

An illustration of a green house with solar panels on the roof. A large tree is on the left, and a person in a wheelchair is on the right. The background is a stylized globe.

# GREEN & ACCESSIBLE

Tired of paying high electric bills, one Maryland couple decided it was time to build a custom home that's completely accessible and sustainable.

*by Brittany Martin  
photos courtesy of  
High Performance  
Homes*

## **Earth Day is this month,**

and that's always a good time to consider ways to help protect the planet and maybe reduce utility bills by making your home greener. But what if you have accessibility needs, too? Can your home be both green and accessible?

One couple from Westminster, Md., has already gone the extra mile to "go green" and have accessibility in their own home.

Dan Swisher, a bilateral above-the-knee amputee who sustained a T-5/6 complete spinal-cord injury in a rope swing accident about 20 years ago, and his wife, Suzanne, worked with Pennsylvania-based High Performance Homes (HPH) to complete their vision of a home that is both completely accessible and sustainable. HPH specializes in custom homes that are certified by the Department of Energy as zero-energy ready, meaning all or most energy consumption can be offset with renewable energy.

Every inch of their home, from the solar roof tiles to the insulation under the slab of the basement floor, was carefully thought out to allow the Swishers to reduce their electric bills and consumption, while also allowing them to live as independently as possible as they age.

The empty nesters were looking to downsize a few years ago but wanted to stay close to family. They purchased a 3-acre lot just a few miles away and drew up some construction plans, then enlisted the help of HPH and Kiere DeGrandchamp, head of construction operations.

"I build as a general rule to universal design, age in place ... so I'm very up on the codes as far as ADA [Americans with Disabilities Act]-capable, ADA compliancy, and then when Dan and Suzanne came to us, it was a pretty easy, natural fit," DeGrandchamp says. "We can do either a fully or partially ADA-compliant home at a zero-energy-ready level. It's beautiful."



The Swishers' kitchen has a work station with a lowered countertop and open space for Dan to roll his wheelchair under the sink.



A hearth-free gas fireplace maximizes floor space in the Swishers' custom Maryland home.

## Accessibility

The Swishers had accessible features in their previous home, but Dan, a real estate agent, felt like their electric bills were outrageous. He was pretty much sold on the smart-home package HPH offered, in addition to the company's willingness to build an ADA-compliant custom home, says Suzanne.

"They are pretty much the only ones doing that technology, that we know of, that

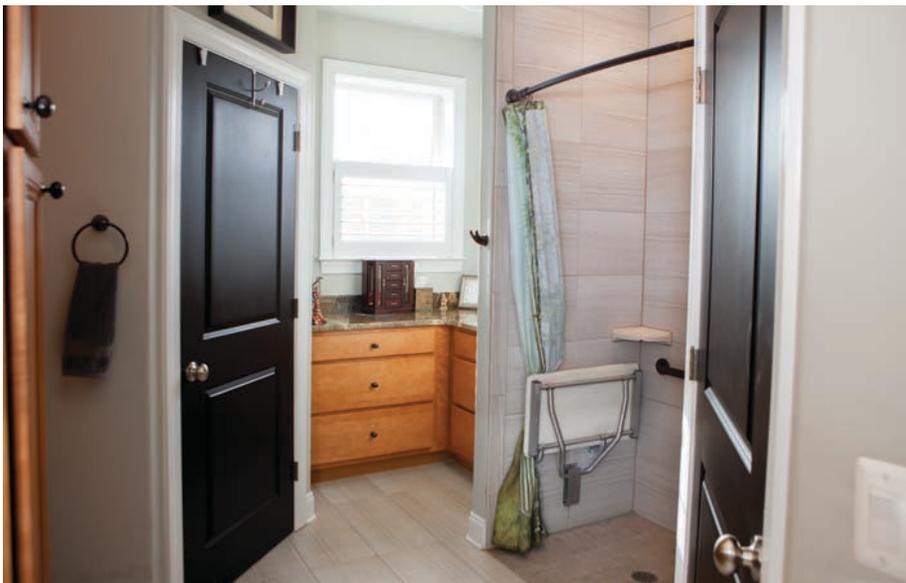
we were able to find, with the green energy and the whole smart-home package included, and it was a little pricier, but we do believe the overall savings is going to make up that initial cash out," Dan says.

Construction took about nine months, and the Swishers officially moved into their home in May 2017. The home's main living space is 2,200 square feet including a bonus space above the garage, which Suzanne currently uses as an office. There are three bedrooms and two full bathrooms on the main level, plus a finished basement that adds 1,700 square feet, with two bedrooms and one full bathroom.

Starting with the entrances to the home, a gently sloping gravel path leads to the zero-threshold porch and front door. When entering from the two-car garage, a special building technique allowed them to make the threshold flush with the main floor, as well.

Their previous home's front porch had five steps, making it inaccessible for Dan. There was a fairly steep ramp from the garage into the home, which not only took up valuable parking space but also made it difficult for Dan to manage in his manual wheelchair.

Once inside, details such as 42-inch-wide hallways, 32-inch-wide doorways, a hearth-free gas fireplace and an open floor plan with scratch-resistant vinyl, wood-look flooring allow plenty of space for Dan to maneuver.



The Swishers' master bathroom includes a curbless shower and dressing area.

Dan Swisher has easy access to the lowered circuit breaker box in his laundry room.



“The design of the home is customized to Dan’s specific needs by locating standard devices and systems such as switches, controls, storage and shelving within the wheelchair-reach zones between 12 inches and 48 inches above the floor,” says Mark R. Thompson, AIA, associate director of architecture services for Paralyzed Veterans of America, in an email. “These locations will not inconvenience Suzanne or other ambulatory family members or guests visiting the home. Special attention has been placed on providing additional clearances for Dan’s wheelchair in passageways and to special features such as windows, kitchen work areas and the fireplace, which provide Dan access to all of the home’s amenities, improving his enjoyment of their new home and his quality of life.”

In the kitchen, a work station with a lowered countertop, base cabinets with pull-out drawers, an under-counter microwave and front-panel oven control knobs make it easier and safer for Dan to prepare meals.

Dan says the new layout is more user-friendly and having open space under the kitchen sink is a big plus compared to their

former home because he used to scuff up the cabinets with his wheelchair.

“We took every little detail, where he [Dan] would just pull up in his wheelchair and say, ‘This is where I want this, this is where I want this,’” DeGrandchamp says.

The master bathroom has a curbless shower with grab bars and a shower bench, as well as a dressing area for Dan.



A programmable thermostat helps the Swishers keep their energy use in check.



An inviting, open-concept floor plan creates a seamless flow in the Swishers’ home.



Solar shingles on the Swishers' home in Maryland are an attractive alternative to traditional solar panels.

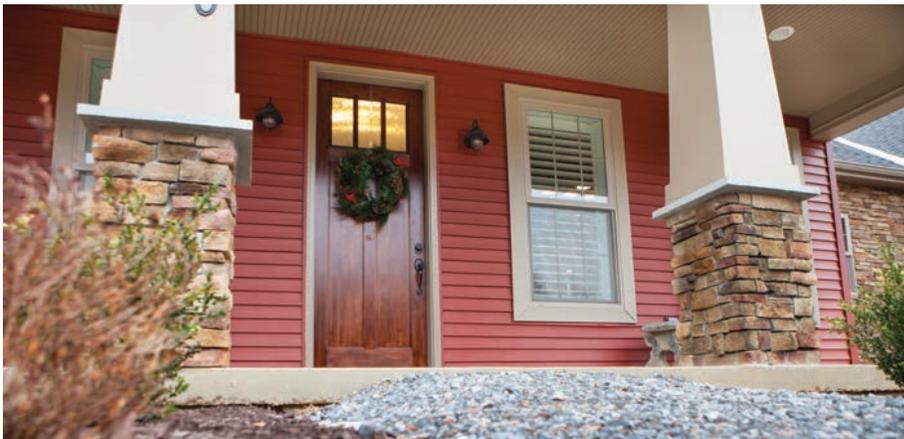
Outside, there is a gravel pathway that allows Dan to access the basement. In their previous home, Dan says their lift going to the basement was pretty temperamental, which was frustrating.

"We store seasonal items down there, and should Dan need to access the lower level, he is able to manually wheel himself around the house or drive his car down and enter," Suzanne says. "There are steps from inside the garage to the basement for able-bodied people."

They may add a lift to the basement level at some point in the future, but Suzanne says they didn't want to unnecessarily disrupt the integrity of the living space with a costly lift. Dan says their dream is to one day convert the basement into an ADA apartment for veterans or anyone else with wheelchair needs.

"We'd been looking to simplify things, so there's less maintenance," Suzanne says. "We had a pretty extensive hardscape backyard with an in-ground pool and a lot of landscaping so,

A gravel path slopes gently upward, creating a ramp to the Swishers' front door.



we're out in the country now, so that's definitely been simpler. Just the ease of the open floor plan, to be able to move about with smooth transitions in and out of the house. It's very easy."

## Sustainability

The home's accessible features are fairly standard and customized to Dan and Suzanne's needs, but what really makes the home unique are the zero-energy-ready and smart-home elements.

All of these features came at a price that was slightly higher than regular construction, and the Swishers were on a tight budget. Getting everything that met their needs on a budget was the biggest challenge, says DeGrandchamp.

The exterior walls use a structural insulated panel (SIP) system with a 6½-inch perimeter wall composed of expanded polystyrene that gives the home a thermal resistance, or R value, of 25. The SIP system is water-resistant, fire retardant and structurally stronger than conventional building, DeGrandchamp says, making the home more durable over time in a changing climate. The panels also can endure over 200 mph winds and seismic activity.

Under the slab, 2-inch R-10 extruded polystyrene gives the basement floor a radiant heat quality and makes it more comfortable in cold temperatures.

"You can go down there in your bare feet, even in the middle of winter, and it doesn't feel like it's 40 degrees on your feet," DeGrandchamp says. "It's more comfortable, and it also has a little bit of a radiant quality, where I don't have to heat as much since I don't have a cold floor that I need to overcome."

CertainTeed solar shingles are an esthetically pleasing alternative to traditional

A geothermal heat pump uses the earth's constant ambient temperature to heat and cool the Swishers' home.



solar panels, as the shingles are flush with the roof line. With a geothermal heat pump, the Swishers can cut their energy use even more by using the earth's constant ambient temperature ranging from 56 to 58 degrees to heat and cool their home, as well as heat their water almost instantly.

"We build the house like a refrigerator," DeGrandchamp says. "It's super insulated. Once you build a tight house with high insulation, good windows and build it to a high standard, it doesn't require an awful lot of energy to maintain a very high level of comfort."

A crucial part of maintaining the homeowners' health and comfort is air quality, and HPH installed a filtration unit in the Swishers' home, as well as an exhaust fan in the garage to keep vehicle fumes from entering the home.

"We're very aware of indoor air quality," DeGrandchamp says. "We knew that Dan was going to be there all the time, and since he's a real estate agent, he works out of his home. So, we have standard in our regular homes, an indoor air quality box, for lack of a better term, called a Nautic Air unit, and it scrubs the air pretty much like a hospital."

With smart-home features incorporated, the couple can monitor the home's energy production and consumption levels and control them remotely from any smart device. They can also lock the doors remotely and control the garage door and security alarm with their smart devices, as well as control most of the LED lights in the home.

The Swishers have definitely noticed a difference since moving into their new home. In their previous home, their electric bill was \$550 to \$650 a month. It's now dropped to about \$38, and DeGrandchamp says a typical house of that size would require about \$680 in utilities. The Swishers also will be looking into tax credits when they file their taxes this year.

Dan says his wife did a great job picking out colors for inside and outside the home, but he's enjoying the low energy bills the most.

"And just the practicality of the zero thresholds and whatnot, not having to deal with ramps or lifts," he says.

Looking toward retirement, the Swishers will have more control over their cost of living expenses.

"Sustainable design and built environments are inherently healthier environments with improved indoor air quality and minimized material toxicity," says Thompson. "There is also long-term cost savings due to reduced consumption of utilities. The accessibility components of any home are primarily focused on improving quality of independence/life. So I think you can say that the



Superior walls help insulate the Swishers' basement.

combination of sustainability and accessibility improves the quality of life for disabled occupants by providing a healthier environment, independent living and independence from traditional power supply. There are also the societal benefits from sustainability to reduce waste, air pollution and the negative impact on the environment."

For more information, visit [hphpa.com](http://hphpa.com). ■