

Energy efficiency is easier than ever

I've been writing about residential energy-efficiency measures for more than 25 years, ever since I was hired as an assistant editor at the *Journal of Light Construction* in 1999. Recently I wondered, "What's changed during those 25 years?" The answer, as it turns out, is "a lot."

My conclusion contradicts a recurrent theme in newspaper stories on U.S. residential construction—namely, that our industry is stuck in the mud, still building houses the old-fashioned way. The authors of these articles often point out, accurately, that most U.S. homes aren't delivered by truck from a factory; instead, they're mostly site-built out of framing lumber, much as they were in 1960.

But if you are one of a subset of builders or homeowners who cares about energy efficiency and environmental responsibility, you'll find that the specifications for a home in 2024 are much different than they were in 1999.

Some specifications for energy-efficient construction haven't changed much. For example, back in 1999, many New England builders were building extra-thick walls to accommodate more insulation; installing a thick layer of cellulose insulation on attic floors; choosing among various brands of triple-glazed windows; get-

ting ready for a blower-door test by performing air-sealing work; and specifying the installation of a heat-recovery ventilator. For energy-conscious builders in cold climates, these details remain common today.

However, the following residential features that are now quite common didn't exist (for the most part) back in 1999.

Home EV chargers

In many areas of the U.S., builders are becoming accustomed to installing a 240v circuit in the garage for an electric vehicle charger. Back in 1999, electric cars were still quite rare—and if you ever saw an electric car, there was a good chance it was hand-built by a tinkerer.

LED fixtures and bulbs

If you cared about energy efficiency back in 1999, you probably installed compact fluorescent lamps (CFLs) in most of your fixtures. CFLs were a mixed blessing: They were efficient and affordable, but they contained poisonous mercury, so broken bulbs had to be disposed of carefully.

In the late 1980s, researching lighting options for my off-grid home, I looked into some of the earliest available LED lamps. I ended up buying a funky, handmade 12v light fixture assembled from an array of orange LEDs. Back then, LEDs

able to produce white light were not yet available. (I still have this antique LED fixture; I use it as a night-light.)

When LED lamps that produced white light finally became available in the late 1990s, they were quite expensive, of course. Now they are ubiquitous and cheap.

Compared to CFLs, LED lamps are better in every way. They produce more lumens per watt, they are less fragile, and they last longer than CFLs.

an installed residential system PV system—12%, on average, according to the Energy Sage website.)

Back in 1999, the only people who had residential PV systems were very wealthy experimenters and off-grid hippies who used almost no electricity (and therefore needed only one or two PV modules). Times have changed. These days, a homeowner who borrows money to install a rooftop PV system will probably save

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Large photovoltaic arrays

According to a website called Our World in Data, the average price of a PV panel, in constant 2021 dollars, has dropped from \$6.29 per watt in 1999 to \$0.26 per watt in 2023. In other words, the cost dropped by a factor of 24. (Of course, then as now, the cost of PV modules makes up only a small percentage of the cost of

more money each month in lower electricity bills than the monthly loan payment for the PV system.

Residential induction ranges

In 1999, residential induction ranges were expensive and rare. These days, the percentage of new home buyers who choose an induction range is