Warwick District Council NZC DPD Examination Matter 3 Viability Testing and Assessment: Viability Note Addendum

Warwick District Council
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1 Summary of the % Cost Uplifts used in the Viability Study

3% Uplift for Residential Dwellings

1.1 The approach taken to calculate the 3% uplift is outlined in SUB5 (Energy and Sustainability Policy Review) (Annex 1, Page 21) and in SUB7 (Paragraphs 4.14 - 4.20, Pages 55 - 56) and in the Council's examination statement to Matter 3 (Paragraph 6.1, Page 11).

1.2 Data has been extracted from reputable, and comparable sources including:

1) National Government's Future Homes Standard Impact Assessment (Ministry of Housing, Communities & Local Government [MHCLG], 2019)[1]

2) Etude, Currie and Brown Energy and Modelling (2021) for Cornwall Council Climate Emergency DPD[2]

3) MHCLG Live Tables on Energy Performance of Building Certificates[3] (October 2021)

4) BEIS (Department for Business, Energy, Innovation and Skills) national carbon prices for 2021-2050 and future grid carbon intensity projections, both from BEIS Green Book Supplementary Guidance: Valuation of Energy Use and Greenhouse Gas Emissions for Appraisal[4] (October 2021).

1.3 In respect of the costs associated with an increase to residential fabric efficiency and low carbon heat to match the Future Homes Standard, the following steps to calculate were taken:

a) The proposed cost of achieving the Future Homes Standard (FHS) fabric requirements is taken from the Etude, Currie & Brown Cornwall energy review 2021 (page 34). This figure represents the full cost uplift for all parts of the notional building specification that are improved in Part L 2025 (FHS), which include uplifts to insulation (within walls, floors and roof) and glazing. The figure is £1,977 for a three-bedroom semi-detached house of 93 square metres floor area, representing a 1.2% uplift on the base build cost used in that study (page 34). This was cross checked with the Government MHCLG impact assessment of building to the Future Homes Fabric to ensure no regional impacts was skewing the data. The MHCLG cost uplift for the

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/836925/REQUEST.pdf

[2] https://www.swenergyhub.org.uk/wp-content/uploads/2021/04/20200359-Climate-Emergency-DPD-Energy-review-and-modelling-Rev-H.pdf

[3] https://www.gov.uk/government/statistical-data-sets/live-tables-on-energy-performance-of-buildings-certificates#epcs-for-all-new-domestic-properties-including-new-build-dwellings-conversions-and-change-of-use

[4] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

fabric-only part of the FHS was £2,160[5] (semi-detached house of 84sqm). This would translate to a 1.3% cost uplift if applied to the same base build cost as was used for the Cornwall study. Both of these sources of fabric cost uplift data are from a baseline of basic compliance with Part L 2013, which is appropriate as this was the version of Part L that was in place for the period in which the viability assessment base build costs are drawn.

b) The proposed cost of achieving the installation of an Air Source Heat Pump system was also taken from the Etude, Currie & Brown Cornwall energy review 2021 (page 34 – please note in this evidence piece for Cornwall, the authors file the cost of a heat pump under the cost of meeting their proposed 'total energy use intensity' target). This was £1,562 uplift (0.9% uplift) compared to a gas boiler baseline. We were not able to compare this to a national FHS heat pump figure because the FHS Impact Assessment did not itemise a per-home heat pump system cost uplift.

1.4 To calculate the average costs of offsetting to net zero regulated carbon after the Future Homes Standard is applied, the following was calculated:

a) Annual average CO_2 data per new build home in Warwick from 2020 onwards was extracted from the MCHLG live data tables (Table NB7) on new build energy performance certificates (based on SAP as built, to Part L 2013 as was the regulatory standard when those buildings were completed and no local policy was in place requiring any improvement on this)

Result: 1.48 tonnes CO2/year.

b) Reduce the per-home CO_2 figure by 75% to reflect policy for on-site reductions and achieving of FHS (noting that 75% reduction on part L 2013 is equivalent to 63% reduction on Part L 2021, as sought by the DPD policy)

Result: 0.37 tonnes CO2/year.

c) Multiply remaining CO_2 per home by BEIS national carbon price for 2021, central figure. Then:

i. **Either** multiply the 2021 £/tonne price by 30 years (static offset)

Result for 'static offset': (0.37 tonnes CO_2 per year x £244.63 per tonne = £90.57) x 30 = £2716.98 total offset payment for this home.

ii. **Or** (dynamic offset): reduce the 2021 cost by a percentage each year to 2050, with the percentage reduction each year reflecting the percentage reduction in grid carbon as projected by BEIS Green Book as follows.

[5] FHS Impact Assessment cost uplift for "Option 1" (£2560, page 7) minus £400 for waste-water heat recovery system (page 30) because that element was in fact removed from the indicative specification for the FHS that was later released within the Future Homes Standard Consultation Response (p18).

Result: £90.57 in 2021+ £84.62 in 2022 + £81.17 in 2023 … so on to 2050

And then increase the cost each year to reflect the published year-on-year increases in BEIS monetary value per tonne of grid carbon:

Result: £90.57 in 2021 + £85.91 in 2022 + £82.40 in 2023 … so on to 2050

iii. Calculate a sum of all years from 2021-2050.

Result: £854.36 total offset payment for this home.

1.5 Noting that a home may (instead of offsetting) use on-site solar panels (PV) to reduce its regulated carbon emissions to zero, as this is strongly encouraged by the policy NZC2(B), an alternative calculation was also performed to estimate the cost of solar panels. To do this, we also drew on the same Etude, Currie & Brown Cornwall energy review 2021 document that is cited above. This document does not give an exact figure for 'PV to meet net zero regulated carbon in an FHS building'. However, it does give an amount of solar panels necessary to meet *total* regulated and unregulated energy use in an energy efficient new-build which is 10 solar panels (page 14). This is costed as £3,900 total (page 34). Based on a typical split of approximately 60% regulated: 40% unregulated energy for an energy efficient new build home, to address the regulated portion of the energy this would mean 6 solar panels would be needed at a cost of approximately £2,340 (i.e. 60% of £3,900). This would represent a 1.4% uplift on the base build cost used in this same study (page 34). We note this is an approximation, but it is a reasonable one and any further adjustments for more preciseness would make a negligible difference to the overall cost uplift % and subsequent impact on viability scenarios.

1.6 The conclusion of these calculations are summarised in Table 1

Table 1: Summary of cost uplift sources, amounts and % uplift on base build

Element of policy		**Source**	**Cost uplift on base build semi-detached**	**% cost uplift on base build**
Future Homes Fabric (insulation + glazing; no change to airtightness)		*Etude,* Currie + Brown 2021, page 34	£1,977	1.2%
		Or: FHS Impact Assessment, 2019 (considered less accurate as data is older) (page 7, minus waste-waste heat recovery page 30 as not part of actual FHS spec)	£2,160	1.3%
Heat pump		Etude, Currie + Brown 2021, page 34	£1,562	0.9%
Allowable solutions to reduce remainder of	*Either:* 6 PV panels, OR	Etude, Currie + Brown 2021, page 34 (scaled down to reflect only enough panels to cover regulated energy, while p14 explains	£2,340	1.4%

regulated emissions to zero **(either/or)**		that the p34 cost is for 10 panels)		
	Or: Offset ('static' without grid carbon reductions)	National live data tables on new build energy performance + BEIS Green Book Supplementary Guidance	£2717	1.6%
	Or: Offset ('dynamic' with grid carbon reductions)		£854	0.5%

1.7 Achieving a 75% carbon reduction against Part L 2013 to achieve the Future Homes Standard notional specification (equivalent to 63% against Part L 2021) and offset the remaining carbon using a dynamic offset (taking into account grid decarbonisation as policy NZC2(C) allows for results in a **2.6% uplift** if FHS fabric costs are taken from Etude/Currie & Brown 2021. This is shown in Table 2. This is our selected option, as the figures are more up to date than the MHCLG figures (noting there is only a negligible % uplift difference between the two).

Table 2: Summary of cost uplifts combined (FHS + 'dynamic' offset option)		
	Cost	% uplift on base build
Fabric (Currie + Brown 2021)	£1,977	1.2%
Heat pump	£1,562	0.9%
Offset ('dynamic' with grid carbon reductions)	£854	0.5%
TOTAL	£4,393	2.6%

1.8 Achieving a 75% carbon reduction (to achieve the Future Homes Standard notional specification as per Etude/Currie & Brown 2021 above) and offset the remaining carbon using a static offset (not taking into consideration grid decarbonisation): **3.7%** uplift as shown in Table 3. This scenario is unlikely to materialise because the DPD's initial 63% on-site required reduction in regulated carbon is designed to exclude gas boilers and most likely mandate a heat pump or other similarly efficient electrically-driven heating solution. Therefore, it is reasonable to assume, for the purposes of this DPD, that all homes are all-electric and will therefore take advantage of grid carbon reductions in any offset payment.

Table 3: Summary of cost uplifts combined (FHS + 'Static' offset option)		
	Cost	% uplift on base build
Fabric (Currie + Brown 2021)	£1,977	1.2%
Heat pump	£1,562	0.9%
Offset 'static' over 30 years, i.e. without grid carbon reductions)	£2,717	1.6%
TOTAL	£6,256	3.7%

1.9 Achieving a 75% carbon reduction (to achieve the Future Homes Standard notional specification as per Etude/Currie & Brown 2021 above) and add sufficient rooftop PV to address the remaining regulated carbon emissions to zero: **3.5%** uplift as shown in Table 4.

Table 4: Summary of cost uplifts combined (FHS + solar panels)		
	Cost	% uplift on base build
Fabric (Currie + Brown 2021)	£1,977	1.2%
Heat pump	£1,562	0.9%
PV panels to reduce remainder of regulated carbon emissions to zero	£2,340	1.4%
TOTAL	£5,879	3.5%

1.10 The cost uplift data from the FHS Impact Assessment (fabric), Currie & Brown (heat pump), and offset costs (Bioregional, as above) were summed to give a total cost uplift for an average home (taking the three-bedroom semi-detached home as a reasonable mid-point of the range of home types from flats to detached).

1.11 Recognising that building costs are constantly in flux and may have changed since the FHS Impact Assessment and Currie/Brown work, this absolute cost was not directly applied to the Warwick base build cost scenario. Rather, those costs were translated into a % uplift in the base build costs of a home as used in the Currie & Brown report. This translated to a 2.6% uplift and reflects a new home built to the Future Home Standard and a dynamic offset.

1.12 This was rounded up to 3% to allow a margin of error and an allowance for the fact that some homes will use PV rather than offsetting. That 3% uplift was applied to the current base build cost of a home in Warwick as estimated by the professional viability consultants (BNP Paribas) appointed by Warwick.

1.13 These tables show that the cost uplift for using PV as the net zero carbon solution is slightly higher than that for a carbon offset. In reality, it is likely that most applications will use a combination of PV and offset to reduce their regulated carbon to zero. Offset will play more of a role in situations where for technical or policy reasons that the amount of rooftop PV generation is constrained by the setting. For example, taller buildings (where there is relatively less roof space and more floor space, thus more carbon to offset and less space for PV to offset it), overshadowed buildings, buildings where plot shape/size means the roof cannot be optimally oriented towards the sun, and buildings where there are visual protections to natural or manmade heritage. All of these constraints arise more often in brownfield and infill sites. As it is expected that a significant proportion of the remaining housing delivery in the plan period will happen on brownfield and windfall sites (windfall usually is small infill), this means the overall balance across the housing delivery is likely to skew slightly towards offsetting. Table 5 shows an average of 3.1% cost uplift between the dynamic offsetting and the solar panel cost uplift. Therefore a 3% cost uplift is a reasonable assumption for testing in the viability assessment.

Table 5: Average of total cost uplift depending on choosing PV panel route or dynamic offset route		
	Cost	% uplift on base build
FHS + 'dynamic' offset option (Table 2)	£4,393	2.6%
(FHS + solar panels) (Table 4)	£5,879	3.5%
Average	£5,136	3.1%

6% Uplift for Non-Residential Development

1.14 The 6% uplift for non-residential buildings is outlined in SUB6 (Paragraphs 4.22 – 4.23). It is however noted that an incorrect source had been named, and should in fact reference *Currie & Brown (2018) report: Cost of Carbon Reduction in New Buildings*[6].

1.15 The source data for the 6% uplift as repeated in SUB6 (Paragraphs 4.22 – 4.23) is the Currie and Brown (2018) report which is summarised at Table 9.1 of that report.

Table 9.1 – Indicative cost uplifts of the potential standards to reduce carbon emissions

Standards	Target	Percentage of construction cost
Energy Efficiency	Minimum carbon reduction of 15%	2%
On site saving	Total carbon reduction of 35%	1%
Allowable solutions	Offset 65% of regulated CO_2 emissions	2-4%
BREEAM	BREEAM Excellent rating	1-2%

Source: Currie and Brown (2018). https://www.cse.org.uk/downloads/file/cost-of-carbon-reduction-in-new-buildings.pdf Page 56

[6] Source: https://www.cse.org.uk/downloads/file/cost-of-carbon-reduction-in-new-buildings.pdf

1.16 We note that the Currie & Brown report (2018, page 18) notes that their 'allowable solutions' offset cost was based on a £95/tonne carbon value, multiplied by 30 years, resulting in a cost of £2,850 per tonne. While the Warwick Net Zero Carbon DPD seeks a higher per-tonne cost of £245 per annual tonne, the Warwick offset calculation allows the amount of carbon offset to be reduced for each of the future years in line with future grid carbon reductions (BEIS Green Book guidance, ibid). Our calculation of the implications of future grid carbon reduction results in a total 30-year offset payment of £2,534 for the full 30 year period, which is lower than the amount allowed for in the Currie & Brown report which did not make allowance made for future grid carbon reductions. Therefore the % cost uplift allowance made by the Currie and Brown (2018) report would easily be enough to cover the impact of the Warwick DPD carbon offset requirement.

1.17 The Currie and Brown 2018 report concludes a % uplift of 5-7% for net zero regulated emissions, excluding the BREEAM Excellent uplift. The 6% uplift figure used in SUB6 (Paragraphs 4.22 – 4.23) represents a mid-point of the Currie and Brown 2018 assessment excluding the BREEAM uplift. This is considered reasonable in the context of the Warwick Net Zero DPD as it reflects the policy approach of the DPD in relation to the overall on site carbon saving of 35%, including a minimum carbon reduction from energy efficiency and an offset of the remainder of regulated carbon emissions (i.e. 65%) compared to Part L 2013.

1.18 In reference to BREEAM, the DPD does not introduce a BREEAM Excellent requirement; the DPD instead sits alongside the existing adopted Warwick Local Plan Policy CC3 which only requires BREEAM 'Very Good'.

1.19 Paragraph 9.4 of the Currie & Brown (2018) report cited above notes that "The most significant costs associated with achieving higher BREEAM ratings are often associated with meeting minimum energy requirements". The 'higher' BREEAM ratings, 'Excellent' and above, require achievement of a certain number of BREEAM credits for mandatory minimum energy performance improvement. By contrast, a 'Very Good' rating – which the existing adopted Warwick Local Plan requires – does not have any mandatory minimum energy-related credits. The uplift of 1-2% for BREEAM Excellent is therefore not relevant to the specific cost uplift calculated for the DPD policies, as neither the adopted Warwick Local Plan (Policy CC3) nor the polices within the DPD require BREEAM 'Excellent' or above.

1.20 Therefore, the figure of 6% (excluding BREEAM) was used for the DPD viability assessment. The following table summarises the choices reasonably made to compile the non-residential cost uplift to meet the DPD requirements for on-site savings and offset, based on the Currie & Brown (2018) report cited above.

Table 6 summarising non-residential build cost uplift suitable for testing for emerging Warwick Net Zero Carbon DPD	
Element of improvement on carbon emissions rate set by Building Regulations 2013	Cost uplift (Currie & Brown 2018, as above)
Energy efficiency	2%

Total minimum on-site saving of 35%	1%
Allowable solutions (offset remaining 65%)	3% (midpoint of 2-4%)
Total build cost uplift for DPD policies in non-residential	6%

1.21 No alternative evidence-based figures for cost uplift in non-residential local buildings been proposed during the examination or prior consultation, but there have been requests for further clarity on data sources and interpretation which we trust this addendum addresses.