

BUSINESS OF HOME

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HOME SMART HOME

In a market of rapid-fire tech innovations, we cut through the noise to find out what you need to know about smart home design right now.

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What's your least favorite household chore? Whether you hate changing the HVAC filter, unloading the dishwasher or resetting the circuit breaker, chances are, one day your home might be able to do it for you. That's the idea behind today's smart home technology, along with the opportunity to live healthier, safer and more sustainably. Yet widespread smart home adoption has been slowed by consumer wariness of pricey devices that may complicate our lives and encroach on our privacy.

Right now, the technology driving IoT, or the Internet of Things—the system of connected, online objects in our daily life—is ahead of our usage. “A lot of people just want a basic switch to turn on the light or a remote to turn on the entertainment system,” says Atlanta-based custom home builder Michael Ladisic of Ladisic Fine Homes, who installs automation systems in many of his clients' high-end homes. “Sometimes these products get too sophisticated.”

Smart home industry professionals are keenly aware of this challenge and working to make the market more consumer-friendly. “Many homeowners, and even some architects and designers, falsely believe that this technology is too complicated,” says Daryl Friedman, global president and CEO of CEDIA, an organization founded in 1989 for home technology designers, manufacturers and installers (known as integrators). “That's a barrier we're trying to overcome by making this experience professional, reliable and seamless, so you don't have to think about the technology—it does all of the thinking for you.”

Along with lobbying for change on a regulatory level, organizations like CEDIA promote collaboration among product manufacturers in an effort to support consumers. Two years ago, the Connectivity Standards Alliance, a nonprofit founded in 2002, launched a universal connection standard for smart home devices called Matter. Although it's compatible with a growing number of products, Matter is still far from universally used, underscoring the reality that people often take a while to catch up with technology. But that adoption lag won't last forever: The smart home market is growing rapidly—in five short years, it ballooned from \$16.5 billion to \$20.1 billion in 2022, according to CEDIA—and is on track to keep expanding.

Having a positive firsthand experience with smart home technology is often all it takes to get the uninitiated to jump on board. Carisha Swanson, director of special editorial projects for *House Beautiful*, learned about automated devices through her job. Once she applied that knowledge to her home, she never looked back. “I'm a believer in all the tech a person can put in their home to make



LEFT AND ABOVE: Designer Lori Paranjape found that clients were more likely to embrace smart home technology—like automated draperies in the bedroom or a high-tech bidet in the bathroom—in their second (or even third) homes.

life simpler,” says Swanson. “I understand concerns about privacy, user-friendliness and autonomy, but it's about educating yourself. And in a new-construction home, it's the designer or architect's job to educate their clients on what smart home features are going to be most successful.”

At its best, technology makes life at home more streamlined and stylish through smart appliances, lighting, shades, health monitors and security systems, among others. When it comes to these innovations, we're all on a learning curve. Wherever you find yourself on that spectrum, here's hoping this primer will support you in creating spaces that are intelligently designed from the inside out.

CUTTING-EDGE APPLIANCES

Smart appliances—whether big-ticket items like refrigerators, dishwashers and washing machines or smaller electronics like microwaves, coffee machines and vacuums—are the starting point for embracing home automation. The change is happening quickly: In 2022, 10.8 percent of American households contained smart appliances—a portion that is predicted to surge to 27.6 percent by 2027, according to Hamburg, Germany-based global business data platform Statista.

“The kitchen in particular is often where people start easing into technology,” says Swanson. “It's a family space, where there's less hesitation to try new features.” She

outfitted her kitchen in Charlotte with gadgets like a smart oven, faucet, coffee maker and espresso maker. She'll often preheat the oven before dinner from the comfort of the couch, and regularly prompts the faucet to dispense specific amounts of water while she's cooking. In 2021, at the height of air fryer mania, Swanson's oven automatically updated to add an air fryer feature without so much as a phone call, push of a button or an added charge. "There's convenience in that," she says.

Swanson's connected home isn't without its hiccups. Her kitchen's smart faucet recently underwent a syncing snag that temporarily downgraded its features, causing confusion. "For the everyday consumer, there's often frustration built into smart tech," she says. "Which button do you press to close the blinds and turn off the overhead lights? How do you turn on the little lamp next to you? Adoption has to be about simplification."

Josie Abate, the Ontario, Canada-based principal designer and owner of Ambience Design Group, advises clients to invest in comprehensive smart home systems while managing their expectations: "Smart home features have their benefits, but relying on them may be disappointing when technology breaks down or misfires without cause," says Abate, who notes that smart kitchen appliances in particular are ripe for development. "Future home automation technologies will help with personalized ready-to-order food shopping lists, grocery orders and home shipments, as well as the ability to clear any food that has reached its expiration date." That's a feature many of us could certainly get used to—if it works.

SHADES OF THE FUTURE

Like appliances, motorized shades are another fast-growing sector of the smart home market—and one that many designers have likely encountered already. According to a 2022 market study by *CE Pro*, a custom electronics industry publication, nearly a third of home tech integrators' residential projects include motorized shades, with a 12.6 percent predicted revenue growth rate among integrators for their overall shade business in 2023.

When the earliest iterations of motorized shades appeared on the market in the 1990s, they required a well-paid specialist to create a custom-programmed shade system. Now, the technology is much more attainable. "Today's automated shades have gotten a lot easier to set up and a lot more appealing to the masses," says Scott Stephenson, senior director of product and global motorization for windowcovering manufacturer Hunter Douglas. "The products on the market are a lot smarter, a lot easier to program, a lot more reliable—and a lot quieter."

While clients of all kinds will benefit from the convenience and customization of motorized shades, there are some in particular for whom this might be an especially good fit: homeowners who have second or third properties that need to be managed from a distance; those who live in homes with hard-to-reach windows; people with limited range of motion; and those in extreme climates that need extra temperature control or sun protection. And, as with all custom design solutions, the earlier in a project you begin planning, the better your results will be. Motorized shade systems can be best customized when they're integrated not only into a home's electrical system but ideally the architecture itself.

"What looks interesting architecturally may not work well for a functional window treatment," says Adam Skalman, vice president of sales development for custom window treatment brand The Shade Store, offering angled or triangular windows as examples. "Motorized shades usually require a deeper window or pocket to be completely flush and seamless. Designers, architects and shade consultants should work together to consider these factors, as well as wiring and outlet placement."

Like home technology as a whole, the motorized shade market is at an inflection point. Smart products are on the rise, but they've yet to be adopted by most homeowners, who still need to be convinced of their user-friendliness. "Over the next year or two, we'll start to see even more simplification of the home automation space for the consumer," says Stephenson. "Window treatments are expensive. But when you think about the cost of automating them and the value over a lifetime, why wouldn't you?"

NEXT-LEVEL LIGHTING

The right lighting can make even a mediocre room look good; the latest generation of smart home technology can take it one step further and make it *feel* good. That's because it's one of the most subtle, hardest-working smart home features—a supportive technology that makes everything and everyone around it look and feel better, brighter and more natural.

"We're only in the early stages of intelligent lighting," says Ben Bard, vice president of luxury lighting and shading systems at Lutron. "Most people, even in the luxury market, haven't been exposed to it yet. The good news is, it can be simple to start. Right now, we're approaching it from [that perspective], often trying to solve simple problems. But the applications that can be solved with intelligent lighting are many and broad."

The easiest smart lighting features are familiar ones: dimmable lights and temperature adjustability. Beyond that, says Bard, is dynamic color temperature tuning, which

allows users to program lighting "scenes" based on mood, use or time of day—like a cool, energizing daytime light for working or a warm, relaxing evening light for socializing. One step up from there is a function whereby lights automatically mimic the sun's movement and color temperature in your location, which may support your body's natural circadian rhythms.

Beyond mood and aesthetics, smart lighting also has an important role to play in wellness, accessibility and sustainability. Spaces become easier to navigate with features like flexible strip lights, which can be put on a schedule or turned on by other smart devices, and can be used to illuminate nooks like steps, elevation changes, inside cabinets or under cabinet toe kicks. Meanwhile, super-dim lights make it less disruptive to get up at night, while remote controls or motion sensors mean all these features can work with a mere touch of a button—or none at all. And with the now-required use of LEDs (regulations banning the sale of incandescent light bulbs took effect in August), all this functionality can happen in an efficient earth- and wallet-friendly way. "This technology is flexible—it can be updated, adapted, personalized," says Bard. "As people learn more about it and live with it, it will be exciting to see how it evolves and what new applications [arise]."

RARIFIED AIR

We already spend the vast majority of our lives indoors (about 90 percent, according to the EPA). Viral pandemics and runaway wildfire smoke have done nothing to bring that number down. But is the air inside our homes as clean as it should be? IAQ (indoor air quality) devices aim to tell us just that—and offer a fix when the answer is no.

"Covid-19 brought the clean air movement onto center stage," says Justin Reedy, an IAQ Specialist for Ferguson, a wholesaler in a variety of home categories including HVAC. "We used to run a ventilation fan or air filter on a timed sequence. With smart sensors and monitors, we can now create a system that responds to real-time changes. If you have a large family gathering on a Sunday afternoon, it would sense the additional heat load and increase in carbon dioxide and run a ventilation sequence until enough fresh air returns the home to normal levels."

It's not just the occasional big gathering that might warrant an air quality adjustment. Our day-to-day routines create unhealthy conditions too. "Activities like cooking, cleaning and using personal care products all release particle and gas pollutants, which get trapped inside our homes," says Omer Ali, design engineer at Dyson. "Meanwhile, indoor humidity levels and temperatures, even when optimal, can allow mold, germs and bacteria to grow."

SMART HOME MARKET

2017

\$16.5
BILLION

2022

\$20.1
BILLION



ABOVE: Michael Ladisic was the builder of *House Beautiful's* 2022 Whole Home show house, where designer Keia McSwain created this swanky media room with a sleek TV, perfect for movie night.

As a designer, Abate is more attuned than many to the possibilities of smart home design, having started exploring automated technology upon founding her firm in 1987. When asked what device she'd put in every home worldwide, she veered practical: "The essential home tech feature is a smart thermostat that incorporates air quality sensors to maintain optimal air quality by detecting particulate matter, carbon dioxide and total volatile organic compounds, as well as other air pollutants," says Abate. (Her second priority is a whole-home water filtration system for drinking and bathing.)

Smart monitors and purifiers may not be the most exciting aesthetic addition to a space, but they go a long way toward creating a holistically healthy, happy home—much like other wellness-centric lifestyle expenses, from organic produce to a gym membership. "Every day, we take in more air than any other substance—30,000 breaths or around 10,000 liters of air," says Ali. "So clean air is essential for a healthy life, yet we don't think about it anywhere near as much as we stress about eating the right foods and drinking the right amount of water."

Reedy agrees that air quality in homes has long been underprioritized. "Whether it's a new home or major renovation, the effort and budget is often put into aesthetics like flooring, lighting, cabinets, appliances and entertainment, while the mechanics of a home are overlooked," he says. "When we educate people on the health benefits of a properly ventilated and humidity-controlled home, people are willing to invest in their health and quality of life."

WELL CONNECTED

Along with smart lighting and indoor air quality devices, other health-boosting home technologies include motion sensors and pressure maps that notify users of unusual movement or potential risks. At the moment, many of these products are targeted toward an older demographic through retirement communities or assisted-living facilities. Yet there's a growing awareness of and interest in the protective benefits of such devices for people of all ages with disabilities, physical conditions or mental illness. "These solutions have huge potential to promote a more proactive model of care," says George

Demiris, associate dean for research and innovation at the University of Pennsylvania School of Nursing. "The idea behind smart homes is that by monitoring how people live, you can see a certain trend or change in trajectory early on so that you can intervene. There are a lot of powerful examples of how this can be life-saving when it comes to detecting emergencies, but also proactively improving quality of life."

Through motion sensors on doors and refrigerators, bed sensors and smart carpets that detect pressure, Demiris and his team are able to make inferences about their study subjects' day-to-day activities. "We can see time spent in bed, sleep quality, number of bathroom visits, movement around the home and whether people are socially isolated," says Demiris. "We used to rely on very general self-reporting, but this data helps us calculate individual fall risk scores with the goal of preventing and detecting falls. The objective is to keep people more engaged, help with preparation and investigate and intervene if and when appropriate—rather than just reacting or trying to minimize catastrophic consequences."



In addition to reducing serious injuries and hospitalizations by allowing clinicians or family members to monitor patient activity, smart technology can also create a more supportive, customized living environment for those who need it. People with cognitive decline or dementia, for example, can benefit from personalized reminders when their memory fails. “When you open the door at night, a device can play a recording of a family member saying, ‘It’s the middle of the night—don’t go outside,’” says Demiris. “Or when the phone rings, a screen can inform you not just of the person’s name, but some context on what your relationship is.” Simple, technologically speaking, but transformative on a practical level for many.

As consumer awareness and demand grow, the hope is that these products will

become better designed and more subtle inside the home. “The design aspect needs improvement so that the technology can be more seamlessly integrated into the home in a way that’s invisible rather than potentially stigmatizing,” says Demiris. “Instead of indicating that this is a home-based ICU, it’s a home. That’s important.”

SMART SECURITY

Gone is the era of the fancy security system being reserved for society’s upper echelons. Now, cameras, motion sensors, smart locks and remote monitoring are available—and relatively affordable—to anyone.

Logistically, smart security systems vary in their complexity. Some, like Ring and ADT, don’t require a professional; others, like Vivint, do—but the ability to personalize the device is integral to all smart home

ABOVE:

Dynamic color temperature tuning, a feature that allows lighting to be adjusted to create a specific mood, is a feature that smart lighting brand Lutron sees catching on. In the adjacent bedroom, Lutron fixtures are set to an “energizing” color temperature.

security systems. “Despite the number of smart home devices and security brands, and increased visibility on crime, consumers still vary in their fear of home security threats,” says Alina d’Aubermont, director of product for Amazon’s Ring Alarm system. “Some desire minimal monitoring, while others lose sleep if they don’t have their home armed.”

Some scenarios make it even more likely that your client may want a smart home security system: a ground-floor living space in a big city, frequent travel or a secondary or vacation home. For Nashville-based designer Lori Paranjape, it was the latter situation that began her initiation into the world of home automation. “When we got into designing second and third homes, it became more important to clients to have remote control over the house,” she says. “If we have an

athlete who plays certain months in one city but lives the rest of the year in another, they need to close up a house so that there's privacy and the interiors aren't visible from the outside."

As convenient and effective as smart security systems can be, it's important to remember that IoT products of all kinds can present a different kind of security risk—that of data privacy exposure—even with devices that are intended to enhance physical security. Experts such as Rebecca Herold, CEO of software-as-a-service consultancy Privacy and Security Brainiacs, have been working to raise awareness about the fact that products may lack robust authentication or encryption systems; fail to provide adequate privacy capabilities, controls and rights for consumers; usually sell your data to third parties without obtaining your explicit consent; and, disconcertingly, even come with tracking and recording settings turned on by default, giving manufacturers (and their partners) access to a wide range of your activities and locations.

For many, those downsides are a fair tradeoff for the benefits the technology brings. "We know our phones are tracking us, and none of us are getting rid of our phones anytime soon," says Swanson. "There are a lot of murky aspects at play, and the landscape is evolving so quickly, with updates to terms of agreement [happening all the time on our devices]." So far, 10 states have adopted comprehensive consumer data privacy laws, and a number of others are considering similar legislation—which is a good sign, but still leaves millions of consumers vulnerable to predatory practices. When in doubt, and if your client is especially concerned with privacy and security, your best bet is to bring in a security professional (or two—one specializing in physical security, another specializing in digital security) who can help you understand your options.

POWER PLAY

Of all the burgeoning applications of automated home technology, smart energy management may have the loftiest and most transformative large-scale potential. Not only can smart energy systems, when optimized, allow homeowners to customize their homes and save money—they may also offer a more sustainable long-term approach to powering our homes and mitigating widespread energy shortages throughout the U.S.

For home automation brand Savant, that solution started with a device that most designers rarely think about: the circuit breaker. "It's the dumbest product in your home—if you look at it, it's probably a bunch of handwritten stuff and on-off buttons," says Savant president JC Murphy. "Yet it's literally the gateway to your entire house, and to making your house a smart home. So we

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When we
got into
designing
second
and third
homes,
it became
more
important
to clients
to have
remote
control
over the
house.

LORI PARANJAPÉ

built a smart module that almost universally fits all circuit breaker panels to give homeowners visibility into how much energy is being consumed, as well as the ability to control it."

In the coming decade, fueled by climate change and green legislation like the Inflation Reduction Act, the American energy system is poised to shift from a centralized power grid to microgrids, in which power is stored in homes and in local power centers. Much like a hybrid car that automatically shifts between gas and electric modes, smart energy modules will tell your home when to use different types of energy for optimal performance and conservation on both an individual and collective level. They also dispose of the need for generators since the battery system offers a built-in power backup.

"In California, utility rates increase from something like 12 cents to 56 cents between 4 o'clock and 8 o'clock in the evening as electric companies try to curb demand during that peak period," says Murphy. "But the smart power home switches over completely to battery during that time." Adopting the system may not be as complex or expensive as you might imagine. Smart modules—which Murphy describes as "electrician-friendly" to install—start at \$120 for two small circuits and up to \$240 for larger circuits. Systems range in total cost based on square footage and household energy consumption, but the average American home can likely be done for \$20,000 or less, estimates Murphy, based on his experience outfitting his 3,700-square-foot home in Florida for a little over that amount.

Yet as appealing and exciting as these energy innovations are—from Savant and other companies such as Control4 and Crestron—they also come with complex socioeconomic implications. Although digitized energy management systems have the potential to save energy and money, they could backfire unless implemented with great care, exacerbating energy waste and social inequity by failing to account for the needs of a wide spectrum of households. "States and utilities must work to create nationally uniform rules regarding data sharing and privacy to ensure that the maximum number of households, regardless of income and racial background, can participate," writes Carlos Martín, project director at Harvard University's Joint Center for Housing Studies, in a recently published paper about residential energy digitization.

Even so, smart energy systems are certainly the future, however that might look, and should be on the radar of any designer undertaking a new build or major renovation. Savant's energy management modules currently connect to existing circuit breakers, but one day Murphy hopes the system will be integrated with them

altogether, in one device. "We want to arm everybody with this technology," he says.

SIMPLICITY'S SAKE

Diving into smart home technology might feel intimidating, but experiencing the products yourself is the best way to get comfortable with them. "It's like doing an immersive experience with a kitchen brand to understand how appliances work," says Swanson. "Seeing integrated spaces firsthand is a nice way to get a better handle on what's most useful, what you might want in your own home and what's not necessary."

Leverage your professional and personal projects as a testing ground for new technology, and use that intel as a way to help clients feel less overwhelmed. "What clients are asking of me as a designer is to be educated and tell them what they want, as well as what options they're choosing from," says Paranjape. "I'm often introducing product to them, and I want to know that there are no glitches in how it's installed or maintained, so I don't advocate for brands until they have a track record with [positive] feedback. With a brand I haven't experienced, I'll crowdsource information and report it to clients [so they can make a decision]. But until I can feel confident about a product, I won't ask someone to hardwire it into their new construction."

Even with all the recommendations and test drives in the world, there will be bumps on the road to designing smarter spaces, and that's OK. Even the most tech-forward designers are still discovering the abilities—and limits—of the smart home features they help their clients implement. "Sometimes there are expectations about what you want in theory, but after you're in the space, you realize you don't want it after all," says Ladisic. "A client did a bunch of smart art lighting in a house recently and decided it was too pronounced once it was installed; it was taking over the paintings a bit rather than creating a subtle backdrop. Sometimes people prefer something simpler, more comfortable or more known, rather than cutting-edge." On the other hand, he adds, sometimes clients end up wanting more smart home features than they originally requested—it's all about living with the technology and tweaking accordingly.

Paranjape takes a positive yet realistic view of technology's role in the home, seeing it as a life- and space-enhancing tool but not necessarily a life-altering, world-shaking one. "I've had the opportunity to become more educated and a bit more of an advocate than I was before we built our own home," she says. "Now, we use our lighting app, our speaker app and our pool app every day, and it becomes an expected convenience. When we get it right, you don't really notice this technology." □