how old the system actually is. One source describes the problem exactly: ask a seller the age and you usually get a guess, the year they bought the house, or the year of the last big repair, and disclosure forms are not much better because many sellers genuinely do not know.

The reliable method is the data plate on the outdoor unit. The manufacture date is encoded in the serial number, the format varies by brand, and a technician or a quick brand-specific lookup will decode it. Do not accept a verbal answer on a question worth thousands.

Then ask what refrigerant it uses, which on anything installed before 2025 will be R-410A, and on much older equipment may be R-22. That matters, because R-22 is a different and considerably more expensive situation than anything in this book.

Then ask for service records, and treat their absence as information.

Disclosure, briefly

Disclosure obligations are set by state and the forms differ. The common principle is that sellers disclose defects they actually know about, such as a system that does not cool properly or one that has stopped working.

Age alone is generally not a defect. A known failure is. The distinction matters, and if your situation is close to the line,

that is a question for your agent or an attorney in your state rather than for a book.

The connection worth drawing

Everything in this chapter rests on a single fact established in Chapter Seven: equipment has a knowable life expectancy, and the market prices that in.

Which means the maintenance in Chapter Thirteen is not only about comfort and repair bills. It is about the effective age an appraiser assigns, the concession a buyer demands, and the smoothness of a transaction that may be the largest of your life.

Chapter Sixteen: What Could Change Next

This book has spent fifteen chapters correcting things that changed. It would be dishonest to close without acknowledging that the same could happen to the material you have just read.

So this chapter does two things. It tells you what is currently unsettled, and it gives you a method for checking any of it yourself.

The enforcement story, which most readers never heard

Before the May 2026 rule was finalized, something else happened that is worth understanding.

EPA issued an enforcement statement related to the Technology Transitions reconsideration proposal, effectively deprioritizing federal enforcement of the installation prohibition while the rulemaking was pending.

An industry association welcomed it and described its limits accurately, which is the part worth carrying forward. The action did not repeal or amend the rule. The enforcement discre-

tion applied only to federal enforcement. States and local governments retained authority under state law, building codes, and permitting programs, and contractors remained obligated to comply with those.

That distinction is generally true and it outlives this particular episode. Federal enforcement posture and local code requirements are separate things. Your permit office does not take its instructions from an EPA enforcement memo.

There is also a useful signal in what EPA said it would prioritize instead: illegal refrigerant imports, and maintaining the R-410A manufacturing prohibition on non-repair components. Note the phrase non-repair. Even at the level of enforcement priority, repair is treated differently from new equipment, which reinforces Chapter Four.

The litigation, which is genuinely unresolved

Here is the live uncertainty.

The May 2026 rollback has been challenged in court. Commonwealth of Massachusetts and other states versus EPA is pending in the D.C. Circuit. The states argue EPA ignored statutory mandates, and industry has already made significant investments to comply with the 2023 rule. Legal analysts describe the case as testing the boundaries of the agency's discretion to relax existing restrictions under the AIM Act's technology transitions authority.

I am not going to predict the outcome, and you should be skeptical of anyone who does.

What I can tell you is what a reversal would and would not touch. The installation deadline is the thing at issue. The manufacturing restriction that took effect January 1, 2025 is not being challenged in the same way and is the settled part of this. The AIM Act phasedown schedule is statutory and sits outside this case entirely.

Most importantly for you: the repair and servicing position

described throughout this book does not depend on the outcome. Servicing existing equipment was never restricted by the Technology Transitions rule, under either version.

Other moving pieces

Several smaller adjustments were made alongside the main rollback, which tells you the rule is being actively revised rather than settled.

Retail food and cold storage GWP limits were pushed to January 1, 2032. Compliance for industrial process refrigeration with small charge sizes was postponed to 2030. A proposed rule would exempt road and intermodal container transport refrigeration units from HFC leak repair requirements.

None of those affect your house. They are included here because the pattern matters: this is a regulatory area in motion, and a book claiming otherwise would be the fourth kind of wrong information described in these pages.

How to check any of this yourself

This is the most durable thing I can give you, because it will still work when every specific figure here has aged.

For the equipment restrictions, go to EPA's Technology Transitions HFC restrictions by sector page. It is a table, organized by sector, showing current compliance dates. It is where the sentence that anchors Chapter One appears, and it is updated when rules change.

For the phasedown and allowances, EPA's HFC allowance allocation pages carry the current schedule and the annual allocation notices.

For regulatory history, EPA's regulatory actions page for Technology Transitions lists rules in sequence, which is how you confirm whether what you are reading describes the current rule or a superseded one.

And the single most useful habit: check the date on anything you read about this subject, then check whether the rule it describes is still in force. That two-step would have spared a great many homeowners the wrong version of the 2026 deadline.

What will not change

Worth ending on, because the volatility is not evenly distributed.

The physics do not change. A sealed system does not consume refrigerant, so low charge still means a leak.

The equipment lifespans do not change. Fifteen to twenty years for central AC, shorter for heat pumps that run year-round.

The sizing standard does not change. Manual J, done in your house, with the results shown to you.

The economics of repair versus replacement do not change in their structure, only in their inputs.

And the signals of a contractor worth hiring do not change: licensed, insured, written quote with model numbers, patient with questions, willing to warrant their own labor.

Those are the parts of this book that will still be true when the regulatory chapters need a second edition. Which, given the last three years, they probably will.

Chapter Seventeen: What to Do Monday Morning

Sixteen chapters is a lot to hold. This one reduces the book to the actions that follow from it, organized by the situation you are actually in.

If your system is working

Do nothing about refrigerant policy. Nothing in the current rules asks anything of you.

Change your filter. Inspect it monthly, replace it every one to three months. Book a professional tune-up in spring, before contractors get busy. Keep the outdoor unit clear and treat the condensate drain line.

Find out two things and write them down: how old your system is, from the data plate on the outdoor unit, and what refrigerant it uses. You will want both the next time anyone gives you a quote.

That is the entire list. You are in the position most readers of this book are in, and it requires almost nothing from you.

If your system is not cooling properly

Check the filter first. A clogged filter produces weak cooling, long run times, and even a frozen coil, and ruling it out costs nothing.

If the filter is clean, look and listen. Hissing near the refrigerant lines, oily residue at fittings, ice on the lines or indoor coil.

When you call someone, the question is not “can you add refrigerant.” It is “where is it leaking, and can that leak be repaired in a way that lasts.” Refrigerant is not consumed. Low charge is a condition, not a diagnosis.

Do not run a low-charge system for weeks while you decide. That is how a leak repair becomes a compressor replacement.

If you have been quoted a repair

Get the specific component named. A capacitor is not a compressor.

Ask whether the repair is because the part failed, or because of the refrigerant rules. Component replacement is unrestricted and has no end date. A new R-410A compressor or coil can go into your R-410A system indefinitely. What crosses into new installation is replacing the condenser and coil to-

gether.

Weigh the repair cost against the system's age using Chapter Seven. Under ten years, repair almost always wins. Fifteen and up with a major failure, replacement earns serious consideration. In between, run the numbers.

If refrigerant is on the quote, ask whether the per-pound price includes labor, recovery, and the leak check, and how many pounds the system takes. Those two questions dissolve most of the confusion in this market.

If you are replacing the system

Require a Manual J load calculation, done in your house, and ask to see it. If the proposed size is more than 15 to 20 percent above the calculated load, ask why. If a contractor dismisses Manual J for a rule of thumb, get another contractor.

Get three written quotes with brand and model numbers, permit status, and the labor warranty stated. Compare what is included, not the bottom line. An unusually low bid is a red flag in the same way an unusually pushy one is.

Verify the license. Ask whether technicians are A2L certified. Ask about lead time separately from price, because R-454B supply has stretched some installs to six weeks or more.

Expect R-454B, or R-32 on a ductless system. Do not agonize over which. Installation quality and correct sizing will matter far more over fifteen years than the refrigerant.

Check your utility and state rebates, and do not rely on the federal credit. Section 25C expired December 31, 2025 and 2026 installations do not qualify.

And treat urgency as a warning. There is no deadline requiring you to replace anything.

If you are buying or selling a house

Sellers: gather your maintenance records. Effective age beats chronological age, and documentation is what proves it. If the system is over fifteen, get a contractor quote before you list, so you are anchoring the concession conversation rather than reacting to it.

Buyers: get the real age from the data plate rather than the disclosure form. Ask what refrigerant it uses. Ask for service records and treat their absence as information.

The six sentences

If you remember nothing else.

There is no installation deadline anymore, for systems whose components were made before January 1, 2025.

Repairing and servicing your existing system was never restricted and still is not.

R-410A remains available, increasingly from reclamation, at prices that rise in steps rather than smoothly.

The rule is about a GWP threshold of 700, not about a brand name.

Correct sizing and installation quality will determine your satisfaction far more than which refrigerant you get.

And check the date on anything you read about this subject, because the rules changed three times in three years and most of what is published has not caught up.

A closing thought

The refrigerant changeover is real. Manufacturing did change on January 1, 2025, permanently, and the phasedown to 15 percent of baseline by 2036 is written into statute.

But almost everything sold to homeowners as urgency about this transition has been either outdated or overstated. The deadline that drove the urgency is gone. The repair pathway

was never closed. The supply is not vanishing on any identifiable date.

What you have is a functioning asset, a maintenance routine that keeps it working, a repair pathway that stays open, and a replacement decision you get to make on your own timeline.

That was true before this book and it will be true after. The only thing that has changed is that you can now tell the difference between someone explaining it to you and someone selling to you.

Chapter Eighteen: We Have Done This Before

There is a way to test almost every claim in this book, and it does not require predicting anything. The industry already ran this experiment once, with a different refrigerant, and we can look at how it turned out.

R-22, sold under the brand name Freon, was the standard residential refrigerant for decades before R-410A. It was phased out for a different reason, ozone depletion rather than global warming potential, under a different treaty. But the mechanism was nearly identical: stop manufacturing equipment that uses it, then wind down production of the refrigerant itself, and let the installed base age out.

What happened next is the single most useful guide to what happens with R-410A, because it is history rather than forecast.

The timeline, which took thirty years

This is the first lesson, and it corrects the sense of urgency almost everyone carries.

Manufacturers could no longer produce new equipment designed for R-22 as of 2010. Production and import of the refrigerant itself ended at the close of 2020. One industry source notes that the R-22 phase-out was planned for nearly thirty

years from start to finish.

Ten years between the equipment cutoff and the refrigerant cutoff. Three decades from plan to completion.

Now map that onto R-410A. The equipment cutoff was January 1, 2025. Under the AIM Act schedule, production allowances step down but do not reach their floor until 2036, and even then production does not stop, it drops to 15 percent of baseline.

By the R-22 precedent, we are somewhere near the beginning of a long process, not near the end of a short one.

What happened to the price

Here is the part that should be taken seriously, because it is the strongest argument for not letting an aging system limp along indefinitely.

The numbers vary by source, as they do everywhere in this subject, but the direction and magnitude are consistent.

One account puts R-22 at 5 to 10 dollars per pound before the phase-out, rising to 50 to 100 dollars or more per pound for recovered stock afterward.

Another describes homeowners seeing costs rise from roughly 20 dollars per pound to 150 to 250 dollars per pound over several years.

A third gives reclaimed R-22 at 50 to over 150 dollars per pound depending on region and supplier.

Whatever the exact figures, that is a multiple, not a percentage. And it did not happen on the cutoff date. It happened gradually and then sharply, as production ended and supply narrowed to reclaimed stock alone.

One source draws the conclusion plainly: by 2024, R-22 systems were essentially uneconomical to repair if they needed significant refrigerant.

The pattern, stated as a sequence

Put the R-22 history in order and you get a template.

Equipment manufacturing stops. Nothing changes for owners immediately. Existing systems keep running and keep being serviced.

Refrigerant production winds down on a schedule. Prices begin climbing, gradually at first.

Production ends. Supply becomes reclaimed-only. Prices multiply.

Repairs involving significant refrigerant stop making economic sense. The refrigerant cost, not the rules, is what finally forces replacement.

The installed base ages out over years, and the whole thing ends quietly.

Notice what is absent from that sequence. No date on which servicing became illegal. No moment when owners were compelled to replace anything. No enforcement against homeowners. The transition happened through economics, which is exactly what the sources in Chapter Fourteen describe for R-410A.

Where the analogy holds, and where it does not

Honesty requires naming the differences, because they cut both ways.

R-410A's situation is gentler in one important respect. R-22 production went to zero. R-410A production does not, under current law, go to zero. It steps down to 15 percent of baseline and stays there. A floor above zero means a virgin supply channel persists indefinitely, which R-22 never had after 2020.

It is also gentler in a second respect: the installed base of R-410A equipment is vastly larger than R-22's was at the equivalent point, which means the reclamation stream feeding the aftermarket is correspondingly larger.

But it is harsher in one respect worth flagging. The R-22 transition ran on a fixed endpoint everyone could see coming for decades. The R-410A transition has already had its rules changed three times in three years, with litigation pending. Predictability was one thing R-22 owners had that you do not.

What to actually do with this

Three practical conclusions follow, and they are the reason this chapter earns its place.

First, do not panic about availability. R-22 remained obtainable for servicing throughout, and remains obtainable now, years after production ended. R-410A will too.

Second, do take the price trajectory seriously. The R-22 experience says the cost of feeding an old system can multiply over a decade. A slow leak you tolerate today is a different financial proposition in 2033. That is an argument for fixing leaks, per Chapter Twelve, more than an argument for replacing systems.

Third, watch for the crossover point rather than a deadline. For R-22, the moment that mattered was when a refrigerant-involving repair stopped being economical. That is the moment to watch for with R-410A as well, and it will arrive as a number on a quote, not as an announcement.

The thing worth noticing

One detail from the R-22 era deserves attention because it repeats exactly.

Homeowners could not buy R-22 themselves. It required EPA certification, the same as R-410A does today. Which means that throughout the most expensive phase of that transition, every homeowner's access to refrigerant ran through a contractor, at a price the contractor set, during a period when prices were multiplying and most homeowners had no inde-

pendent way to know what was reasonable.

That is precisely the situation this book exists to correct, one refrigerant later. The best defense then was the same as it is now: understand the actual rules, know what your system needs, ask what a price includes, and work with someone who explains rather than pressures.

The last transition rewarded the informed and penalized the anxious. There is no reason to think this one will be different.

Chapter Nineteen: Efficiency Ratings, and How Much to Pay For Them

Your quote will carry a number like 15.2 SEER2, and somewhere in the conversation a contractor will offer you a more efficient system for more money. This chapter is about whether to take that offer.

What the number means

SEER2 stands for Seasonal Energy Efficiency Ratio 2, a revised efficiency measure set by the Department of Energy. Higher is better: a higher-rated system uses less electricity to deliver the same cooling.

The most useful framing comes from one guide that compares it to a car's combined miles-per-gallon rating. It is an average across a range of operating conditions over a season, not a measurement at a single moment. Your actual result depends on your house, your climate, and how you run the system, exactly as your real fuel economy differs from the sticker.

The 2 matters. SEER2 replaced the older SEER standard using a revised test procedure with higher external static pressure, meant to better reflect real installed conditions. The practical consequence is that SEER2 numbers read lower than the old SEER numbers for equivalent equipment. A system that would have been rated 14 SEER is roughly 13.4 SEER2.

If you are comparing a new quote against the rating on your existing twelve-year-old unit, you are not comparing like with like.

You may also see EER2, which measures efficiency at a single high-temperature condition rather than across a season, and HSPF2, which measures heating efficiency on a heat pump. In a hot climate, EER2 deserves more attention than it usually gets, because it describes performance on exactly the days that matter most.

The regional minimums, which are law

This is the part homeowners do not know, and it has teeth.

The country is divided into efficiency regions, and the southern and southwestern states face stricter minimums than the north. For split-system air conditioners in the South, the minimum is 14.3 SEER2, roughly equivalent to the old 15 SEER standard. You cannot legally install a system below that threshold in those states.

One source raises a warning worth repeating: some retailers still move dead stock of older units, and buying one can mean a local inspector refusing to sign off on the installation. If a deal seems unusually good, confirm the model meets your region's current minimum before anything is installed.

Standards continue to rise, with further increases in minimum requirements scheduled. Anything you buy today will be built to at least the current floor, but the floor is moving upward, which is worth knowing when comparing a new quote against an older one.

Is higher efficiency worth the money?

Here the sources split, and the split is instructive.

The optimistic view comes from manufacturers and many contractors: paying for a higher SEER2 rating is often worth

it if you plan to stay several years, because reduced utility bills offset the higher initial cost over time. Carrier notes that a 20 SEER system is roughly 43 percent more efficient than a 14 SEER one. Another source says the answer is almost always yes.

The more precise view puts numbers on it. One analysis finds that the jump from minimum to mid-efficiency, roughly 14 to 16 SEER2, is usually the best value: about 12 percent less electricity per cooling season for an 800 to 1,500 dollar installed premium.

Read those two together and a pattern appears that neither states outright. The first jump in efficiency is where most of the value is. The premium to go from minimum to mid-tier is modest and the efficiency gain is real. The premium to go from mid-tier to top-tier is much larger, and the incremental gain is smaller.

Efficiency upgrades have diminishing returns. The question is never simply “is higher better,” it is “is this particular step worth this particular price.”

What actually determines your payback

Three variables decide whether an efficiency premium pays for itself, and only one of them is on the spec sheet.

Run hours. A system in Tampa logging 2,200-plus cooling hours a year, or anywhere in the hot South, has far more hours over which to accumulate savings than one in a mild climate. One source makes the point directly: higher SEER2 helps most when cooling runtime is high. In a hot Southern climate running 2,000 cooling hours annually, the mid-efficiency upgrade pays back meaningfully. In a northern climate with a short cooling season, the same upgrade may never pay back.

Your electricity rate. Savings are measured in kilowatt-hours, but paid in dollars. Two identical houses with identical systems have different paybacks if their utilities charge differ-

ently, and rising rates improve the case for efficiency.

How long you stay. A payback period longer than your remaining time in the house is not a payback. If you might move in four years, the efficiency premium is largely a gift to the next owner, and per Chapter Fifteen it does not fully return in the sale price.

The thing the number does not capture

One source makes a point that deserves more attention than it gets: variable-speed equipment improves humidity control more than the SEER2 number suggests on the spec sheet.

That is worth understanding. A single-stage system is either on at full output or off. A two-stage or variable-speed system can run at partial capacity for longer periods, which removes more humidity, holds temperature more evenly, and is quieter.

In a humid climate, that difference may matter more to your daily comfort than the efficiency number that justified the price. And it connects directly to Chapter Nine: an oversized single-stage system short-cycles and leaves the house clammy, while variable-speed equipment is considerably more forgiving of imperfect sizing. Not a substitute for a correct Manual J, but a hedge.

How to decide

Ask your contractor for two or three quotes at different efficiency tiers on the same brand, with the price difference stated plainly.

Then ask the question that makes it concrete: what is the estimated annual savings for this house between these tiers? Divide the premium by the annual savings, and you have a payback period in years. Compare that against how long you plan to stay and against the fifteen-to-twenty-year life expectancy from Chapter Seven.

If the payback is four years and you are staying fifteen, take the upgrade. If it is twelve years and you might move in five, do not.

And if a contractor cannot estimate the annual savings, that is informative in itself. The number is calculable from your climate, your rates, and the equipment specifications, and someone selling you efficiency should be able to quantify it.

Chapter Twenty: The Ductwork, Where Your Money Is Actually Going

You can buy a perfectly sized, high-efficiency system running the newest refrigerant, install it flawlessly, and still lose a quarter of what you paid for before it reaches your rooms.

The Department of Energy estimates that the average home loses 20 to 30 percent of its conditioned air through duct leaks, holes, disconnections, and poor insulation. That figure is repeated consistently across sources, and ENERGY STAR publishes it in its own duct sealing material.

Think about what that means against the efficiency conversation in the last chapter. The jump from minimum to mid-efficiency equipment buys you roughly 12 percent less electricity per season for a premium of 800 to 1,500 dollars. Sealing ducts that are losing 25 percent addresses a larger number, and often for less money.

One source describes it exactly right: duct leakage is the invisible energy drain most homeowners never look at. Another frames the scale as leaving a window open continuously in every room.

How to tell if this is your problem

The symptoms overlap with several other faults, which is part of why it goes undiagnosed.

Rooms that never reach temperature while others are fine.

Uneven comfort across the house is the classic sign, because leakage is rarely evenly distributed.

A system that runs constantly without catching up, while the equipment itself tests fine.

Visible dust accumulation, or dust that returns immediately after cleaning. Leaky return ducts pull air from attics, crawlspaces, and wall cavities, and everything in that air ends up in your rooms.

Utility bills that are high relative to comparable houses nearby.

And the simplest check: look at the ducts you can see, in the attic, crawlspace, basement, or garage. Disconnected sections, crushed flex duct, and sagging insulation are common and visible without tools.

What it costs to fix

The range is wide because the methods differ enormously.

At the low end, accessible do-it-yourself sealing runs 50 to 150 dollars in materials. If your ducts are reachable and the leaks are at visible joints, this is genuinely a weekend project.

Per-leak professional pricing runs around 50 dollars per accessible supply vent, or 50 to 100 dollars and up per leak behind walls, under floors, or in the attic.

Professional sealing of the whole system is quoted at 400 to 1,500 dollars in one source, and 1,100 to 4,000 in another, which likely reflects different scopes and house sizes.

Aerosol-based sealing, which injects sealant into the pressurized duct system to find and close leaks from the inside, runs 1,300 to 3,000 dollars.

Payback is reported as ranging from months to about five years depending on method and severity, which for a home improvement is unusually fast.

One source makes a point that matters for the decision in Chapter Seven: sealing existing ducts often fixes airflow prob-

lems without needing a full duct replacement. If someone quotes you complete duct replacement, ask whether sealing would address the problem first.

Doing it yourself, correctly

ENERGY STAR's guidance is specific, and one instruction is emphatic.

Never use duct tape. Despite the name, it is not durable for this application and fails over time. Use mastic sealant or metal foil tape.

Seal accessible leaks, then insulate the ducts you can reach, particularly those running through attics, crawlspaces, unfinished basements, and garages, where the temperature difference is extreme and losses are largest.

And check the connections where vents and registers meet floors, walls, and ceilings. ENERGY STAR names these as common locations for leaks and outright disconnections, and they are among the easiest to reach.

Most heating and cooling contractors also repair ductwork, so this does not require finding a separate specialist.

Why this belongs in a book about refrigerant

Because it is the clearest example of proportion in this entire subject.

The refrigerant changeover has commanded enormous attention. It generated a deadline that did not survive, price figures that contradict each other by a factor of thirty, and a great deal of urgency aimed at homeowners.

Meanwhile, a quarter of the conditioned air in the average American home is escaping into an attic, and almost nobody is talking about it, because there is no regulation attached and no equipment to sell.

If you are deciding where to put a thousand dollars, the

ducts frequently outperform the upgrade in efficiency tier, and they certainly outperform replacing a functional system out of anxiety about a rule that no longer exists.

One caution

Sealing ducts changes system pressures, and on a system that was already marginal it can occasionally expose other problems: inadequate return air, undersized ducts, or a system that was oversized to compensate for losses it no longer has.

That is not an argument against sealing. It is an argument for having the work done by someone who will measure airflow afterward rather than seal everything and leave.

Which returns, as most chapters here do, to Chapter Eleven. The contractor matters more than the product.

Chapter Twenty-One: Heat Pumps, and Why You Are Being Offered One

Somewhere in the replacement conversation, a contractor is likely to suggest a heat pump instead of a straight air conditioner. This chapter explains what is being offered, because the recommendation is usually sound and almost never explained well.

What a heat pump actually is

A heat pump is a reversible air conditioner. That is the whole concept.

In summer it does exactly what your air conditioner does, pulling heat out of the house and dumping it outside. In winter it runs the cycle backward, pulling heat from the outside air and bringing it in. In cooling mode, a heat pump is an air conditioner. There is no meaningful difference.

The objection everyone raises is that cold air has no heat in it. That is a misunderstanding of thermodynamics rather

than a practical concern. Even air well below freezing contains substantial heat energy, and a heat pump extracts it.

The efficiency consequence is the reason for the whole conversation. A gas furnace burns fuel, and a modern one converts roughly 90 to 98 percent of that fuel energy into heat. Electric resistance heat is 100 percent efficient: one kilowatt-hour in, one kilowatt-hour of heat out. A heat pump does not generate heat at all, it moves it, which is why it delivers 250 to 400 percent: one kilowatt-hour of electricity in, two and a half to four kilowatt-hours of heat out, because most of the energy came from outside rather than from your meter.

Nothing that burns fuel can beat that, because moving heat is simply cheaper than making it.

The cold weather question, settled

The belief that heat pumps fail in cold weather was true of older equipment and is the most persistent outdated idea in this field.

Cold-climate heat pumps are now rated to perform at 15 below zero, with some models operating down to 23 below. One contractor reports a system handling a stretch of nights at 8 below without ever switching to backup heat, with the client’s heating bill dropping 30 percent against their old gas furnace.

Performance does decline in extreme cold, and honest sources say so. At 15 below, a cold-climate unit might deliver 200 to 250 percent efficiency rather than 300 or 400. That is a real reduction, and it still beats electric resistance heat by better than two to one.

So the question is no longer whether they work in the cold. It is what your electricity costs.

Where heat pumps win, and where they do not

This is where the sources are refreshingly specific, and the answer depends on your climate and your utility rates rather than on the technology.

Mild to moderate climates are ideal territory: the Southeast, the Mid-Atlantic, Texas, and the Pacific Northwest, where most of the heating season sits between 25 and 55 degrees and heat pump efficiency is excellent.

Electricity rates change the math decisively. In states with cheap electricity, heat pumps win outright. At high rates, around 24 to 40 cents per kilowatt-hour in places like California, New York, and Hawaii, gas can win on operating cost. If you have solar, the calculation reverses again, because self-generated electricity pushes the marginal operating cost toward zero.

The strongest case of all is a home currently heated by electric resistance, propane, or oil. Switching from those to a heat pump can cut heating bills by 30 to 50 percent, and one source calls it among the most impactful energy upgrades available to a homeowner.

The weakest case is a cold climate, zone 6 or 7, with a sound gas connection, good venting, and a relatively new furnace. Replacing working high-efficiency gas equipment to chase heat pump efficiency rarely pays.

The argument that applies to most readers of this book

Here is the point most relevant to someone replacing an aging air conditioner.

If you are replacing cooling equipment anyway, a heat pump gives you heating as well, for a smaller premium than you would think, because you are already paying for the outdoor unit, the coil, and the installation labor. One source puts it di-

rectly: the cooling performance is identical, the installed cost is competitive once you account for the furnace you would otherwise eventually need, and efficient heating comes along with it.

The gap narrows even further if both your furnace and your air conditioner are aging, because a heat pump replaces two machines with one.

For rough numbers in 2026 on a 2,000 square foot home: a gas furnace runs 3,500 to 7,500 dollars installed, a ducted air-source heat pump 5,000 to 12,000, and a cold-climate heat pump 7,000 to 15,000.

Backup heat, in plain terms

Heat pump quotes include a backup arrangement, and there are three approaches worth knowing.

Dual-fuel, also called hybrid, pairs the heat pump with a gas furnace. The heat pump handles heating down to a balance point, often between 25 and 35 degrees, then the furnace takes over. This captures heat pump efficiency for most of the season, commonly 70 to 95 percent of heating hours, while keeping gas as a safety net for the coldest stretches. It is the most common way homeowners transition without replacing everything at once, and it is the standard recommendation for climate zones 6 and 7.

Electric resistance backup uses strip heaters in the air handler. Cheap to install, expensive to run, and appropriate only when the heat pump covers the large majority of heating hours anyway. Many installations keep a small strip heater for a handful of extreme days a year, which is standard practice and costs little when genuinely used that rarely.

Sizing a cold-climate heat pump to carry 100 percent of the load at design temperature is the newest approach, eliminating backup entirely. It requires the load calculation from Chapter Nine to be right, because there is no second system

to hide an error.

What to plan for

A heat pump retrofit is more involved than swapping an air conditioner.

Expect two to four days of work, plus possibly a day for an electrical panel upgrade. Between permits and scheduling, four to eight weeks from quote to completion is realistic. That argues for planning rather than waiting for a failure, which is the same conclusion Chapter Seven reached for different reasons.

One cost item that rarely appears in comparisons: if you go fully electric and cancel gas service, you stop paying the fixed monthly connection fee, typically 15 to 30 dollars whether you burn any gas or not. Over fifteen years that is a few thousand dollars that no fuel-cost comparison captures.

A word about the incentive claims

Be careful with what you read here, and this connects directly to Chapter Ten.

Several 2026 sources discussing heat pumps still describe the federal Section 25C credit as available, some framing its expiration as an upcoming deadline that should factor into your timing, one even citing a 2,000 dollar credit as part of a fifteen-year cost comparison.

That credit expired December 31, 2025. It does not apply to a 2026 installation. Any cost comparison that includes it is overstating the heat pump’s case by exactly that amount.

What remains are state and utility rebates, plus the HEAR and HOMES programs described in Chapter Ten. Those are real and worth pursuing. The federal credit is not.

Where the refrigerant fits

Everything in this book applies to heat pumps as well as air conditioners. They use the same refrigerants and fall under the same rules. Your new heat pump runs R-454B or R-32.

One difference matters, and Chapter Seven covered it: heat pumps run year-round, so their calendar life is shorter, commonly 10 to 16 or 12 to 17 years against 15 to 20 for a cooling-only system. More run hours means more wear. It is not a defect, it is arithmetic, and it belongs in any cost comparison over a fifteen-year window.

Chapter Twenty-Two: When It Dies in August

Everything in this book assumes you have time to think. This chapter is about the situation where you do not.

It is a hundred and two degrees, the house is getting warmer by the hour, a technician is standing in your living room, and the number he has just said is larger than you expected. Whatever you decide in the next twenty minutes will cost you thousands of dollars, and you are deciding it while uncomfortable, rushed, and without a second opinion.

This is the single worst set of conditions under which to make a large financial decision, and it is how an enormous number of these decisions get made.

Why the emergency is expensive beyond the emergency

The direct costs are obvious: after-hours rates, weekend calls, whatever premium attaches to same-day service.

The indirect costs are larger and less visible.

Contractor availability tightens sharply in peak season, so you may not be able to get three quotes. You may not be able to get two. Whoever can come today has substantial leverage over whoever cannot come until Thursday.

Equipment choice narrows to what is in stock. The efficiency comparison from Chapter Nineteen and the sizing conversation from Chapter Nine both require options, and an emergency offers whatever is on the truck or in the warehouse. Lead times stretch in high demand, which as Chapter Six noted has been a real constraint on R-454B equipment.

And you cannot comparison shop while your house is at ninety degrees. That is the actual mechanism. The pressure is environmental, not rhetorical, and it does the sales work without anyone applying a tactic.

One source describes the consequence accurately: emergency replacement during peak heat leaves limited scheduling options, higher stress, and less time to compare equipment or consider financing, forcing a quick decision rather than an informed one.

The honest disclosure about this chapter's sources

Almost everything written about emergency HVAC decisions is written by HVAC contractors. They are also the people who sell emergency service, next-day replacement, and financing.

That does not make their advice wrong. Much of it is sound, and they have seen this situation more than anyone. But it does mean the advice consistently arrives with a direction, and the direction is usually toward replacement, usually today, usually financed.

Read it knowing that. At least one contractor source is candid enough to name the problem from the inside, warning that some contractors use late-summer heat waves to deploy high-pressure tactics, pushing homeowners into rushed replacements without explaining the options.

When an industry warns you about itself, that is worth listening to.

What to do in the first hour

Before any decision, establish what actually failed. Chapter Twelve's question applies with more force here, not less: what is the specific failure, and is it repairable?

There is a real difference between a blown capacitor, a failed contactor, a seized compressor, and a leaking coil. The first two are relatively inexpensive parts that fail commonly, particularly on older units forced to run continuously through a heat wave. One contractor describes exactly that pattern: components that cannot shed heat fast enough during sustained operation, leading to locked compressors and blown capacitors.

A capacitor is a repair. A locked compressor on a seventeen-year-old system is a replacement conversation. Do not let the two blur together under the pressure of the moment.

Ask for the diagnosis in writing before agreeing to anything, even a repair. It takes two minutes and it changes the conversation.

The bridge decision nobody mentions

Here is the option that rarely gets offered, and it deserves to be on the table.

If the failure is repairable but the system is old, you can repair it now and replace it later, deliberately, in a shoulder season.

The case against is straightforward and one source states it plainly: paying heavy labor costs to patch a failing unit just to get through a few more weeks of heat rarely offers good long-term value, and in cases of major failure immediate replacement is usually the right path.

That is true for a major failure. It is not automatically true for a minor one. A four-hundred-dollar repair in August that lets you buy a properly chosen system in October, with three

quotes, a real load calculation, and no one waiting in your living room, can easily be worth four hundred dollars.

The way to evaluate it is to ask the contractor directly: will this repair reliably get me through the season? A straight answer to that question is one of the better tests of who you are dealing with.

On financing, carefully

Financing will be offered, and approval often takes minutes, with same-day or next-day installation following immediately because the lending platform sits inside the contractor's own system.

That convenience is real, and so is the pressure it creates. An approval that takes minutes removes the last natural pause in the process.

The legitimate argument for financing in a true emergency is about liquidity rather than cost. As one source frames it, emptying your savings to replace a dead air conditioner in August, just as other expenses land, leaves you exposed if something else breaks the following month. Paying reasonable interest to keep your emergency reserve intact can be a fair trade.

Two cautions belong alongside that.

First, the interest is a real cost, and promotional terms often convert to a much higher rate after an introductory period. Ask what the rate becomes, and what happens if the balance is not cleared in time.

Second, and more important: financing makes a larger purchase feel manageable, and a monthly payment is a poor way to evaluate whether you are buying the right system. The sizing, efficiency tier, and contractor quality questions from earlier chapters do not become less important because the price is spread out.

Every honest source on this subject includes the same line,

and it is the right one: walk away from high-pressure tactics, whatever the financing terms.

The real answer: do not be here

The genuinely useful advice about emergency replacement is about avoiding it, which is unhelpful in the moment and valuable every other week of the year.

The recommended windows are consistent: spring, roughly March through May, and fall, September through October. Demand is lower, scheduling is flexible, and you can compare equipment without pressure.

The stakes scale with your climate. In North Texas, summers can bring forty to sixty days above a hundred degrees, which is sustained strain on aging equipment and a long window in which a failure is genuinely dangerous rather than merely uncomfortable.

Combine that with Chapter Seven's lifespan data and the planning rule is simple. Once your system passes fifteen years, stop waiting for it to fail and start deciding when to replace it. Get a quote in a shoulder season with no urgency attached. You are not committing to anything by knowing the number.

And the maintenance from Chapter Thirteen is what keeps the choice yours: a spring inspection that catches a developing problem is the difference between choosing a replacement date and having one chosen for you.

If you are in it right now

A short list, for the situation itself.

Get the specific failed component named, and the diagnosis in writing.

Ask whether a repair would reliably carry you through the season.

If replacement is genuinely necessary, still ask for the load

calculation, still ask for model numbers, and still ask what the labor warranty is. These take minutes and they are the questions that matter over fifteen years.

Ask what the financing rate becomes after any promotional period.

And if anything about the interaction relies on urgency rather than on the failure itself, remember that the heat is creating the pressure, not the contractor, and that the same house will still be there tomorrow when a second opinion arrives.

Being hot is miserable. It is not, for most people in most situations, an emergency in the medical sense, and it is worth being honest about which one you are in. If there are seniors, small children, or anyone heat-sensitive in the house, the calculation genuinely changes and speed matters more than savings. If it is you and a dog and a bad afternoon, you have more time than the moment suggests.

Appendix A: The Timeline, in One Place

Every date that matters, in order, with what it did.

October 2023 — The Technology Transitions Rule. EPA finalized restrictions on high-GWP hydrofluorocarbons across aerosols, foams, refrigeration, air conditioning, and heat pumps. For residential AC and heat pumps, the threshold was set at 700 GWP, with prohibitions on manufacturing, distribution, sale, installation, import, and export beginning January 1, 2025.

December 2023 — The interim final rule. EPA allowed inventory of higher-GWP equipment manufactured or imported before January 1, 2025 to be installed until January 1, 2026. This is the deadline that entered public consciousness and never left it.

June 2024 — Reconsideration granted. EPA granted reconsideration of four administrative petitions.

January 1, 2025 — The manufacturing cutoff, and it

stands. Manufacturers and importers could no longer produce or import new residential and light commercial AC and heat pump equipment designed for refrigerants above 700 GWP. This part of the rule was not rolled back and remains in force.

March 12, 2025 — Enforcement memorandum. EPA's Office of Enforcement and Compliance Assurance directed that HFC enforcement focus on unlawful import and subsequent sale.

September 30 / October 3, 2025 — The proposed rule. EPA proposed removing the installation compliance date for residential and light commercial equipment, citing supply chain problems. An enforcement statement accompanied the proposal, deprioritizing federal enforcement of the installation prohibition.

December 31, 2025 — Federal tax credits expire. Section 25C, the Energy Efficient Home Improvement Credit, and Section 25D, the Residential Clean Energy Credit, both ended for property placed in service after this date, under the One Big Beautiful Bill Act signed July 4, 2025.

May 26, 2026 — The installation deadline is removed. EPA issued the final reconsideration rule. There is now no installation compliance date for systems where all specified components were manufactured or imported prior to January 1, 2025.

2026 onward — Litigation. Commonwealth of Massachusetts and other states v. EPA is pending in the D.C. Circuit, challenging the rollback.

The allowance schedule, which is statutory and separate from all of the above:

- 60 percent of baseline through 2028
- 30 percent of baseline, 2029 through 2033
- 20 percent of baseline, 2034 through 2035
- 15 percent of baseline, 2036 onward

Other sector dates worth knowing: VRF equipment made before January 1, 2026 is installable until January 1, 2027, or until January 1, 2028 with a permit approved before October 5, 2023. Retail food and cold storage GWP limits moved to January 1, 2032. Industrial process refrigeration with charge sizes of 100 pounds or less moved to 2030.

Appendix B: Questions to Ask, by Situation

When a technician says you are low on refrigerant

- Where is it leaking?
- Can that leak be repaired in a way that lasts?
- What did you use to find it?
- Will the system be pressure-tested before it is recharged?

When you are quoted a recharge

- How many pounds does my system take?
- Is this a top-up or a full charge?
- Does the per-pound price include labor, recovery, and the leak check, or is labor billed separately?

When you are quoted a repair

- Which specific component failed?
- Is this being replaced because the part failed, or because of the refrigerant rules?
- Can I have the diagnosis in writing?

When you are quoted a new system

- Will you run a Manual J load calculation in the house, and may I see the results?
- What size does the calculation call for, and what size are you proposing?
- What are the brand and model numbers?

- Is the permit cost included?
- What is the labor warranty, in writing?
- What is the lead time on this equipment?
- Are your technicians certified on A2L refrigerants?
- What is the estimated annual savings between this efficiency tier and the next one down?

When you are offered financing

- What is the interest rate?
- Is it promotional, and what does it convert to?
- What happens if the balance is not cleared before the promotional period ends?

When you are buying a house

- What is the manufacture date on the outdoor unit's data plate?
- What refrigerant does it use?
- Are there service records?

When you are selling a house

- What does a replacement actually cost, per a written contractor quote?
- What do my maintenance records show about the system's condition?

Appendix C: The Numbers Other People Published

This appendix exists because the disagreement is the point. Every figure below appeared in material published in 2026, and the conflicts are why several chapters of this book are necessary. None of these are this book's estimates.

R-410A, cost per pound

Reported figure	What it appears to measure
$4–8	Wholesale, contractor’s cost
$40–75	Billed to homeowner
$40–90	Billed to homeowner, installed
$50–80	Mixed
$80–150	Installed, bundling labor and recovery

A three-ton system holds roughly 6 to 12 pounds.

New system equipment premium, R-454B versus prior generation

Reported figure	What the source attributes it to
About the same	Equipment widely available; no material increase
8–10 percent	Equipment prices against the outgoing generation
10–20 percent	Sensors and redesigned compressors
15–25 percent	Redesigned coils, cabinets, controls, leak detection
15–30 percent	Leak detection sensors and updated certification

Installed system cost, 2026

Reported figure	Scope
$5,200–10,300	Central air installation
$7,750–16,000	2,000 sq ft ducted heat pump, July 2026
$3,500–7,500	Gas furnace
$5,000–12,000	Ducted air-source heat pump
$7,000–15,000	Cold-climate heat pump

Leak detection and repair

Reported figure	Scope
$100–330	Detection only
$150–600	Detection only
$200–1,500	Find, fix, and refill
$250–1,600, averaging $800	Find, fix, and refill
$2,000–3,500	Coil replacement plus 8 lb refill, 4-ton system

Equipment lifespan

Reported figure	Equipment
15–20 years	Central air conditioner
15–25 years	Gas furnace
10–16 years	Heat pump
12–17 years	Heat pump
10–20 years	Heat pump

Seller concessions on an aging system

Reported figure	Scope
$4,000–8,000	Closing credit, system over 15 years
$10,000–18,000	Concessions requested, system 16–20 years

Duct sealing

Reported figure	Scope
$50–150	DIY, accessible
~$50 per vent	Professional, accessible
$400–1,500	Professional, whole system
$1,100–4,000	Professional, whole system
$1,300–3,000	Aerosol-based sealing

Appendix D: Where to Check This Yourself

The specific figures in this book will age. The method for checking them will not.

For the equipment restrictions. EPA's Technology Transitions HFC restrictions by sector page presents a table organized by sector showing current compliance dates. This is where the sentence underpinning Chapter One appears, and it is updated when the rules change.

For the regulatory history. EPA's regulatory actions page for Technology Transitions lists the rules in sequence. This is how you determine whether something you are reading describes the current rule or a superseded one.

For the phasedown and allowances. EPA's HFC allowance allocation and reporting pages carry the schedule and the annual allocation notices.

For the underlying law. The American Innovation and Manufacturing Act of 2020, and the implementing regulations at 40 CFR Part 84.

For tax credits and rebates. IRS guidance for Section 25C and Form 5695 for prior-year claims. For current programs, your state energy office for HOMES and HEAR status, and your electric utility's own website for rebates, which are frequently the largest remaining incentive and the easiest to claim.

For efficiency standards. Department of Energy regional minimum efficiency standards, which differ between the North, South, and Southwest.

The two-step habit. Check the date on anything you read about this subject. Then check whether the rule it describes is still in force. Those two steps would have spared a great many homeowners the wrong version of the 2026 deadline, and they will work equally well on whatever changes next.

Sources

The regulatory content of this book is drawn from primary sources: the Environmental Protection Agency's own published rules, fact sheets, sector restriction tables, and enforcement statements, together with the text of the American Innovation and Manufacturing Act of 2020 and its implementing regulations.

Secondary sources are treated differently here than in most books, and the distinction is worth stating plainly.

Where this book cites trade publications, contractor websites, cost guides, and manufacturer materials, it does so in two ways. Sometimes they are the best available source for a practical figure that no government agency publishes, such as what a leak repair costs or how long equipment lasts. And sometimes they appear as evidence of the problem itself: Chapters Five, Six, and Ten exist because published sources contradict each other or describe rules that have since

changed, and the contradictions are quoted so that readers can see the range rather than be handed a single confident number.

No figure in this book was invented, averaged, or smoothed to look tidier than the underlying material. Where sources disagree, the disagreement is shown.

Regulatory material was verified against EPA's own current publications rather than against summaries of them. Cost and market figures are reported as published by their sources, with the scope stated wherever the source stated it, and flagged wherever it did not.

About the Author

Maurice Johnson writes practical field guides for homeowners, landlords, and buyers navigating rules that changed without much warning. His books share a method: find a real, dated change, read the primary documents rather than the coverage of them, and explain what it actually means for the person who has to make a decision.

He lives in East Texas.

Other titles include *The Landlord's Cost Map*, a state-by-state account of what a rental property actually costs to hold, and field guides to the ROAD to Housing Act and the 2026 condominium financing overhaul.