



ECO-FRIENDLY HOME BUILDING Innovations Boost Energy Efficiency

by John D. Ivanko and Liam Kivirist

Smart, innovative, technological breakthroughs are making buildings more energy-efficient, healthier to live in and highly attuned to our connected world.

“Homeowners continue to be interested in green building options because they help foster a healthier, more comfortable and affordable home—and it’s good for the environment,” says Dan Chiras, Ph.D., of Gerald, Missouri, founding director of the Evergreen Institute and author of *The Homeowner’s Guide to Renewable Energy*.

Panel Insulation

“Structural insulated panels in walls, roofs and floors dramatically reduce air leakage and heat loss through thermal bridging, or heat conduction through framing materials, facilitating a more energy-efficient home that can

maintain comfortable temperatures with lower fuel bills than a conventionally built home,” advises Chiras. Find manufacturers via the Structural Insulated Panel Association at sips.org.

Efficient Heat Recovery

“The energy recovery ventilator, or ERV, ensures fresh air in tightly sealed homes with little heat loss,” adds Chiras. The UltimateAir RecoupAerator, a whole-house air filtration ERV, also flushes out harmful airborne pollutants commonly found in residences, replacing them with clean, fresh, healthy air.

Solar Monitor

“Many solar energy users want to monitor their system using their computer,

tablet or smartphone through advances in energy software,” says Allison Lindquist, with the Midwest Renewable Energy Association (MREA), which hosts the Annual Energy Fair and sustainable living event every June in Custer, Wisconsin. “One highlight last year was PacketFlux Technologies’ SiteMonitor.”

“When a homeowner views their energy monitoring data, they quickly begin seeing the correlation between their energy consumption and production,” says Leon Dulak, the MREA site manager. “The direct correlation drives them to change how they live and use energy.”

Energy Storage

Tesla Motors does more than produce high-end electric cars and solar shingles. The company is also on the cutting edge of future energy storage. Tesla’s new, compact Powerwall 2 battery system, complete with inverter, can power an average two-bedroom home for 24 hours.

Chiras says, “Utilities throughout the nation are cracking down with special fees on solar-home owners that occasionally pull electricity from the grid. I think more people are going to opt to go off-grid or install a Tesla battery to provide nighttime power to preempt this. It’s easier to maintain than a standard lead-acid battery, and should last as long. When its useful life is over, the homeowner returns it to the company.”

“Saltwater-based batteries for homeowners are coming up,” observes Clay Sterling, assistant professor of electrical technology at Kankakee Community College, in Kankakee, Illinois. “The batteries from Aquion Energy are non-toxic, safe and recyclable.” Their Aspen series of aqueous hybrid ion batteries contain neither heavy metals nor toxic chemicals and are non-flammable and non-explosive, adding to their safety.

Home Plans

Building green gets easier with green home plans. The prototype, super-insulated, 970-square-foot NewentHouse sustainable home in Viroqua,

Wisconsin, is about 50 percent smaller and more than 80 percent more energy efficient than the average American home. The plans-and-services package for the Passive House-certified Newen-House home features double walls for insulation and a super-efficient heat recovery ventilator. Four different home plans are available for houses under 1,000 square feet.

John D. Ivanko is co-author of ECOpre-neuring. Liam Kivirist captures the latest technology news on TechSocket.net.

It costs slightly more on a monthly mortgage to build a home that costs far less per month to operate.

~DAN CHIRAS

HOME TECH UPDATE

NEST SMART THERMOSTAT: Google's Nest Learning Thermostat replaces the old thermostat and immediately starts saving energy and money. Partnered with a smartphone, custom settings will lower the temperature at night, warm up the house upon waking and reduce heating or cooling swings when owners are away. On average, people save 10 to 12 percent on heating bills and 15 percent on cooling bills according to Energy Trust of Oregon research, with the device often paying for itself in less than two years.

BLUEAIR PURIFIER: Leveraging a mix of filters, ionizers and fans, the Blueair HEPASilent air purification system captures 99.97 percent of particles down to 0.1 micron. A range of sizes are available to suit different spaces.

HAIKU LIGHT: The Haiku Light fixture from Big Ass Solutions brightens when someone enters a room and turns off when it detects the absence of movement. The light-emitting diode (LED) fixture produces 50 percent more light than a typical 15-watt compact fluorescent light (CFL).

NATUFIA: The Natufia Kitchen Garden is a fully automated vertical garden that easily fits into a kitchen area. Natufia manages the non-GMO, certified organic seed germination, watering, nutrient needs, humidity control and light cycles, freeing the gardener to simply pick and savor year-round fresh produce. While pricey, it provides an option for urbanites that both lack outside growing space and prioritize convenient healthy eating.

SMART ROBOT: This handy droid vacuums up dust mites, allergens, pet hair and dirt. iRobot's Roomba 880 detects debris, maneuvers around most furniture and curtains, features a high-efficiency particulate air filter to suck up the small stuff, works on a variety of surfaces and automatically plugs itself in to recharge.

SELF-CLEANING TOILETS: The bowl of Toto's MH wall-hung, high-efficiency toilet with powerful 3-D dual flushing is coated with a nanotechnology glaze that seals the porcelain with an ionized barrier; its non-porous surface repels visible and invisible waste. The company's smart toilet model also cleans itself.