



# **CARBON COMPLIANCE**

Setting an appropriate limit for zero carbon new homes

## **Technical Feasibility Charts**

# TECHNICAL FEASIBILITY HOUSES

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			12		11		10		9		8	
<b>Detached House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP					1.5		3.4		5.3	
		Gas CHP	4.9		6.8		8.7		10.6	0.6	12.6	2.5
		GSHP	2.1		4.0		5.9		7.9	1.8	9.8	3.8
	<b>Individual options</b>	ASHP + SHW	5.1		7.1		9.0	1.6	10.9	3.6	12.9	5.5
		ASHP	11.6	4.3	13.6	6.3	15.5	8.2	17.4	10.1	19.4	12.1
		Gas + SHW	5.5		7.4		9.3	1.1	11.3	3.0	13.2	5.0
		Gas	10.1	2.0	12.0	3.9	14.0	5.9	15.9	7.8	17.8	9.7
<b>End Terrace House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP					0.6		1.8		3.1	
		Gas CHP	4.5		5.8		7.0		8.3		9.5	1.1
		GSHP	3.7		4.9		6.2	1.1	7.4	2.3	8.7	3.6
	<b>Individual options</b>	ASHP + SHW	6.0		7.2	1.1	8.5	2.3	9.7	3.6	11.0	4.8
		ASHP	11.9	5.8	13.1	7.0	14.4	8.3	15.6	9.5	16.9	10.8
		Gas + SHW	5.9		7.2	0.4	8.4	1.6	9.7	2.9	10.9	4.1
		Gas	10.1	3.5	11.4	4.7	12.6	6.0	13.9	7.2	15.1	8.5
<b>Mid Terrace House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP									0.9	
		Gas CHP	2.3		3.6		4.8		6.1		7.3	
		GSHP	2.1		3.4		4.6	0.1	5.9	1.3	7.1	2.6
	<b>Individual options</b>	ASHP + SHW	4.2		5.4		6.7	1.2	7.9	2.4	9.2	3.7
		ASHP	10.1	4.7	11.3	5.9	12.6	7.2	13.8	8.4	15.1	9.7
		Gas + SHW	4.0		5.2		6.5	0.4	7.7	1.6	9.0	2.9
		Gas	8.2	2.3	9.4	3.5	10.7	4.8	11.9	6.0	13.2	7.3
<b>Fabric specification *</b>			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area <sup>†</sup>	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
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\* FEES = Minimum Fabric Energy Efficiency Standard for 2016; Spec C = Example higher fabric specification

<sup>†</sup> SE/SW facing, 45 deg pitch, none/ v. little overshadowing

# TECHNICAL FEASIBILITY LOW-RISE APARTMENT BLOCKS

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			14		13		12		11		10	
<b>3-Storey Apartment Block</b>	<b>Shared/Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP			2		23		44		66	
		GSHP	3		24		46		67		89	18
	<b>Individual options</b>	ASHP + SHW	59		80		102	17	123	39	144	60
		ASHP	170	83	191	105	213	126	234	148	256	169
		Gas + SHW	47		68		90		111	18	133	40
		Gas	126	30	148	52	169	73	191	94	212	116
<b>4-Storey Apartment Block</b>	<b>Shared/Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP					17		46		74	
		GSHP			24		52		81		109	18
	<b>Individual options</b>	ASHP + SHW	68		96		125	17	154	45	182	74
		ASHP	219	105	247	134	276	162	304	191	333	219
		Gas + SHW	51		80		109		137	18	166	47
		Gas	157	33	186	61	215	90	243	119	272	147
<b>Fabric specification *</b>			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area <sup>†</sup>	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
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# TECHNICAL FEASIBILITY HIGH-RISE APARTMENT BLOCKS

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			14		13		12		11		10	
<b>8-Storey Apartment Block</b>	<b>Shared/ Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP							51		109	
		GSHP			20		78		135		192	20
	<b>Individual options</b>	ASHP	414	192	471	249	528	306	586	364	643	421
		Gas	281	44	338	101	395	158	453	215	510	273
<b>20-Storey Apartment Block</b>	<b>Shared/ Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP							68		211	
		GSHP			11		154		297		440	25
	<b>Individual options</b>	ASHP	999	453	1143	596	1286	739	1429	882	1572	1026
		Gas	652	76	795	220	938	363	1081	506	1224	649
<b>Fabric specification *</b>			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area <sup>†</sup>	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
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<sup>†</sup> SE/SW facing, 45 deg pitch, none/ v. little overshadowing