BIRMINGHAM DEVELOPMENT PLAN EXAMINATION

Policy TP4: Additional Note on Viability of CHP in schemes of 200 residential units or more.

Background

1.1 This note responds to the inspector's request for further explanation of the conclusions set out in the Birmingham Places for the Future Technical Note: Viability Assessment (EXAM 28) in relation to the issue of the viability of Combined Heat and Power (CHP).

1.2 Policy TP4 deals with low and zero carbon energy generation. It requires developers to incorporate the provision of low and zero-carbon forms of energy generation in new developments wherever practicable, and in the case of residential developments of over 200 units it requires first consideration to be given to the inclusion of CHP generation or connection to an existing CHP facility. The policy does not seek to make the use of CHP mandatory, but it does seek positively to promote its use in order to build on existing schemes within the city and create a wider network with the potential to serve existing as well as new development.

1.3 The 200 unit threshold within the policy is derived from advice provided in the Technical Note (EXAM28), prepared by Atkins and in particular paragraphs 4.13 – 14 of that document. It should be noted that only 32 (2.4%) of the 1,312 sites listed in the 2014 SHLAA (EXAM 6) had a capacity above this threshold. However these sites are expected to deliver a total of 16,731 dwellings within the plan period – 43.6% of the 38,395 SHLAA capacity on identified sites.

The Viability Assessment

2.1 The methodology for the viability assessment is described in paras 1.4 to 1.14 of EXAM28.

2.2 The assessment drew on the conclusions of the Affordable Housing Viability Study (H6) prepared by ENTEC in relation to the division of the city into 'hot',' moderate' and 'cold' market areas, based on the strength of house prices (see appendix A of H6). These areas are as follows:

Hot areas comprise: Edgbaston, City Centre, Nechells South, Bearwood, Harborne, Sutton Four Oaks, Billesley, Moseley, Sutton Trinity and Sutton Vesey.

Moderate areas comprise: Bournville, Selly Oak, Hall Green, Walmley, Yardley Wood, Balsall Heath, Brandwood, Erdington (South East), Longbridge and Sparkhill

Cold areas comprise: Bartley Green, Erdington (North West), Northfield, Lea Hall, Aston, Perry Barr, Oscott, Shard End, Sheldon, Small Heath, Sparkbrook, Washwood Heath, Yardley and Nechells (North)

2.3 This division is broadly comparable to the definition of higher and lower value residential market areas in the GVA CIL Viability Assessment (EXAM 2G) – see in particular Map B1 in Appendix B.

2.4 18 of the 32 sites in the 2014 SHLAA above the 200 unit threshold are within the 'hot' market area (with a capacity of 7,546 dwellings). 10 are within the 'moderate' area (capacity 8,118) and only 4 are in the 'cold' area (capacity 1,067).

2.5 Based on an analysis of the most recent available SHLAA (at the time this was the 2010 version) the assessment then identified a series of six case studies which would be representative of the range of housing sites within Birmingham. These are:

Case Study 1: 15 units – apartments
Case Study 2: 15 units – housing
Case Study 3: 50 units – apartments
Case Study 4: 50 units – housing
Case Study 5: 200 units – mixed residential
Case Study 6: 500 units – mixed residential

2.6 Viability was tested for each of these case studies, within each of the three market areas, giving a total of 18 scenarios. The assumptions used in the viability assessment are summarised in section 3 of EXAM28.

2.7 The construction costs utilised in the assessment incorporate the costs of achieving compliance with the non-energy elements of the Code for Sustainable Homes (CfSH). The costs of applying different forms of renewable energy generation are then applied separately to enable the viability implications of different approaches to be identified.

2.8 Assessments were carried out for 2011 (the year of the study), 2013 and 2016 (the date of the planned requirement for all new homes to be zero-carbon).

Current and Future Viability - Outcome

3.1 EXAM 28 does not provide full details of the results of the assessment for each scenario at each of the study dates, but the outcome of the assessment is summarised in paragraphs 3.25 to 3.58 and further detail is provided in Appendix D.

3.2 Table 3.5 (page 15) shows the base position in terms of viability at 2011, on the assumption that homes are built to CfSH level 3 and with 35% affordable housing in 'hot' areas and 20% affordable housing elsewhere. Schemes are considered to be viable where the developer's return is 20% or above. Under these assumptions all the case studies are viable in 'hot' market areas, but only case studies 4, 5 and 6 in moderate areas and none are viable in 'cold' areas.

3.3 In the following paragraphs the viability of the six case study examples is considered. In each case a table is provided showing viability at 2011 by market area for different levels of the CfSH and for different renewable technology options. This shows that at 2011 CfSH5 zero carbon with CHP is only viable for case studies 4, 5 and 6 and only in hot market areas. None of the case studies are viable in moderate or cold areas. Tables are not provided showing viability at 2013 or 2016, but the commentary makes it clear that although viability improves over time, this is not sufficient to change this situation.

3.4 Some further detail of the analysis is given in appendix D. This provides a table giving details of the costings and values used in the assessment for each case study, but only for 'hot' market areas.

3.5 The rows at the bottom of each table show, for different renewable technology options:

- The performance of the option in achieving the carbon reduction targets required at different levels of the code. Outcomes shown in green meet the target, while outcomes shown in red do not.
- Developer's return, with the viability threshold being set at 20%.

This confirms that CfSH level 5 zero carbon and CHP remains viable for the hot areas in 2013 and 2016.

Current and Future Viability – Additional Evidence

4.1 The material presented in the document does not therefore present a full picture of the viability results. Although the viability position at 2013 and 2016 is discussed in the text in section 3, the full results of the viability assessment are not presented.

4.2 To address this further information has been provided by Atkins and this is set out in tables attached as an appendix to this note. These tables set out the viability position for all six case studies at 2011, 2013 and 2015 on the same basis as tables 3.6, 3.8 and 3.10 to 3.13 of the original report.

4.3 Since the submitted BDP policy only applies to schemes of over 200 units, only case studies 5 and 6 are directly relevant, and the tables below summarise the viability conclusions in relation CfSH level 5 and CHP for these case studies in 'hot', 'moderate' and 'cold' areas, at 2011, 2013 and 2016.

Case Study 5 – 200 units mixed residential

	2011	2013	2016
Hot	20.1%	23.4%	28.5%
Moderate	7.9%	11.0%	15.6%
Cold	-4.8%	-2.0%	2.2%

Case Study 6 – 500 units mixed residential

	2011	2013	2016
Hot	22.4%	25.7%	30.7%
Moderate	10%	13.0%	17.6%
Cold	-2.9%	-0.2%	3.9%

4.4 These tables confirm that in the 'hot' areas in 2016 level 5 CfSH and CHP will deliver returns well above the viability threshold, meaning that it is likely to be a viable approach in the vast majority of residential schemes of over 200 units in those areas.

4.5 The position in the 'moderate' areas is less positive, with the 20 % viability threshold not being achieved in either case study. However in both cases by 2016 the position is moving towards viability with a significant improvement in the developers' rate of return compared to 2011. In these conditions it is reasonable to conclude that CfSH level 5 plus CHP would be viable in some cases within this area. In this respect it should be noted that the moderate area includes parts of Sutton Coldfield which are included in the higher value residential market area in the CIL Viability Assessment.

4.6 There is also an improvement in the viability position in the cold areas – but not sufficient to bring the expected developers' rate of return near to the viability threshold. Few, if any, schemes are likely to be viable within this area.

Conclusions

6.1 The Viability Assessment confirms that residential schemes of over 200 units built to CfSH level 5 zero carbon and with a CHP connection will be viable at 2016 in many parts of Birmingham, but not in all areas. Significantly those parts of the city with the strongest viability are also the areas with the greatest potential for schemes of this scale to come forward, so in practice CHP is likely to be viable for the majority of schemes within this size range .

6.2 The Assessment also confirms that CHP is unlikely to be generally viable in schemes below the 200 unit threshold.

6.3 As already noted, the submission BDP does not seek to require the use of CHP – but does require it to be the first consideration for schemes of more than 200 units. This reflects the potential for such schemes to contribute to the development of city-wide CHP networks with the potential to serve existing as well as new development, thereby enhancing the benefit in terms of carbon reduction.

6.4 In the light of the viability evidence the Council continues to believe that this is a sound approach.

Appendix

CASE STUDY 1: 15 APARTMENTS

2011	Hot	Moderate	Cold
CfSH3	22.9%	10.6%	-1.9%
Cfsh3 + connected CHP	19.0%	6.7%	-5.7%
CfSH4	22.8%	10.5%	-1.9%
Cfsh4 + connected CHP	19.0%	6.7%	-5.8%
CFSH4 + PV and Solar	7.6%	-4.6%	-17.1%
CfSH5	12,9%	1.6%	-9.9%
CfSh5 + connected CHP	9.3%	-1.9%	-13.4%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	8.1%	-3.2%	-14.7%
CFSH5 + PV and Solar	-1.1%	-12.3%	-23.9%

2013	Hot	Moderate	Cold
CfSH3	26.2%	13.6%	0.8%
Cfsh3 + connected CHP	22.5%	9.9%	-2.9%
CfSH4	26.2%	13.6%	0.8%
Cfsh4 + connected CHP	22.4%	9.8%	-3.0%
CFSH4 + PV and Solar	11.5%	-1.1%	-14.0%
CfSH5	15.8%	4.3%	-7.5%
CfSh5 + connected CHP	12.4%	0.9%	-10.9%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	11.2%	-0.3%	-12.1%
CFSH5 + PV and Solar	2.3%	-9.2%	-21.0%

2016	Hot	Moderate	Cold
CfSH3	31.3%	18.2%	4.9%
Cfsh3 + connected CHP	27.8%	14.7%	-1.4%
CfSH4	31.3%	18.2%	4.9%
Cfsh4 + connected CHP	27.7%	14.6%	1.3%
CFSH4 + PV and Solar	17.3%	4.2%	-9.1%
CfSH5	20.4%	8.4%	-3.8%
CfSh5 + connected CHP	17.2%	5.2%	-7.1%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	16.0%	4.0%	-8.2%
CFSH5 + PV and Solar	7.6%	-4.4%	-16.7%

CASE STUDY 2: 15 HOUSES

2011	Hot	Moderate	Cold
CfSH3	29.0%	16.6%	3.4%
Cfsh3 + connected CHP	24.9%	12.2%	-1.1%
CfSH4	27.8%	15.6%	2.5%
Cfsh4 + connected CHP	23.5%	11.3%	-1.9%
CFSH4 + PV and Solar	19.3%	7.1%	-6.0%
CfSH5	20.9%	9.4%	-3.1%
CfSh5 + connected CHP	16.8%	5.2%	-7.2%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	15.8%	4.3%	-8.1%
CFSH5 + PV and Solar	12.9%	1.3%	-11.1%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	11.5%	0.0%	-12.5%

2013	Hot	Moderate	Cold
CfSH3	32.9%	20.2%	6.6%
Cfsh3 + connected CHP	28.7%	16.0%	2.3%
CfSH4	31.7%	19.2%	5.7%
Cfsh4 + connected CHP	27.5%	15.0%	1.4%
CFSH4 + PV and Solar	23.5%	10.9%	-2.6%
CfSH5	24.5%	12.7%	-0.1%
CfSh5 + connected CHP	20.5%	8.7%	-4.1%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	19.6%	7.8%	-5.0%
CFSH5 + PV and Solar	16.7%	4.9%	-7.9%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	15.4%	3.5%	-9.3%

2016	Hot	Moderate	Cold
CfSH3	39.0%	25.8%	11.6%
Cfsh3 + connected CHP	34.9%	21.7%	7.5%
CfSH4	37.8%	24.7%	10.5%
Cfsh4 + connected CHP	33.7%	20.6%	6.5%
CFSH4 + PV and Solar	29.9%	16.8%	2.6%
CfSH5	30.1%	17.8%	4.4%
CfSh5 + connected CHP	26.3%	13.9%	0.6%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	25.4%	13.1%	-0.3%
CFSH5 + PV and Solar	22.7%	10.3%	-3.1%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	21.4%	9.0%	-4.4%

CASE STUDY 3: 50 APARTMENTS

2011	Hot	Moderate	Cold
CfSH3	29.4%	16.5%	3.4%
Cfsh3 + connected CHP	25.4%	12.4%	-0.7%
CfSH4	28.6%	15.7%	2.7%
Cfsh4 + connected CHP	24.6%	11.7%	-1.4%
CFSH4 + scheme CHP	23.9%	11.0%	-2.0%
CFSH4 + PV and Solar	12.7%	-0.2%	-13.2%
CfSH5	18.9%	7.0%	-5.1%
CfSh5 + connected CHP	15.2%	3.3%	-8.8%
CFSH5 + scheme CHP	14.5%	2.7%	-9.4%
CFSH5 + PV and Solar	4.2%	-7.7%	-19.8%

2013	Hot	Moderate	Cold
CfSH3	32.7%	19.4%	6.0%
Cfsh3 + connected CHP	28.8%	15.5%	2.0%
CfSH4	31.8%	18.6%	5.3%
Cfsh4 + connected CHP	27.9%	14.7%	1.4%
CFSH4 + scheme CHP	27.3%	14.1%	0.7%
CFSH4 + PV and Solar	16.4%	3.3%	-10.1%
CfSH5	21.8%	9.6%	-2.7%
CfSh5 + connected CHP	18.2%	6.0%	-6.3%
CFSH5 + scheme CHP	17.6%	5.5%	-6.9%
CFSH5 + PV and Solar	7.6%	-4.5%	-16.9%

2016	Hot	Moderate	Cold
CfSH3	37.6%	23.9%	10.0%
Cfsh3 + connected CHP	33.9%	20.2%	6.2%
CfSH4	36.7%	23.1%	9.2%
Cfsh4 + connected CHP	33.0%	19.4%	5.5%
CFSH4 + scheme CHP	32.4%	18.8%	4.9%
CFSH4 + PV and Solar	22.0%	8.5%	-5.4%
CfSH5	26.3%	13.7%	0.9%
CfSh5 + connected CHP	22.9%	10.3%	-2.5%
CFSH5 + scheme CHP	22.3%	9.7%	-3.1%
CFSH5 + PV and Solar	12.8%	0.2%	-12.6%

CASE STUDY 4: 50 HOUSES

2011	Hot	Moderate	Cold
CfSH3	38.6%	25.3%	11.1%
Cfsh3 + connected CHP	33.9%	20/6%	6.4%
CfSH4	37.2%	24.1%	10.1%
Cfsh4 + connected CHP	32.6%	19.4%	5.4%
CFSH4 + scheme CHP	31.6%	18.5%	4.5%
CFSH4 + PV and Solar	28.1%	15.0%	0.9%
CfSH5	29.4%	17.0%	3.8%
CfSh5 + connected CHP	25.0%	12.6%	-0.6%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	24.5%	12.1%	-1.1%
CFSH5 + scheme CHP	24.1%	11.8%	-1.5%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	23.6%	11.2%	-2.1%
CFSH5 + PV and Solar	20.8%	8.5%	-4.8%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	20.1%	7.7%	-5,6%

2013	Hot	Moderate	Cold
CfSH3	42.5%	28.9%	14.3%
Cfsh3 + connected CHP	37.9%	24.3%	9.8%
CfSH4	41.1%	27.6%	13.2%
Cfsh4 + connected CHP	36.6%	23.1%	8.7%
CFSH4 + scheme CHP	35.7%	22.2%	7.8%
CFSH4 + PV and Solar	32.3%	18.8%	4.4%
CfSH5	33.0%	20.3%	6.7%
CfSh5 + connected CHP	28.8%	16.1%	2.4%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	28.3%	15.6%	1.9%
CFSH5 + scheme CHP	27.9%	15.2%	1.6%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	27.4%	14.7%	1.0%
CFSH5 + PV and Solar	24.7%	12.0%	-1.6%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	24.0%	11.3%	-2.3%

2016	Hot	Moderate	Cold
CfSH3	48.6%	34.4%	19.2%
Cfsh3 + connected CHP	44.2%	30.1%	14.9%
CfSH4	47.1%	33.1%	18.1%
Cfsh4 + connected CHP	42.8%	28.8%	13.7%
CFSH4 + scheme CHP	41.9%	27.9%	12.9%
CFSH4 + PV and Solar	38.7%	24.7%	9.6%
CfSH5	38.6%	25.4%	11.2%
CfSh5 + connected CHP	34.5%	21.3%	7.1%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	34.0%	20.8%	6.6%
CFSH5 + scheme CHP	33.7%	20.5%	6.3%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	33.2%	20.0%	5.8%
CFSH5 + PV and Solar	30.6%	17.5%	3.2%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	30.0%	18,8%	3.6%

CASE STUDY 5: MIXED RESIDENTIAL, 200 UNITS

2011	Hot	Moderate	Cold
CfSH3	34.4%	21.2%	7.5%
Cfsh3 + connected CHP	30.0%	16.8%	3.1%
CFSH + scheme CHP	29.2%	16.0%	2.3%
CfSH4	33.1%	20.1%	6.5%
Cfsh4 + connected CHP	28.8%	15.7%	2.2%
CFSH4 + scheme CHP	28.0%	14.9%	1.4%
CFSH4 + PV and Solar	20.5%	7.4%	-6.1%
CfSH5	24.1%	11.9%	-0.7%
CfSh5 + connected CHP	20.1%	7.9%	-4.8%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	18.9%	6.7%	-6.0%
CFSH5 + scheme CHP	19.3%	7.2%	-5.5%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	18.0%	5.8%	-6.8%
CFSH5 + PV and Solar	12.3%	0.2%	-12.5%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	11.8%	-0.4%	-13.1%

2013	Hot	Moderate	Cold
CfSH3	37.9%	24.4%	10.4%
Cfsh3 + connected CHP	33.7%	20.2%	6.2%
CFSH + scheme CHP	32.9%	19.4%	5.4%
CfSH4	36.6%	23.3%	9.4%
Cfsh4 + connected CHP	32.4%	19.1%	5.2%
CFSH4 + scheme CHP	31.7%	18.3%	4.4%
CFSH4 + PV and Solar	24.4%	11.0%	-2.9%
CfSH5	27.3%	14.9%	1.9%
CfSh5 + connected CHP	23.4%	11.0%	-2.0%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	22.2%	9.8%	-3.2%
CFSH5 + scheme CHP	22.7%	10.3%	-2.7%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	21.4%	9.0%	-4.0%
CFSH5 + PV and Solar	15.9%	3.5%	-9.5%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	15.4%	3.0%	-10.1%

2016	Hot	Moderate	Cold
CfSH3	43.4%	29.4%	14.8%
Cfsh3 + connected CHP	39.4%	25.4%	10.8%
CFSH + scheme CHP	38.6%	24.6%	10.0%
CfSH4	42.0%	28.2%	13.7%
Cfsh4 + connected CHP	38.0%	24.2%	9.7%
CFSH4 + scheme CHP	37.3%	23.5%	9.0%
CFSH4 + PV and Solar	30.4%	16.5%	2.0%
CfSH5	32.3%	19.4%	5.9%
CfSh5 + connected CHP	28.5%	15.6%	2.2%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	27.4%	14.5%	1.0%
CFSH5 + scheme CHP	27.9%	15.0%	1.5%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	26.6%	13.7%	0.2%
CFSH5 + PV and Solar	21.4%	8.5%	-5.0%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	20.9%	8.0%	-5.5%

CASE STUDY 6: MIXED RESIDENTIAL, 500 UNITS

2011	Hot	Moderate	Cold
CfSH3	37.4%	23.9%	10.0%
Cfsh3 + connected CHP	33.0%	19.5%	5.5%
CFSH + scheme CHP	32.1%	18.7%	4.7%
CfSH4	36.1%	22.8%	8.9%
Cfsh4 + connected CHP	31.7%	18.3%	4.5%
CFSH4 + scheme CHP	30.9%	17.5%	3.7%
CFSH4 + PV and Solar	22.9%	9.6%	-4.3%
CfSH5	26.5%	14.1%	1.2%
CfSh5 + connected CHP	22.4%	10.0%	-2.9%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	21.2%	8.8%	-4.1%
CFSH5 + scheme CHP	21.7%	9.3%	-3.6%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	20.3%	7.9%	-5.0%
CFSH5 + PV and Solar	14.2%	1.9%	-11.1%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	13.7%	1.4%	-11.6%

2013	Hot	Moderate	Cold
CfSH3	40.9%	27.1%	12.8%
Cfsh3 + connected CHP	36.6%	22.8%	8.5%
CFSH + scheme CHP	35.8%	22.0%	7.7%
CfSH4	39.6%	25.9%	11.7%
Cfsh4 + connected CHP	35.3%	21.6%	7.4%
CFSH4 + scheme CHP	34.5%	20.9%	6.6%
CFSH4 + PV and Solar	26.8%	13.1%	-1.1%
CfSH5	29.7%	17.0%	3.8%
CfSh5 + connected CHP	25.7%	13.0%	-0.2%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	24.5%	11.9%	-1.4%
CFSH5 + scheme CHP	25.0%	12.3%	-0.9%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	23.7%	11.0%	-2.2%
CFSH5 + PV and Solar	17.8%	5.1%	-8.1%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	17.3%	4.7%	-8.6%

2016	Hot	Moderate	Cold
CfSH3	42.2%	32.0%	17.1%
Cfsh3 + connected CHP	41.4%	27.9%	13.0%
CFSH + scheme CHP	34.0%	27.1%	12.3%
CfSH4	44.9%	30.7%	16.0%
Cfsh4 + connected CHP	40.8%	26.7%	11.9%
CFSH4 + scheme CHP	40.1%	25.9%	11.2%
CFSH4 + PV and Solar	32.7%	18.6%	3.8%
CfSH5	34.5%	21.4%	7.7%
CfSh5 + connected CHP	30.7%	17.6%	3.9%
CFSH5 + connected CHP + Allowable Solution to Reach Zero Carbon	29.6%	16.5%	2.8%
CFSH5 + scheme CHP	30.1%	16.9%	3.2%
CFSH5 + scheme CHP + Allowable Solution to Reach Zero Carbon	28.8%	15.7%	2.0%
CFSH5 + PV and Solar	23.2%	10.1%	-3.6%
CFSH5 + PV and Solar + Allowable Solution to Reach Zero Carbon	22.8%	9.7%	-4.1%