

The Cardinal Points of a Zero (*NET*) Carbon House

Is there such thing as a Zero Carbon House?

All the materials and labour involved in the construction process create carbon gasses. There is a general understanding of the accepted definition of a 'house', so let's clarify the 'Zero Carbon' bit. All components manufactured across the globe and later transported to your site produce carbon and so creates a carbon footprint.

What you can do is build a home that uses less energy to function than traditional homes. You can power the home in part from renewable resources and build in features that will reduce the amount of energy needed to effectively function. You can calculate that the carbon arising out of the operation of your home will be netted off so that no more carbon is created than is neutralised. This type of house is called a Zero *NET* Carbon Home (ZNCH).

The products we select to construct a house have already created carbon (embodied carbon). We are informed by the United Nations Environment Programme that the component materials of our new home have created a large carbon footprint with construction accounting for 39% annually of the global greenhouse gas emissions.

The 'Net' part is an attempt to equal the carbon created after the house is complete and in operation (operational carbon) with carbon capture and removal. This is termed carbon sequestration.

Q. Will your new home create carbon?

A. Yes, but it will reduce carbon emissions over and above the 'just meeting the regulations home' and more so, if it is 'off grid' and only takes power from renewable sources and if it does not send waste to a municipal dumping place. This can include both mains sewerage and refuse collection. All the other aspects of modern life from the power equipment to any other possession will have created a carbon footprint to currently exist.

As an individual and not a government or multi-national manufacturer this is about all that is in your direct control, but that is a lot and a lot more than just about anything anyone else is doing. We can, with the help of consultants, assess the amount of carbon the construction and functioning systems of the house create and offset this quantity by planting trees, reflecting sunlight from roofs and constructing ponds etc. to balance this carbon footprint.

To clarify ZNCH will produce carbon as a result of its creation but the greenhouse gasses produced during operation will be minimised and other carbons will be captured and neutralised.

The Cardinal Points

What can we as Owner Builders do?

The cardinal points of a compass North, South, East and West can be used as a mnemonic device to give guidance going forward.

North	Need
South	Selection/Specification
East	Energy – saved and lost
West	Waste – during construction and on-going

N

(North) – Need

What do you ‘Need to do and why do you need to do it?’

We have all heard of the ‘Climate Crisis’ and its cousin the ‘Energy Crisis’. In order to combat both of these we can do our part by reducing our carbon footprint. That is good but are you a little extreme in seeking out the full ‘Zero Net Carbon’ option?

Are you one of the following?

The Prosumer – someone who likes the idea of creating your own energy from renewable sources and selling any excess energy to the grid. They will draw down energy from the grid when necessary.

Creative Consumer – someone who creatively use products for purposes other than that the manufactures intended. This is the hallmark of individualism in your wish to design and live in ‘your’ space and not in a predetermined box. Shipping containers and elaborate rainwater harvesting systems come to mind.

Independent Thinker – someone who has ideas and knowledge of facts not commonly stated. This can be of real financial benefit if you can spot trends before they come rolling in on a passing bandwagon. From a marketing perspective highly insulated and energy efficient homes are sought after and sell at a premium. More return for your investment while you are helping to save the world is always welcome.

If so, you are the type of person who along with nerds, technophiles and other assorted tree-huggers are moving into this area. You are also however joined by Nobel prize winners, 97 per cent of actively publishing climate scientists, worldwide scientific societies and government bodies and scientists from very nearly every country in the world who have handed down reports from the United Nations.

Good for you as you are right and wish to do something to tackle this crisis.

S

(South) – Selection/Specification.

Design your home and construct & specify how it is put together and what equipment is included as part of the build.

You and your designers should thoroughly investigate the options available to you to specify alternate lower carbon materials and look to include energy smart features. How is your home heated, ventilated and cooled? How will different materials be positioned and sealed to have air only leaving and entering the property, as designed?

You can select materials that are produced locally to lower the delivery miles or are made in a carbon reducing way? All cold bridges are eliminated and passive house conversations become the norm. High levels of insulation will be installed and building codes exceeded. Planning and management of the process becomes paramount and forensic examination takes place before anything is signed off or covered over. Discuss with your consultants what can be constructed off-site and delivered ready for inclusion as modern methods of construction (MMC) can reduce carbon (CO₂) and increase efficiency. Consider a digital twin to test the design as reports relate how actual homes are in reality less efficient than they were planned to be. Overall, planning and performance are where the action is.

E

(East) - *Energy saved and lost.*

You probably both buy and resell energy where you can and keep it and reuse it to reduce further purchase. Energy can be generated by passive or active means. Passive is where by the very design of the home, less energy is required to function and create a pleasant living environment. Active is where low levels of power are harnessed to create a larger return of energy. Pumps that circulate heating or withdraw heat from the ground or a near body of water fall into this category. This is rated as a co-efficiency and a value can be given to demonstrate the value of both passive and active systems.

W

(West) – *Waste during construction and ongoing.*

Waste comes in many forms and all you can do is try to control it as you will never eliminate it. Waste considerations start with the design of the home. Will designers reduce structural elements to sizes needed to support the structure or will they design to ensure they are never liable for any future insurance claim? This is called ‘over engineering’ and perhaps the hardest nut to crack as consultants assure you that they have heard of this ailment but luckily for you, their designs are immune.

Poor site management practices run from over ordering materials to incorrect storage and damage. Off cuts are unable to be used and are separated and tipped somewhere else at great expense. The waste material industry is making strides to recycle but waste tips are still busy.

How inventive are you at repurposing or reusing materials to reduce the carbon footprint of your build? There are examples of this working well but they are very much in the minority.

When you are occupying your home – how will you deal with waste?
What foodstuffs will be composted to use in the garden, what water saving/harvesting and recycling devices will be standard practice in this home going forward?

Are construction materials considered as recyclable on the completion of their natural life within the home – 40,50 or 60 years hence?

What does the future hold?

We cannot eliminate carbon production but we can try to reduce it and neutralise it. In 30 years' time it is expected that 80% of the current houses will still be with us so as far as new build is concerned, we are concentrating on the next generation of 20% of the housing stock.

The world's governments are signing treaties and protocols that are increasing the building codes to legislate so that the constructors meet higher standards. We need to embrace a ZNCH future above and beyond these regulated benchmarks and not only the construction industry but also agriculture and forestry.

To change the world is a gigantic initiative and every little helps. As an Owner-Builder you have your chance to make a difference in your world and everyone else's world.

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