sero

For Attention of: The Minister for Housing and Local Government
Welsh Parliament
Cardiff Bay
Cardiff

CF99 1SN

RE: SETTING THE TARGET FOR ZERO CARBON

Monday, 13 July 2020

Your Ref.:
Our Ref.: 20-07-01_Letter to Minister_v2

Dear Minister,

I am writing to highlight a concern about how Welsh Government sets and communicates the goals of delivering net zero operational carbon ("Zero Carbon") across the various regulatory and funding frameworks. This concern is not the target of zero carbon, nor timescales to deliver them, but rather that the wrong metric will deliver the wrong results, and embed unintended consequences and costs.

The wrong metric most commonly used to convey this zero carbon target is the Energy Performance Certificate (EPC) or its underlying Standard Assessment Procedure (SAP).

The SAP score and resultant EPC rating were designed by the BRE for UK Government as a minimum standards compliance tool to fulfil the EU obligation for a state-wide mechanism. It assesses whether a home is no worse than a nominal equivalent to achieve this. In recent years, it has been co-opted to try and fulfil all sorts of other functions that broadly support the drive towards zero carbon. It is this expansion of the use of SAP and EPCs that is the root of this particular concern.

A zero carbon home, as defined by the UK Green Building Council (UK GBC) (and Sero's own approach), is one which over the course of the year, emits or causes emission of, no carbon dioxide or equivalent climate change gases (0.0 gCO_{2eq}). This would consider the heating, lighting, hot water, fans and pumps permanently fixed into the building ("regulated energy"), but also the plugged-in energy usage from the residents such as TVs, fridges, phones and more ("unregulated energy").

Typically, to be zero carbon, a building will generate zero carbon energy on-site from renewables and share some of this generation with the UK's National Grid (when it is not required in the home). This power fed to the grid puts zero carbon energy in, and is deemed to displace the equivalent grid generation carbon emission at the prevailing rate. By balancing what is fed in to the National Grid with what is drawn from the National Grid over the year, a home (or any other building) achieves net zero operational carbon.

No SAP or EPC rating is equivalent to zero carbon for one fundamental reason: time of demand.

To achieve its intended function as a compliance check, SAP uses a fixed constant conversion factor from energy (kWH) to carbon emissions (gCO_{2eq}) for all fuel sources. Whilst adequate as a regulatory check, this simplification ignores the time of demand of the energy. All energy generation, but most notably electricity, causes emissions that vary for each kWh depending on time. For electricity, during a single day one kWh can result in emitting anything below 75gCO_{2eq} to above 300gCO_{2eq}. This variation is driven by a combination of the renewables on the National Grid, and the demand for power (the latter triggering 'dirtier' Grid generation in order to meet the demand).

t: 029 2000 1415
e: info@sero.life
w: sero.life

Vision House,
Oak Tree Court,
Cardiff Gate
Business Park,
Cardiff.

sero

The consequences of what may seem to be a small detail are huge.

Any delivery mechanism using SAP or EPC will inherently value all kWh the same regardless of time. Buildings will therefore consider pushing photovoltaic excess power to the Grid at noon (at c.75gCO_{2eq}) to be equivalent of when they draw power back during the evening peak (at c.300 gCO_{2eq}). In this scenario, SAP will claim 1kWh balances 1kWh out due to the fixed constant conversion factor, but in carbon terms they have caused c.225 gCO_{2eq} of emissions.

Not only does this not equate to zero carbon, but pushing power to the Grid at peak Grid renewable generation times is more problematic than helpful. It can lead to increased payments for grid renewables to 'switch off', and does not mitigate the need for higher carbon emission power generation at times of high demand. It therefore risks undermining the commendable and ongoing achievements of the National Grid to reduce the carbon intensity of large scale electricity generation over the last few decades.

Time is also a forgotten factor in the wider journey towards zero carbon. The SAP and EPC metrics result in a drive for these ratings being achieved now, whereas the real ask is for zero carbon by a date in the future (albeit as soon as practicable). The zero carbon date approach allows the National Grid's ongoing decarbonisation to support the homes, and the decarbonisation of the homes to support the National Grid. Conversely, the SAP and EPC approach ignores the future decarbonisation of the Grid, forcing homes to 'go it alone' to zero carbon. Inevitably, this makes the challenge for our homes greater.

We would therefore strongly encourage the Minister to stay true to goal of "Zero Carbon by" and setting relevant year targets for differing sectors, perhaps starting with social housing to be zero carbon by 2030.

We acknowledge that this requires new assessment tools, though thanks to the foresight of the Welsh Government's Innovative Housing Programme we are already funded by you to build and make freely available one such example (our H.E.D.G.E.H.O.G.). Regardless of whether that particular tool is adopted or others built, the costs of any tools will be inconsequential compared to the costs incurred by building and retrofitting Welsh homes to the wrong metric, and the costs incurred by the energy grids to mitigate the uncoordinated supply and demands uncoordinated homes will inflict. Not to mention that they will almost certainly fail to deliver zero carbon in practice.

We would be delighted to explain this further should you wish,

Yours sincerely,

Andy Sutton RIBA
CoFounder & Design+Innovation Director

CC: James Williams, CoFounder & Managing Director

Enc.: