

## The Case for Rebuilding Green: **surviving homes, gas flares, toxic materials left**

By Ted M. Tiffany

After the fires, our normal greetings were replaced by three quick questions to our friends and neighbors we encountered in the next month after the fires: How are you? How's your family? Did your house make it? The varying responses, hugs, and connections made with former acquaintances that became neighbors and friends changed our concept of community. We all faced some level of shock, terror, and sustained fear for those weeks following the initial event, which for most was slowly replaced by grief, acceptance, and motivation to do something productive.

Out of this need formed the Rebuild Green Coalition (RGC), a group of experts that have dedicated their lives to building sustainable buildings and communities, and setting standards for the industry such as LEED, CALGreen, and the Living Building Challenge. The RGC members saw a need to help homeowners rebuild in a smart, healthy way, without adding to the already expensive price tag for rebuilding -- we have all experienced the fascinating way that smart, green design, if done right, can actually *reduce* costs with efficiency gains.

Many of those affected by the fires, and the majority of those coming into the area to help, use the word "opportunity" in the context of how we will rebuild. We used that word, too, but after talking with many people who lost their homes we've replaced it with the "imperative" to act consciously and thoughtfully in this rebuilding effort. We owe it to those who lost lives and homes, and are struggling to reinvent their lives, to produce a better outcome through our efforts.



Photo: Arkin Tilt Architects, surviving straw bale home, Redwood Valley CA

The influx of offers to help has been incredibly heart-warming, it has also placed some burden on the homeowners and local officials – to figure out what to do with all this help, what is good and bad help, and where to apply it most effectively. For homeowners who have never built a home in their life and are now thrown into a process that most never attempt, information overload is a huge problem. Many of us in the green building movement have taken a lifetime to build knowledge and abilities to bring it to bear in this moment, for those that lost their homes. Green and healthy isn't just for the well-to-do or the perfectly insured, it's a human right we need to bring to the rest of the community, well beyond this rebuild effort that will occupy us for the next few years.

In many planning meetings since the fire, we've come across some incredible tales of homes that survived, studied those cases, learned from them, and have a need to share those lessons. Some homes spared were in fact miracles that defy logic; others that were protected by vineyards or good defensible space make sense; and yet some were designed to survive, yet didn't. David Arkin, of Arkin Tilt Architects, who specializes in green construction, had two straw-bale houses survive the fires: one in Sonoma and the other in the Redwood Valley in Mendocino. Designed with natural, regional, and sustainable materials, they are great examples of green construction, but also healthy survivors with lessons learned: metal roofs and high-performance sealed attics helped in their survival. Even if they did burn, these buildings wouldn't be toxic ash heaps; that in itself is another lesson – we should strive to use more natural materials that are safe for the families living in the homes and, in the worst case, safe for our firefighters.



Photo: Arkin Tilt Architects, surviving straw bale home, Sonoma Valley CA

### Time for a Change of Fuels

RGC members have talked a lot recently about eliminating the need for natural gas in new homes. With clean, safe, and efficient electric heat pumps available for heating and cooling, the need for natural gas space heating has virtually disappeared. New efficient water heaters, called air-to-water heat pumps, offer similar gains for the electricity argument. Gas ranges now represent the last stronghold of natural gas in the home – largely due to memories of unsatisfactory experiences cooking on old-style electric ranges. However, induction stovetops and electric convection ovens not only have been proven to cook faster, more evenly, and more safely than their gas counterparts, these newer technologies have also won the hearts and minds of many initially-skeptical cooks, including professional chefs.



Photo: Fire burns from a gas line near Aaron Dr. in Santa Rosa CA, Monday Oct 9, 2017 (Nhat V. Meyer Bay Area News Group).

Natural gas combustion furnaces, water heaters, and cooking appliances in the home have complicated indoor air quality for decades, with silent carbon monoxide poisoning claiming hundreds of lives each year. There is a better way – with all-electric homes that eliminate combustion and really only require carbon monoxide sensors to prevent vehicle exhaust from entering the home (a risk that can be eliminated entirely with detached garages or carports, and/or electric cars). After the fires subsided, it was disturbing to see gas flares such as the one pictured above, still burning when the combustible materials were all exhausted; the natural gas supply could not be turned off, and that fuel – which new, safe and efficient technologies have made completely unnecessary – kept the flames going.

### **Rebuilding to Code & What You Get**

When rebuilding, we have to meet current building codes. Some fire code sections are being revised for impacted areas, but the California Energy Code and Green Construction Code (CALGreen) will provide owners a very efficient home with improved wall insulation, high-performance windows, and low-flow water fixtures, among other green features. High-efficiency walls and roofs, mechanical systems, lighting, and code-required third-party testing will deliver far better homes that were built even five years ago, and even more so in comparison with the thousands that were built in the boom in the 80s and 90s.

While the energy code still allows natural gas, new homes on their path to zero net energy or carbon (ZNE or ZNC) are largely constructed using 100% electricity, because it is much easier to offset all of a home's energy usage with a solar electric system (photovoltaics) when it is all-electric than it is to try to offset the carbon impacts of using natural gas. After meeting the current code, getting to ZNE/ZNC is not as large a leap as many people think, because the codes have been progressively evolved over time to move toward the State's carbon emissions goal. A few relatively minor changes – such as reducing air leakage, a bit more insulation, and slightly better windows – all can be done cost effectively with good design and a contractor involved in the planning. These up-front investments can improve comfort and durability, with lower utility bills – reducing the total monthly housing expense.

### **Building Beyond Code**

There are many things that a home that just passes the code don't delivered; that starts with quality of construction, knowledge of healthy materials, and willingness to incorporate integrated design goals for sustainability, health, and resiliency. The current code doesn't require new single-family homes to be solar-ready – i.e., cost-effectively including features that make it easy to add solar electric systems in the future. Designing and installing these features – conduit, space, and roof structure to support solar – is least costly to do during the initial construction on the home. Opportunities to prepare for future improvements are not limited to solar production; they may include electrical services for electric vehicle charging, conversion of gas cooking to electric induction ranges, or converting gas clothes dryers to electric heat pump models.

While information on green materials is readily accessible online, not all green materials are locally available, and it really takes a strong discussion about sourcing, contractor knowledge, and action to get smart materials into the construction process. There are a thousand small choices in home construction

that have a large collective impact on the indoor air quality of the home and the natural resources through the life cycle of the building. Sources like the Living Building Challenge Red List for materials and Declare programs are a fantastic starting place for this conversation. <https://living-future.org/declare/declare-about/red-list/>

Discussions about incentive programs and funding for a resilient, green, and renewable rebuilt community are ongoing, and funds to support this goal are in development by a handful of agencies. The Rebuild Green Coalition, a powerhouse of experts in the sustainability field, is pushing these ideas forward throughout the planning community with education, outreach, and coordination between agencies. To bring this information to the homeowners, the Rebuild Green Coalition is hosting the Rebuild Green Expo – free to the community – on February 23 at the Santa Rosa Veterans' Memorial Building. The Expo will bring scores of green building experts and resources straight to the homeowners, architects, contractors, and others responsible for the rebuilding effort. More information on the Rebuild Green Expo is here: <http://rebuildgreenexpo.com/>