

Manzanita architect Tom Bender has been living in a passive solar house for over 30 years, heating with wood, using a “cool box” rather than a refrigerator, and designing off-the-grid and low-energy homes. He says the benefits go way beyond dollars and energy. And today we can go far beyond what was possible 30 years ago.

DAVE FISHER PHOTO



# Getting simple, getting wise

## The solution to many of the world's problems lie in our own homes

BY TOM BENDER FOR LIVING GREEN

Thirty-five years ago, some friends did a research project for Seattle City Light that is still reverberating through the energy and housing world. They found SCL would do better giving away insulation to homeowners rather than developing any new source of energy.

Sounds like a funny way to do business, but it tells a lot about our crazy conventional way of doing things. They learned it is way easier and cheaper to eliminate waste than to “meet our needs” for things we don’t need or want.

A lot of people today are concerned about global warming, running out of fossil fuels, rising energy costs, our huge national debt, and wacky things being done in our culture. The best and simplest answers to all of these issues also lie in our own homes.

Energy has been so cheap (particularly in the NW) that we’ve been extraordinarily careless about how we design, build, and operate our homes. Studies and executed projects in both the U.S. and Canada have shown we can reduce the energy use in our existing homes by 60 to 80 percent.

So, what makes the most sense for our own homes, or if we’re building a new home?

First, new construction. A two-story home costs 20 percent less to build, and uses 20 percent less energy – half the roof and floor area, for starts. Air leakage in our homes causes 25 percent of the energy loss due to all sorts of

stuff: holes drilled in wall framing for electric wires, space between chimneys and framing, exhaust fans, windows with poor seals, worn weather-stripping on doors.

Houses half the size of current ones obviously use far less energy. We’ve doubled the size of new houses in the last 30 years – from 1,200 to 2400 square feet. We’ve gotta be crazy-wealthy or just crazy to be doing that.

Once we factor in the cost of construction, financing, energy operating and income taxes, just a guest room in a house eventually costs almost \$100,000!

Better insulated walls, roof, floor, and windows of our homes can have big impact. Insulation standards are based on old energy costs, not the twice-higher cost of today’s sources. So, we’re starting to build homes with roof insulation up to R-60 rather than R-38, R-40 walls rather than R-24. Windows are available now with R-7 or higher insulating value, compared to R-1 for single glazing, R-2 for double glazing, and R-3 for low-e/argon windows.

What happens when we put all this together? I’m finalizing the design on an affordable coastal housing “FlexPlex” using German PassivHaus analysis to optimize energy. The com-

compact “duplex” design reduces surface area and heat loss, while using simple new sound separation techniques for privacy. Heating loads are 80 percent below Oregon’s stringent energy code. The compact two-bedroom homes are a third the square footage of today’s oversized homes. Together, this results in an amazing 95 percent reduction in building energy use! Wow! And with this efficiency, a south

overhang of solar panels on a FlexPlex in a sunny spot can produce enough renewable energy to meet the needs of four families.

The other 45 percent of our home energy use varies wildly by our individual living patterns. Solar or (soon) heat-pump water heaters can reduce water heating energy by 50 to 75 percent. Compact fluorescent bulbs can reduce lighting energy by two-thirds. High-speed spin washers and clotheslines can cut laundry energy use in half. Increasingly efficient electronics, refrigerators, and other plugloads can give similar reduction in lifestyle energy use.

So, if you’re wanting to improve your existing house, start with a blower-door test to find and eliminate energy leakage. Go beyond TPUD energy standards. Think about R-values and passive solar when you do your window

replacements.

Are your kids grown and you’re rattling around in a big house? Get approval to shut off the back bedrooms and convert them into an “accessory dwelling unit” (ADU) to provide income for you and affordable housing for the community. (Two families on the same energy!)

Current federal and state tax credits and utility rebates make it particularly affordable right now to do deep energy retrofits on our homes, and to purchase renewable energy systems. A solar hot-water system can be installed with a net cost of around \$4,000, saving \$14,000 over 30 years. A 3kW solar PV electric system with a list price of \$22,000 now has a net cost of \$6,000, and an electric cost savings of \$18,000 over 30 years.

All this results in amazing win-win side-effects: Storm-safe homes, cheap “energy” for TPUD, lower utility bills, local employment for builders doing the retrofits, more efficient use of existing utility infrastructure, less global warming and using up of fossil fuels...

And remember, we pay our energy bills from the same pocket that we pay our mortgages. Back in the ’70s, we got it set up so people could qualify for larger mortgages if the houses were energy efficient. You can still get FHA Energy Efficient Mortgages. Or – just get smart, insulate, and pay off your existing mortgage faster.

**The best answers to rising energy costs lie in our own homes.**