



Our path to net-zero

One family's effort to live their truth

▣ BY DAN CLERE ▣

My wife and I have chosen to prioritize our home as the lynchpin of our effort to live more sustainably.

It is hard to overstate the impact our homes have on the amount of coal and gas we burn. Our homes can greatly exacerbate our dependence on dirty energy or help free us from it. It can lessen our dependence on automobiles or make it worse. Our homes can contribute energy to the grid by casting the largest solar electric net ever from our rooftops or be energy sucking vampire boxes, cold and alone when their constant supply of fossil energy is interrupted.

I realize that "net-zero" is a misnomer on many levels.

While our house generates more electricity than it consumes, it enjoys abundant amounts of solar energy that should not be ignored. Regardless, the best journeys are ones where the end is not clear or even

possible to attain. Our primary reason for walking a path to net zero is love for our children. We deliberately choose to create a better world, not passively create a worse one. Because our energy choices are so inextricably linked to so many qualities of our world, we choose to champion a sun powered home over all others. By keeping this our guiding principal and inspiration, we have achieved difficult goals shared by many.

Like any path, ours comes from somewhere and goes somewhere else. It comes from a culture and lifestyle where intense waste is the default setting and it goes where our home and all its energy use is far closer to our daily allotment of sunshine.

Rather than ignore and even suffer from solar energy, we live in a home that "works" with sun-driven energy flows to both heat and cool our home. Cool nighttime breezes and shade trees are just as much a

product of solar energy as the heat we feel on our skin.

The result of this ancient cosmic design is that our home is exceedingly comfortable throughout most of the year without any electricity being used for heating or cooling of the living space. By opening and closing windows as needed our home stays between 65 and 75 degrees Fahrenheit most days of the year. On cold winter nights we enjoy our wood stove (with an outdoor air supply kit).

The orientation of our windows and their eaves/awnings not only means that the shortest day of the year is the brightest in our home, or that the longest day of the year is the shadiest, but that we have a front row view of the moon and stars, a legitimate need for some big picture windows, and the drama of the outdoors plays constantly from our "box seats." Our home's comfort comes from its systematic relationship with the pulse of natural rhythms.

Here I'll point out some simple design considerations that have allowed us to build such a nest:

■ In shaping our home like a caterpillar shapes its chrysalis, we allow breezes to flow unimpeded around the conditioned space. During the winter this aerodynamic lack of 'inside corners' and minimal surface area means our home's warmth is less challenged by the outside world. During the shoulder seasons we crank out operable casement windows that use the home's shape to "scoop" in heady breezes. Our open central stairwell promotes the "stack effect." During the height of the cooling season, this means we open our floor level casement windows just above the exposed foundation slab along with our bedroom windows upstairs. Throughout the night, cool mountain air flows in across our slab and relatively warmer air from the house blows out our bedroom windows.



Located on the edge of the Pisgah National Forest just south of downtown Asheville, the Clere house is the realization of a dream for contractor Dan Clere and his family (left). Of its many green initiatives, the structure is built in the shape of a caterpillar (above) to allow for unimpeded air flow and also has an outdoor living space to conserve energy used inside (below).



In the morning we close everything up and our home stays in the low to mid-seventies all afternoon despite 90-degree highs outside.

■ By wrapping the exterior sheathing with an inch of rigid foam we stop much of the heat transfer that otherwise would occur through conduction in our wood frame. By eliminating this “thermal bridge” our house maintains comfortable indoor temperatures despite changing conditions outdoors. It also helps that we framed with 2x6 studs 24” on center. This meant a larger surface area is covered with deeper insulation with fewer wood-framing members in contact with the exterior sheathing.

■ By locating our home on a lot previously cleared for and occupied by a single-wide mobile home, we built what is considered “infill development.” This means that rather than clearing native woods for a new home we replaced an energy hog with a small solar plant.

■ We limited the square footage of our house by giving spaces redundant purposes. For instance, our mudroom is also an isolated solar-gain space, an airlock, a traffic pattern connector/divider, and fire-wood storage. We wired a bedroom to have all the functionality of an office so that most days of the year we can work in it while certain other days we give it over to guests as a comfortable bedroom. Even things as simple as accommodating a comfortable couch in our open kitchen/dining space so we don’t feel the need to have a family room in addition to the living room. All of these design considerations result in our house “living large” while keeping our conditioned space to a minimum (1,650 square feet).

■ My favorite aspect of our home is the outdoor living space, particularly our 250-square-foot screen porch. This space is full of bird song and breeze and allows us to spread out most of the year into an outdoor space where we stay dry and don’t get bitten. While we enjoy this space more than any other in our home, we’ve never wasted a watt of electricity heating or cooling it. It’s the ultimate in comfort and the least energy intensive space in our home. We use it as both dining and living space.

■ With our small 3.77 kW solar electric system, we generate more solar electricity than we consume of grid power. This surplus pro-

duction is a crucial milestone on our path. We blow up our own mountains to get at their coal seams for the same reasons a crack addict robs a gas station – we feel like we need it and we don’t consider the consequences, just give us our “fix.” Our solar photovoltaic panels free us of this addiction. The grid actually accepts and sends to our neighbors the extra solar fired electrons we generate. Because our home’s electricity demand is so low we only need to generate between one and two dollars worth of electricity per day to offset all of our consumption. This “small is beautiful” energy budget allowed us to afford our PV system. By doing so we’re forcing our electric utility to become an energy manager rather than an energy generator – let the revolution begin.

Designed by: Owner
Electric: Buckingham Electric
www.buckinghamelectricinc.com
Solar: Sundance Power Systems
www.sundancepower.com
Plumbing: Bartlett Brothers Plumbing
HVAC: Air Craftsman
www.aircraftsmanheating.com
Energy Rater: Vandemusser Design, www.vandemusser.com
Prefabricated building components: Deltec Homes
www.deltechomes.com

All of this eliminates our home’s contribution to mountaintop-removal coal mining. By honoring natural rhythms and using our roofs to cast a wide net for sunshine we eliminate the need for permanent and irrevocable destruction of our Appalachian forest through mountain-top-removal. Our home is one that literally and figuratively prepares our family for a bright future. Our pipes will never freeze and our home will always feel like a home should – stable and supportive of life (especially ours).

The power this gives us is immeasurable.

Dan Clere is a North Carolina Licensed General Contractor (License Number 74292), a carpenter for JAG and Associates Inc., a Certified Interpretive Planner, and a graduate of Ball State University. He enjoys making esoteric concepts of building science understandable and relevant to laypeople. Many Ashevilleans know him as a former ground hog trainer and owl whisperer. He can be reached at DanielClere@Gmail.com.