BY THE NUMBERS **15,000,000** Temperature measurements recorded **291,000** Btu/hr. of cooling tested **250** Testing hours

systems, 16 for split and split ductless. The higher the SEER (numbers range from 13 to 21), the more efficient the model. The credit covers parts and labor. Utility rebates are available but can affect your tax credit.

Energy Star-qualified window air conditioners won't get you a federal tax credit, but we found some utilities offering rebates of between $30 and $150.

Doing it right

Getting the wrong size is the most common mistake people make, regardless of the type of cooling system. Underestimate your cooling needs and you could be sweating and have higher electric bills, but buy more Btu/hr. and you'll have a cold, damp space. Consider our tips for these scenarios:

Upgrading your central air. Don't automatically buy the same-sized system. Any changes you've made to improve your home's energy efficiency, such as replacing windows or adding insulation, can reduce your cooling needs. On the other hand, if you've added rooms, you might need more cooling. So have your contractor do a load calculation based on a recognized method, such as Manual J from the Air Conditioning Contractors of America (ACCA). The contractor's evaluation should include whether your ducts need to be resized, sealed and insulated, or replaced. Remember that an indoor evaporator coil and outdoor condenser must be a matched set, or the performance, efficiency, and capacity claims might not be accurate.

Adding central air. After the required cooling capacity has been determined, focus on installation. Adding a central system is relatively straightforward if you already have ductwork for your heating. Your contractor should use a duct-sizing method such as ACCA's Manual D and make sure there are enough supply registers to deliver sufficient air to the right spots. Leaky or uninsulated ducts can reduce system efficiency considerably. But if your home doesn't have ducts, adding them can be expensive and messy. Consider a split ductless system instead.

Sticking with window units. Energy Star-qualified models use about 25 percent less electricity than those made before late 2000. Use the savings calculator on the room A/C page at *www.energystar.gov* to see if replacing your unit makes sense. Determine the right size by using our A/C sizing calculator at *www.ConsumerReports.org*.

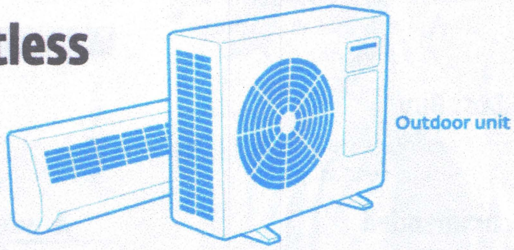
Ratings on next page

ILLUSTRATIONS BY JASON LEE

Two more options

Split ductless

$900 to $2,500



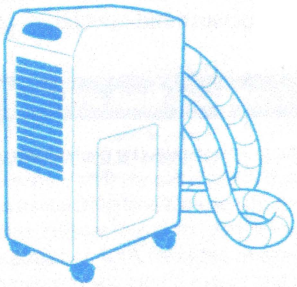
Split ductless systems are similar to central air. They have an outside condenser and one to four indoor units with blowers mounted high on the wall. Tubing connects the parts and circulates refrigerant. The tubing, along with an electric and drain line, is run through a 3-inch hole hidden behind the indoor unit. Each indoor unit cools the room it's installed in and has its own remote control. Unlike central systems, split ductless systems need no ductwork, making them easier to add to homes without existing ducts.

We tested the Sanyo KS-1271 and LG LS122CE, both around $1,000, and the $1,200 Mitsubishi MS-A12WA. All of them have a single indoor unit, did an excellent cooling job, and were much quieter than window air conditioners, indoors and out. When they were set on low, they were barely audible. The Sanyo and Mitsubishi handled brownouts with ease. The systems we tested were about 12,000 Btu/hr., enough to cool roughly 650 square feet. The Sanyo is the most energy efficient, with an SEER, or seasonal energy-efficiency ratio, of 17. They all use R-410A, an eco-friendly refrigerant.

Bottom line. Split ductless systems are more expensive than window air conditioners, and professional installation is recommended, but it's a way to add cooling without tearing up walls to install ducts. Qualified systems with an SEER of 16 or higher earn you a federal tax credit of 30 percent, up to $1,500, on parts and labor, which can help defray their higher cost. If you have a large home, you might need more than one condenser, upping the cost.

Portables

$300 to $700



If your room has only one window or if window units aren't allowed in your building, a portable air conditioner might seem like an ideal solution. But our tests found that portables weren't as good at cooling as manufacturers claim, they're pricey, and they use more energy than similarly sized window units do.

Even models with dual hoses, which vent through a window, weren't impressive. One hose brings air in from the outside to cool the condenser, and the other hose takes the air back outside. The $650 Friedrich P12B and $680 DeLonghi PAC T110P did a slightly better job cooling off our test chamber than the single-hose models we tested, but their performance fell far short of similar-sized window units.

Bottom line. Choose a window unit over a portable, unless a portable is your only option. Then choose a dual-hose model. But even those models produced less cooling than they claimed in our tests; they didn't cool the room to our required temperature. And rolling 85-pound "portables" around on carpeting isn't for weaklings.