

Award-Winning Coverage of Sustainable Construction, Products and Lifestyles

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CIRCULAR THINKING

This year's selection of sustainable-minded Eco-Leaders puts the Circular Economy at front and center. Can the right focus on EPDs, ESGs, Cradle-to-Cradle and other criteria raise the bar on building performance?



High priorities. With home renovations, preference sometimes needs to take a back seat to necessity. In the long run, ignoring mandatory fixes like a bad roof or damaged siding will cost more than not updating flooring or remodeling a kitchen. CREDIT: COURTESY OF RENNETT STOWE/FICKR

MILLENNIALS

ROADMAP TO RENOVATIONS

While new homeowners dream of renovating their home into a model of sustainability, they sometimes bump into the reality that fixing a leaky roof takes priority over installing solar panels and an EV charger.

BY MICHELE LERNER

The frenzied housing market of recent years led many buyers to make a split-second decision on a home that needed some work, often without an inspection. Among buyers who purchased a home in the past two years, 75 percent said they had at least one regret, according to a February 2022 [survey by Zillow](#). Among the biggest regrets: buying a fixer-upper that needed immediate and costly repairs. Renovation experts can help those unhappy homeowners work through projects in the smartest order while balancing their finances, aspirations, and sustainability.

“The homeowners’ intention for how long they will stay in the house drives all our advice,” says Michael Winn, owner of Winn Design + Build in McLean, Virginia. “For instance, some things like a [metal roof](#) are significantly more costly to build but have a longer life span and are more sustainable than an asphalt roof. But if someone plans to move in a few years, that investment may not make sense.”

Renovation experts can help homeowners understand the return on investment of sustainable choices for their home improvement projects, such as reduced utility bills, higher resale value, and resilience to the impact of climate change.

On the flip side, contractors and architects will need to remember that most homeowners, especially if they just purchased an older home, don’t have an unlimited budget and will need to make tradeoffs.

“Anything new you install will be an improvement on an older home and older systems,” says Jim Kitchin, owner of InterWorks, a home renovation and remodeling company in Portland, Oregon. “But once homeowners decide which upgrades are the most important, they often want to go a little above the standard level to achieve higher levels of efficiency.”

An important element of sustainability is smart planning. Failure to carefully consider all aspects of a job can be costly for the customer, which can mean definite dissatisfaction with the renovator, and a possible blow to their good reputation. It can also harm the environment.



Dream home. Many first-time homebuyers opt for existing houses which require upgrades or repairs. Renovation experts can help buyers tackle those projects in the smartest order by incorporating price, sustainability and return on investment (ROI).

"If you don't do something right the first time, you end up redoing it and the materials you used the first time end up in the dump," says Neil Bubel, president of Traver Construction, Inc. in Dallas. "Limiting rework is good for the environment and the pocketbook, so it pays to develop a master plan area by area, and system by system, even if it takes 10 years to complete."

WHAT HOMEOWNERS NEED

Most homeowners are tempted to start with projects they're passionate about, such as a kitchen remodel or a solar panel installation. But if they don't take care of immediately necessary updates and repairs, they expose themselves and their home to potential damage. Depending on the home, "must-do" projects may include:

• NEW ROOF.

A leaky roof must be repaired or replaced before it causes more costly interior damage to a home. Replacing a section can be more cost effective and reduces materials going to a landfill, says Bubel.

Again, the financial element calls the shots, and renovators have to work with their clients as to what should—and can—be done first. "You have to balance the tradeoff between durability and money," says Kitchin. "We recommend concrete tiles or a metal roof because they last years longer than the standard composite roof, but those are more-expensive options."

• BETTER INSULATION.

American energy expert [Amory Lovins](#), chairman emeritus of the Rocky Mountain Institute, says improving energy efficiency is the most effective way to combat climate change. One of the most economical methods to improve efficiency is insulation. Closing penetrations to the house and adding more insulation on top of existing insulation in the attic can make a huge difference, especially in an older home, says Bubel. The payback is lower utility bills and a more comfortable home.



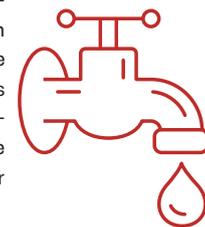
• NEW HVAC.

Replacing the HVAC system is a more expensive upgrade, but it will have a big impact, especially when you're replacing a system that relies on increasingly costly fossil fuels. "Homeowners concerned about minimizing their carbon footprint may be interested in going to an electric ductless mini-split system," says Kitchin.

Bubel suggests that repairing an already energy-efficient HVAC system may be a better option, as it helps avoid putting adequate equipment in a landfill. "The sweet spot for an HVAC system in terms of cost and value is [roughly] an 18-SEER system. This is likely to be more energy efficient than an older system, yet not as expensive as a 23-SEER system," says Bubel. "You also may want to consider adding a [zoned system](#) for greater efficiency."

• UPDATED PLUMBING.

First, inspect the house for leaks or other plumbing issues. Installing leak and water usage sensor systems such as [Phyn Plus](#), which automatically shuts off the water if a leak is detected, can save water and prevent damage to the home. Bubel also recommends replacing fixtures and faucets to save water. And, check the condition of existing copper or galvanized plumbing pipes. Because water tends to be chlorinated and sit longer in pipes, consider [CPVC](#) or PEX piping as replacement alternatives.



• SMART THERMOSTAT.

A smart thermostat is an inexpensive add-on to any existing system that provides the benefit of monitoring and managing energy use, says Bubel.

• VENTILATION SYSTEMS.

Tighter homes need bath fans and range hoods, preferably quiet ones that the homeowners actually use. An energy recovery ventilation (ERV) system may be considered to ensure fresh air is circulating in the house. But that can be an expensive option to retrofit, Bubel says.

- **HYBRID ELECTRIC HEAT PUMP WATER HEATER.**

These models are extremely efficient, says Winn, who is nudging his clients towards remodeling to an all-electric home. One caveat, says Bubel, is that they're typically taller and wider than traditional water heaters, which may make them more difficult to install.

- **UPDATED WIRING.**

Overhauling the wiring in a home can be a costly endeavor, but it's a safety and efficiency issue, says Kitchin. If the walls of the house are open for a remodel, that can also be an ideal time to update the wiring.

WHAT HOMEOWNERS WANT

Once the necessities have been addressed, homeowners can turn to their wish list for upgrading their home and make sustainable choices:

- **KITCHEN REMODEL.**

Discussing the benefits of an all-electric house is ideal at the beginning of a kitchen remodel, says Winn.

- **APPLIANCES.**

All-electric, ENERGY STAR appliances, including an induction cooktop, are recommended. "The annual cost of an all-electric home may be higher, and you may not get an immediate return on investment, but it's the right thing to do socially," says Winn.

- **COUNTERTOPS.**

Countertop options such as [Cambria](#), Caesarstone and Durat are sustainable choices to consider. Some brands use more recycled content than others, says Kitchin, so you want to be careful of which manufacturers you choose.

- **CABINETS.**

Most manufacturers now use low- or no-VOC adhesives and paint. A lot fewer use no-formaldehyde products. In fact, greenwashing—where a company spends more time marketing itself as environmentally friendly than on actually minimizing its environmental impact—is common in this category of green products. Companies with a reputation for green materials don't always live up to their hype. IKEA, for example, gets numerous complaints after the fact about the powerful odors from its particle board



Double duty. Hybrid electric heat pump water heaters use the surrounding warm air to heat water. They also offer premium features such as a user-friendly display, vacation mode, and Internet of Things (IoT) capabilities that allow unit monitoring and control from anywhere.

CREDIT: COURTESY OF AARON HEADLY/FICKR

Estimating a Renovation's ROI

While new homeowners may not be thinking about resale value, it should be part of the renovation calculation. The "best" return on investment (ROI) for renovation projects depends on the condition of the home, the location, the price range, and the homeowner's budget. [The Remodeling 2022 Cost vs. Value Report](#) offers insight into which projects are likely to have the highest return on investment based on the cost and estimated additional resale value.

For example, replacing vinyl windows costs an average of \$20,482, with an estimated ROI of 67 percent when the home is sold. Wood windows cost more at an average of \$24,388, with an ROI of 66 percent.



Peak performance. The return on investment (ROI) for renovation projects varies based on the home's condition, location, price, and the homeowner's budget. In this case, a homeowner opted for vinyl-framed windows because of their greater ROI vs. wood.

Installing a new asphalt shingle roof costs an average of \$31,535, with an ROI of 60 percent. Installing a steel roof, which costs an average of \$51,436, has an ROI of 55 percent. However, that doesn't take into account the longevity and durability of a steel roof.

Solar panels cost an estimated \$15,000 to \$25,000 before any tax incentives are applied, according to the [Center for Sustainable Energy](#). Homes with solar panels sell for an average of 4.1 percent more than similar homes without them, according to a 2019 [study by Zillow](#). The ROI for homeowners also depends on their savings on their utility bills while they own the home. So, for example, a \$300,000 home with [solar panels](#) might resell for \$12,000 more than one without, about enough to cover the price of installation. That's a 100 percent ROI. Keep in mind, however, that the homeowner has been "repaid" every month with lower utility bills. If the tenure of the occupants is long enough, the panels could have an ROI of 200 percent or more.



Start cooking. A homeowner's list of desired upgrades—after the mandatory improvements—includes kitchen elements such as an induction cooktop, reclaimed wood cabinets and granite countertops. Here, it took the owner four years, but he finally completed an "environmentally perfect" kitchen. CREDIT: COURTESY OF JUHAN SONIN/FICKR

type products. "It's important to think holistically about the lifecycle of a product—not just where it comes from, but how durable it is—and whether it can be recycled when it will be replaced," says Winn.

Winn suggests choosing locally sourced and fabricated cabinets for greater sustainability benefits. "If you're trying to save money on a lower-cost cabinet, you need to find out what it's made of and whether it's a low-VOC and low-formaldehyde product," says Kitchin.

• BATHROOM REMODEL.

The EPA's WaterSense label certifies that a fixture meets efficiency and performance standards. A bathroom remodel is also a good time to add water monitoring devices such as the *Phyn Plus* system that can learn your usage and help you save water, Winn suggests.

"Some of the digital products out there can reduce water waste and the power used to heat the water," says Winn. "For example, Kohler has a programmable thermostat to set the shower temperature with individual settings ahead of time."

Bubel recommends picking environmentally friendly tiles such as those made of porcelain, which contain fewer chemicals..

• FLOOR REPLACEMENT.

While luxury vinyl plank (LVP) and luxury vinyl tile (LVT) are durable and economical products, they're vinyl and often made overseas, making them among the least sustainable products, Kitchin says.

"The greenest flooring is still wood if it's sustainably harvested as close as possible to the house," says Winn. "FSC certified wood has an added cost, but it has a chain of custody report to prove its provenance."

WHAT HOMEOWNERS CARE ABOUT

After the practical and aesthetic renovations are complete, homeowners can plan their larger sustainability projects, such as:

• SOLAR PANELS.

Solar power requires a significant investment, particularly if homeowners want to add battery storage, says Kitchin.

"We're not at the breakeven point yet, but solar is definitely coming down in price," says Bubel. "The new Ford F-150 electric truck may change the formula because you're not using gas, and it has a backup power system so you can run your house with it."



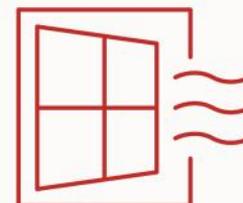
Continuous flow. Greywater collection units such as the Greyter HOME Water Recycling System provide an easy way to efficiently repurpose shower and bathtub runoff. CREDIT: COURTESY OF GREYTER WATER SYSTEMS

• ELECTRIC VEHICLES.

Installing the capability for an EV charger is a relatively small fix, but it requires the capacity for an outlet in the garage or driveway, Kitchin says.

• HIGH-PERFORMANCE WINDOWS.

Replacing every window with a high-performance window can be an expensive proposition, but some homeowners manage this by replacing them in phases. Installing the windows on one side of the house at a time over several years can be easier on the renovation budget.



New direction. Buying a car can help with home renovation efforts. The solar-charged battery in Ford's all-electric F-150 truck can power a house if needed. This gives homeowners an easy and convenient backup plan in case of an outage.

COURTESY OF FORD MOTOR COMPANY

• GREYWATER SYSTEMS.

Some jurisdictions have rules about how greywater can be used and collected. Bubel says a **greywater system** can be an inexpensive way to save water and reuse it for gardening. But in the Pacific Northwest, collecting rainwater with barrels and installing rain gardens are more common practices than installing greywater systems, says Kitchin.



• SMART HOUSE FEATURES.

Systems such as **Panasonic's Swidget, Broan's Overture, Vivint** and **Orro** can manage everything in the household to work seamlessly, but they vary in terms of the complexity to install and troubleshoot, says Winn.

"We usually need to bring in a third-party integrator to set these up with the customer," Winn says.

"Fundamentally, homeowners need to decide what

they want to change and then figure out their budget," says Kitchin.

"It's a balancing act. If they can't afford perfect, we need to figure out what's worth doing and where to compromise." **GB**



Second choice. Solar power is one of the first things homeowners view as an upgrade, but its installation price can move it lower on the priority list.

CREDIT: COURTESY OF MICHAEL COGHLAN/FLICKR

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Vivint is a leading smart home company in North America, focused on redefining the home experience with technology and services that create a smarter, leaner, and safer home for customers. This includes an integrated smart home system with in-home consultation, professional installation and support, and 24/7 customer care and monitoring.



myQ-connected garage door openers, locks and cameras enable control, security and monitoring of a home's main entry points using a smartphone at anytime, from anywhere.



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JinkoSolar is a leading photovoltaic module manufacturer and energy storage system integrator. EAGLE Storage brings together the best energy storage technology for turnkey hardware and energy storage services. Publicly vetted by trusted industry third-party laboratories and top financial institutions, EAGLE is a trusted choice for U.S. solar and storage projects.



RESILIENCE FOCUS

Decarbonization

As rental inventory ramps up, environmental friendliness can dictate the place a renter chooses to call home.

BY ALAN NADITZ

The greener, the better. Demand for rental apartments, houses and condominiums is at an all-time high, but landlords still need to make theirs stand out to stay ahead of the competition.

As housing prices continue to climb, many prospective buyers are renting apartments until they can eventually own their own homes. This has created a major inventory shortage—NPR reports that things are so bad that there are even open houses and bidding wars for rental housing—and apartment rents are skyrocketing. But there's a flipside. While landlords can seemingly set any rental terms they want—rent prices nationwide increased 11.5 percent from August 2020 to August 2021, according to Realtor.com—there's growing competition to make sure their properties are the ones prospective customers visit first. "These days," notes the National Association of Realtors, "people don't come back for a second look, and they don't look at a second place. If it even sounds like something close to what they want, people are taking it, sight unseen."

A key way to stand out, according to commercial energy management service product provider Verdant—now a part of Emerson—is to emphasize the apartment's sustainable amenities. "More and more consumers are turning to sustainable alternatives to the products and services they consume on a daily basis," Verdant notes. "Unsurprisingly, this has sparked demand for more sustainable housing experiences. After all, housing is something that nearly everyone consumes 24 hours

a day, 7 days a week, 52 weeks a year."

Here are several vital sustainability elements that should be stressed when trying to draw renters to a specific rental unit, and also make things more profitable for property owners.

SMART THERMOSTATS

Unlike single-family residences, where consumer-grade smart thermostats are the norm, multifamily dwellings are best served with commercial-grade devices that can handle multiple units. In addition to monitoring the typical elements inside the home, commercial models integrate with occupancy sensors that monitor and automatically adjust to changes in occupancy inside the units and in common areas.

SMART LIGHTING SYSTEMS

Keeping an apartment building running is expensive due to high energy consumption and costs. Smart energy technology can help landlords monitor and manage power use by adjusting to changes in tenant occupancy patterns and time of day. Some lighting systems can also be linked to smart energy management models for a single-interface overview of lighting and HVAC energy use. Smart lighting also generates about 10 percent of the carbon emissions of standard incandescent and less than half of compact fluorescent bulbs, reducing the building's carbon footprint.