

Green on the Grid?

The 2030 Challenge

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Common wisdom tells us that the 'Greener' we want to be, the closer we need to be to 'Off the Grid'. The concept of being unplugged from the community power grid is touted as the best way to achieve energy independence.

In an ideal world, this might be the case, with 100% participation. But let's face it: not everyone is going to build a home severed from the security of community power supplies.

The 2030 Challenge was created by an architect named Edward Mazria, in direct response to scientist's warnings regarding dwindling resources and climate change. Mazria asks us all to design and construct Carbon Neutral buildings by the year 2030. This means that our homes, offices and factories would be producing enough power to offset all of their energy. The ultimate goal is to reduce the carbon dioxide and other greenhouse gases being released into the atmosphere to zero.

It might seem that the best way to construct Carbon Neutral buildings would be to ensure that public power supplies are never used, by building 'off the grid'. This would be true, if we were only concerned with balancing the operational (or use) energies of a Carbon Neutral building. We need to consider more than that. We need to think of *embodied* energies.

Every building requires a certain amount of energy to operate. Consider your home as an example: rooms need to be heated and cooled, food needs to stay edible, televisions need to be watched, webs need to be surfed. These activities comprise the *use* energies of our buildings.

We often fail to consider the hidden energy consumed prior to a building's construction. This is called its embodied (or pre-construction) energy. These embodied energies are expended in all sorts of ways, from the harvesting of materials used to construct a building, to the manufacture of goods, use of tools, and even transportation of the materials to a jobsite. The EPA and others have calculated what these energies are, so we have a very good approximation of what energy is consumed in getting a 2x4 from its origins as a tree to its destination in a wall.

This is an amazingly helpful piece of information. It allows us to determine how much embodied energy needs to be delivered back to the grid, or 'offset', in order to make our buildings Carbon Neutral. To offset both use-energy and embodied-energy, a building needs to produce more than it uses, so as to replenish this already-used power. A home that remains plugged to the grid can send alternative energy that it doesn't need back into the system, thereby reducing the overall demands on the fossil fuel powered plants.

Since 1970 we have exhausted over 75% of the world's known oil reserves. It is acknowledged that the earth's surface temperature is rising dramatically. The majority of scientists and climatologists agree that human influence is significant, specifically from our creation of green house gases. These are largely emitted as a by-product of burning fossil fuels. But what role do buildings play in this larger picture?

Buildings bear a much greater responsibility than was originally thought. According to the US Energy Research and Development Administration, buildings are responsible for almost half (48%) of all energy consumption and GHG emissions annually in the United States. Additionally, a whopping seventy-six percent (76%) of all power plant-generated electricity is used just to operate buildings. This represents a huge opportunity for the construction industry to reduce the release of CO2 and other green house gases over the next 20 years, which is considered a critical time frame for us to reverse global warming.

Adopting the 2030 Challenge means a commitment to incremental increases in building efficiency and use of alternative energies every 5 years. This allows us to adapt our practices and technologies to the end goal of net-positive, Carbon Neutral buildings. The timeline of fossil-fuel reduction in 2030 Buildings looks like this:

60% reduction of GHGs in 2010

70% reduction of GHGs in 2015

80% reduction of GHGs in 2020

90% reduction of GHGs in 2025

Carbon-Neutral in 2030 (using no fossil fuel, GHG emitting energy to operate).

Although this might seem like plenty of time for us to reach Carbon Neutral construction, the truth is that the technology exists now. Most of the 2030 strategies are found in the realm of energy efficiency. Tighter buildings with greater thermal resistance and efficient appliances are the place to start. Active alternative energy systems have become cheaper and easier to install. Current thinking says that hybrid energy systems working together are the best way to become Carbon Neutral.

Global warming aside, The 2030 Challenge still makes sense. It's a win-win proposition: buildings become more efficient and cost less to operate; pollution levels are reduced; alternative energy-related industries are promoted. The recently adopted Code of Colorado Regulations 723-2, Rule 3665 requires public utility cooperatives to buy back energy produced by individually owned systems under 2 Megawatts. This means that alternative energy systems can start to pay for themselves not just in energy savings, but also in energy production.

Given that an 'off-grid' home does not allow us to compensate the embodied energy used in *making* a building, staying on the grid could be 'greener' than we thought. Consider the option of paying back your building's energy deficit by taking on the 2030 Challenge.

To learn more about the 2030 Challenge, visit Architecture 2030 at www.architecture2030.org

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